

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

Facilities Manager

Volume 7 Number 3

Summer 1991

APPA's 78th Annual Meeting

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Facilities Manager

Volume 7
Number 3

Summer 1991

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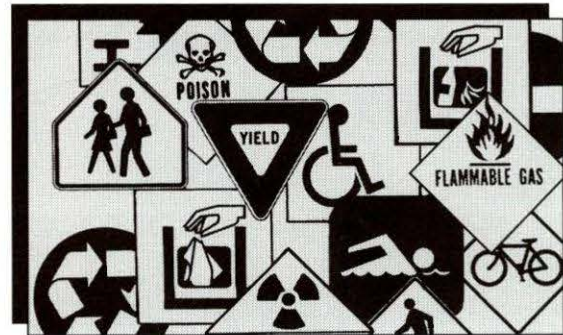
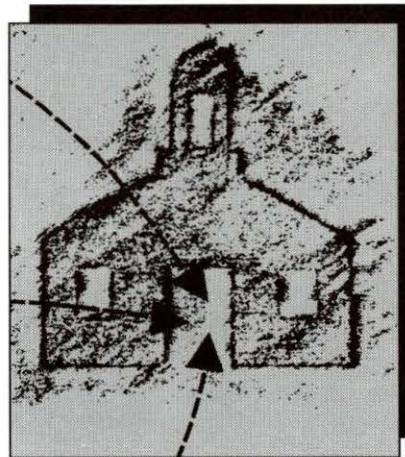
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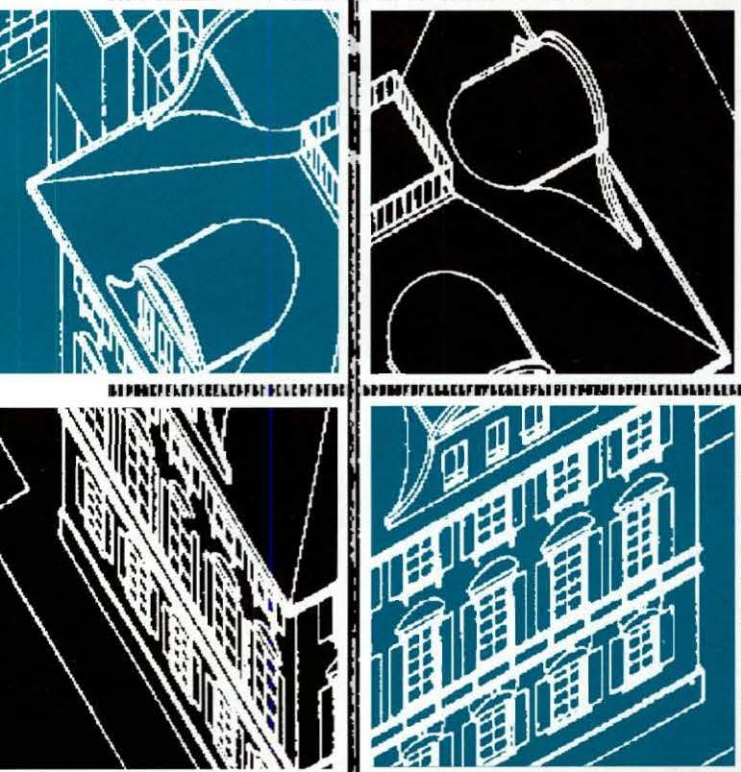
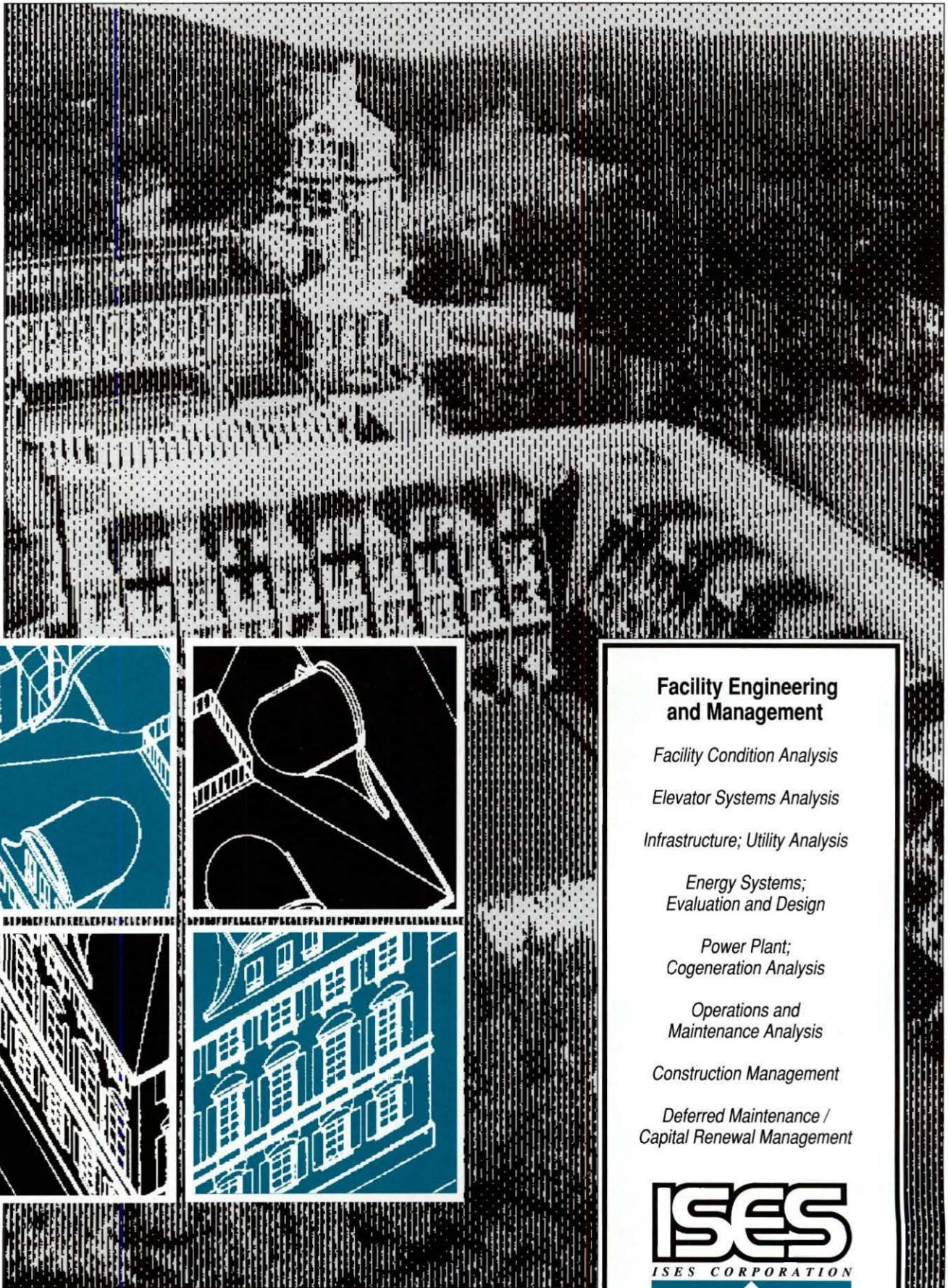
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Editor's Note

With this issue of *Facilities Manager*, we proudly introduce two new columns to our readers. One offers the latest information on APPA's efforts in the government relations arena, while the other brings APPA's international network a bit closer together.

Capital Notes is researched and written by Donna Wiesner, APPA's recently-hired director of government relations. Donna will report to members on the latest legislation and regulations that may affect higher education facilities resources. This will run the gamut from the availability of reconstruction funds through Title VII and the effects of the Americans With Disabilities Act, to the Reauthorization of the Higher Education Act and the latest regulations involving hazardous materials handling.

Capital Notes is scheduled to ap-

pear in each issue of *Facilities Manager*, as well as monthly in *APPA Newsletter*. If you have specific questions or concerns relating to APPA's government relations activity, please contact Donna Wiesner at the APPA office.

The second column making its debut is *Global Exchange*, a quarterly profile of one of APPA's international member institutions. Each column will

be written by the member representative from a different university or college from around the world. Our hope is that the sharing of problems and solutions from our many and varied members will emphasize the common facilities management concerns within higher education.

The inaugural column will focus on La Trobe University in Australia and is written by Denis Stephenson, its manager of buildings and grounds. Future profiles in *Global Exchange* will feature institutions from Hong Kong, Israel, New Zealand, Thailand, and other countries.

We hope the readers enjoy these new columns and find them informative. As always, if you have questions or comments about these columns or anything else in *Facilities Manager*, please send your letters to the editor. We welcome your responses. ■

Banks and Harris Win Rex Dillow Award

Paul Banks, research scholar, and Carolyn Harris, director of conservation education programs, both of the school of library service at Columbia University (NY), are the recipients of the fifth annual Rex Dillow Award for Outstanding Article in *Facilities Manager*. The award will be given at the 78th Annual Meeting in Orlando, Florida.

Banks and Harris cowrote "The Library Environment and the Preservation of Library Materials," which appeared in the fall 1990 issue of *Facilities Manager*. The article was selected by APPA's Professional Affairs Committee from among six eligible articles. Only articles written by staff members at APPA-member institutions are eligible for the award.

"The Library Environment" addresses the conservation and preservation of library materials. The article has been reprinted as the introduction to APPA's recent monograph *Preservation of Library and Archival Materials*.

The Rex Dillow Award was named for member emeritus Rex O. Dillow,

APPA News



Carolyn Harris

Paul Banks

who has made valuable contributions to APPA publications. Dillow was editor-in-chief of APPA's two editions of *Facilities Management: A Manual for Plant Administration*. He was also newsletter editor for APPA's Central region for many years, and he received APPA's Meritorious Service Award in 1983 and the President's Award in 1989.

New NACUBO Facilities Book Available

The National Association of College and University Business Officers (NACUBO) recently published *Managing the Facilities Portfolio: A Practical Approach to Institutional Facility Renewal and Deferred Maintenance*. The publication presents models of portfolio management by discussing the various approaches for estimating deferred maintenance investments needs on a short-range basis and for estimating facility component renewal needs over longer periods. Other areas covered are reduction of CRDM backlogs, facility inspections, critical management indicators, reporting tools and techniques, capital planning and budgeting, and more. This publication was a joint effort with Applied Management Engineering and Coopers & Lybrand. The book costs \$25 for NACUBO members and \$37 for nonmembers. For more information, contact NACUBO Publications, One Dupont Circle, Suite 500, Washington, DC 20036-1178; 202/861-2562.

Fayetteville State, UC/Berkeley Win 1991 Award for Excellence

Fayetteville State University and the University of California/Berkeley were selected as the international winners of the 1991 Award for Excellence in Facilities Management. This award is the highest institutional honor given by APPA.

Fayetteville State University, located in Fayetteville, North Carolina, won the fourth annual Award for Excellence in the small campus category (under 5,000 FTE student enrollment). The University of California/Berkeley won in the large campus category (5,000 and above FTE student enrollment). The chancellors of the two institutions were invited to accept the engraved crystal obelisk at the July 23 Awards Banquet at APPA's 78th Annual Meeting in Orlando, Florida.

The winners of the regional Awards for Excellence in the small campus category are Southeastern, **Fayetteville State University**; Central, **University of Tulsa (OK)**; and Rocky Mountain, **South Mountain Community College (AZ)**.

The regional award winners in the large campus category are Eastern, **Mohawk College of Applied Arts and Technology** (Ontario, Canada); Southeastern, **Virginia Polytechnic Institute and State University**; Central, **University of North Dakota**; Rocky Mountain, **Northern Arizona University**; and Pacific Coast, **University of California/Berkeley**.

The Award for Excellence was developed to increase the recognition of outstanding achievement in facilities management on college and university campuses. The award provides an equal opportunity for regional, national, and international recognition of



Fayetteville State University

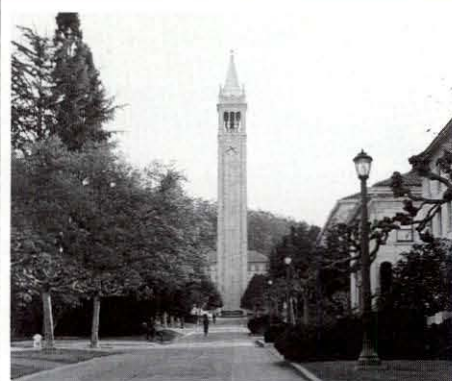
physical plant departments, not just of a single individual or specific unit.

APPA's Professional Affairs Committee made the selections based upon the following criteria: purpose and goals; organization and resources; policies, procedures, and processes; personnel training and development; fiscal planning and management; campus condition and appearance; communications and quality of relationships; campus planning; and other considerations. To ensure objectivity, each member of the committee was responsible for rating one criterion throughout all the applications. The separate ratings were tallied after all applications were reviewed.

The international awards were selected from the regional winners chosen by the APPA regions in each of the two categories. The six APPA regions were responsible for selecting the regional award winners, which were chosen based upon a written self-evaluation. All colleges and universities that are members of APPA are eligible to participate.

Changes Made in Award Program

The Professional Affairs Committee has revised the Award for Excellence program to encompass two separate awards that no longer feature competition among institutions. Both awards fall within the general heading of



University of California/Berkeley

Awards for Excellence in Facilities Management.

The primary award, which continues to be the highest institutional honor granted by APPA, has been redesigned to place the applying institution in competition not with other institutions, but with the criteria established by the Professional Affairs Committee. The institution will submit a detailed self-evaluation based upon the eight topic areas listed above and accompany it with supporting documentation.

Submittals may be made directly to APPA at any time throughout the year; they will be reviewed by the Professional Affairs Committee at its next scheduled meeting. If the committee is satisfied that the submittals have met the published criteria, an on-site visit by a selected APPA member will then be scheduled for final verification and endorsement. If an institution has successfully met or surpassed all eight criteria, it will be presented the Award for Excellence in Facilities Management. The award will be valid for a period of five years.

The number of awards presented each year depends upon the number of successful submittals received. There may be no award winners in any one year, or there may be several.

A variation of the primary award was developed by the committee and

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Of APPA's annual membership dues, \$30 pays for the subscription to *Facilities Manager* and *APPA Newsletter*. Additional annual subscriptions for both periodicals cost \$40 (\$50 for non U.S. addresses). For information on rates and deadlines for display and classified advertising, telephone 703/684-1446.

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is also considered an Award for Excellence in Facilities Management. An institution may know that it must improve in one or more of the topic areas before feeling comfortable in applying for the primary award; such improvements may take months or years to implement and quantify.

Thus, an institution may submit a self-evaluation and supporting documentation in only one of the eight topic areas. Again, the institution is competing only against the criteria, but this time in a specific area in which it feels particularly confident. The format for the module applications is the same as with the primary award.

Additional details on the new awards program will be published in the next issue of *Facilities Manager*. For more information, contact the APPA office or your regional representative to the Professional Affairs Committee.

Title VII Update

Joe Ferguson, chief of the program branch of the Division of Higher Education Incentive Programs at the U.S. Department of Education, has just compiled the figures for this year's applications to Title VII, Construction, Reconstruction, and Renovation of Academic Facilities. The 149 applications request \$289,328,000 in funds, but the budget calls for \$29,277,000 in new loans. Therefore, about 10 percent of the applications will be funded. Announcements will be made by the end of September.

Every presidential budget since 1978 has recommended that there be no funding for Title VII. Although funding has declined, Congress has appropriated money each year. However, two developments may change this scenario: 1) the cap on domestic spending that will make domestic programs compete against each other, and 2) the death of Massachusetts Representative Silvio Conte, Title VII's staunchest supporter. If Title VII survives the Higher Education Act Reauthorization without major changes to its regulations, applications for next year's funding will be due mid-April 1992. If this complicated act (seven categories with different rules in each section and subsection) is streamlined or changed, the deadline may be delayed.

FM Lab Proposed

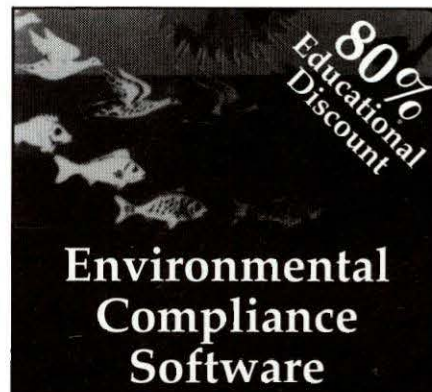
George Mason University (VA) has a unique program in the planning stage that would enable its facilities planning and construction employees and graduate students to work together in solving the university's infrastructure problems, according to the spring issue of *SRAPPA News*. A facilities management "living laboratory" may be part of a proposed master's degree in urban systems engineering. The degree, according to Terry Ryan, urban systems engineering at the university, is designed for students with a few years of "muddy boots" engineering experience who want to move into a management role. Infrastructure of facilities has become more difficult to maintain and operate, and funding of operations and maintenance responsibilities and training for managers has dwindled, said Ryan. The program would help the students deal with such problems.

The graduate students could participate in the living laboratory and gain hands-on experience in planning, construction, operations, and maintenance. Students could work with CADD systems, drawing and document retrieval, updating and archiving, geographic information systems, and operations maintenance work control, scheduling, inventory, and more. The program was introduced last May.

Labor Innovations Sought by DOL

The Department of Labor's second annual LIFT (Labor Investing for Tomorrow) program recognizes innovative and successful programs that have improved the quality of the American work force. The four categories are business-school partnerships, school-to-work programs, employee training programs, and employee work life programs.

Although the deadline for this year's nominations was May 31, we recommend that you obtain the application information and begin thinking about the innovative programs your institution has and how you can be recognized on the 1992 LIFT Award Honor Role. To receive the self-nomination guidelines, call the Office of the Assistant Secretary for Policy at 202/523-6026. Award recipients for 1991 will be announced sometime this fall.



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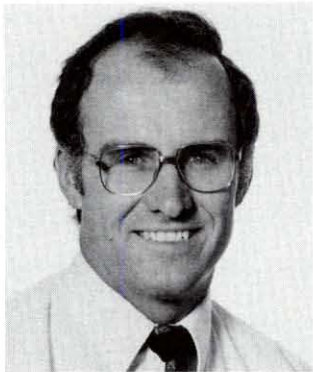
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Ray Morley

Morley Receives New Pawsey Scholarship

Ray Morley, assistant manager, facilities division at Griffith University, Queensland, Australia, has been awarded the inaugural Maurie Pawsey Scholarship by the Australasian Section of APPA.

The Maurie Pawsey Scholarship honors the Australasian Section's foundation president who worked for many years to establish the section. Until recently, Pawsey was deputy vice-principal (property) at the University of Melbourne and was preeminent in the field of facilities management in higher education in Australia.

The Maurie Pawsey Scholarship is valued at US \$2,000 and will assist Morley's travel to and attendance at the August APPA Institute for Facilities Management in New Orleans, Louisiana.

Morley will also attend the APPA annual meeting in Orlando, Florida. On his visit to the States, he will visit a number of institutions on the East and West coasts, many of which have won the APPA Award for Excellence.

In his submission for the scholarship, Morley expressed an interest in examining the social and environmental consequences of physical planning and development on university campuses and in particular, the integration of physical and academic planning.

Morley wishes to examine the communications and public relations activities of facilities divisions or departments when dealing with difficult issues such as providing the required physical facilities for new activities while coping with diminishing resources, space allocation, maintenance backlog, and parking.

Morley has been involved in tertiary education administration in Aus-

tralia for more than twenty-four years. However, he is a relative newcomer to the field of facilities management, having worked as an administrator in the area from 1984 to 1989 and as assistant manager of the facilities division at Griffith University since December 1990. His qualifications include a bachelor of business in communications degree, majoring in public relations and journalism, and a master's degree in administration in which he undertook research into the factors that lead students toward choosing to enroll in a particular college or university.

Information Exchange

The **University of Manitoba** requests information on clay foundations and moisture problems. The university's campus is built on clay and it is experiencing problems with severe shrinkage under floor slabs on grade due to years of dry weather. Floors have dropped as much as eight inches. In one building they are installing a watering system to experiment with offsetting the drying out. Have any other institutions experimented with adding moisture over long periods? If anyone has information on this topic, please contact Robert McDowall, University of Manitoba, Physical Plant, 89 Freedman Crescent, Winnipeg, Manitoba, R3T 2N2; 204/474-6289, fax 204/275-2082.

ISU Receives Solid Waste Grant

The Office of Residential Life at Illinois State University/Normal was the recipient of a \$50,000-grant from the Illinois Department of Energy and Natural Resources. The grant funds will be used to purchase a truck and a baler for the solid waste management program for the residence halls, apartment complexes, and food service areas. The Coca-Cola Company also awarded the school \$30,000 worth of collection barrels and promotional materials.

The Illinois Department of Natural Resources and the Office of Residential Life hope to make students more aware of the cyclical nature of recycling by stressing the purchase of products made from recycled materials such as aluminum desk chairs and pa-

per products. Directors of the recycling effort for residential life are David Cain, superintendent of buildings maintenance, and Janice Freehill, director of special projects.

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

The Environment

EPA is planning to revise its definition of **hazardous waste** under RCRA, according to the May 3 *BNA Environmental Reporter*. EPA will make a clearer distinction between hazardous and solid waste, and clarify rules on recycling hazardous waste.

Watch for a rule on the **management of used oil** later this summer. A federal appeals court remanded the regulation of recycled oil to EPA in 1988, and a rule may be proposed in August.

On April 29, EPA established the first scientific criteria for restricting use of certain categories of pesticides that could contaminate groundwater. EPA said it would screen pesticides and could classify them under restricted-use if they have any ingredients that are "persistent and mobile," thus making them more likely to leach into the soil and groundwater.

Once labeled restricted-use, the pesticide can only be purchased and used by certified applicators or individuals supervised by them.

There is an alternative proposal that would require pesticides to meet more criteria before being labeled as restricted-use. These standards could include data showing that an ingredient leaches and if the pesticide has been detected in groundwater in three counties in the United States at levels greater than 10 percent of the maximum contaminant level under the Safe Drinking Water Act. The pesticide could fall under restricted-use if it has been detected at any level twenty-five times more in four states. The notice was published in the May 13 *Federal Register* (56 FR 22076).

The National Fire Protection Association has recently released its *Fire Protection Guide to Hazardous Materials*. This sourcebook includes facts about hazardous materials emergencies, storage, handling, labeling, and training, plus all four NFPA documents that classify most common hazardous materials. This 477-page book costs \$69.50, \$62.50 for NFPA members. For more information, contact the National Fire Protection Association, P.O. Box 9146, Quincy, MA 02269-9959; 800/344-3555.

On May 7, the EPA issued a new standard for **lead in drinking water** that

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

Stephanie Gretchen

is ten times more stringent than existing standards. The current standard for lead in drinking water is fifty parts per billion anywhere in the water distribution system. The new standard is five parts per billion monitored at the tap, where the highest concentrations of lead are found, according to EPA. Monitoring requirements will go into effect next year, and by 1993, large water systems will have to begin developing corrosion-control programs. Smaller systems will have until 1994 to begin such programs. For more information, contact the Safe Drinking Water hotline, 800/426-4791.

The University of California/Berkeley's Programs in Environmental Hazard Management (PEHM) is offering **certificate programs in hazardous materials management** through the summer. The courses offer an introduction to the foundations, principles, regulations, and technologies of this field. For more information, contact Programs in Environmental Hazard Management, UC Berkeley Extension, 2223 Fulton Street, Berkeley, CA 94720; 415/643-7143, fax 415/643-8683.

BNA is offering *European Environmental Yearbook 1991*, which describes and documents the **environmental policies**, laws, and regulations of the twelve member states of the European Economic Community. The book contains information on agriculture and the environment, energy and nuclear safety, environmental education, toxic and hazardous substances, water supply, and much more. For more information, contact BNA Books Distribution Center, 300 Raritan Center Parkway, P.O. Box 7816, Edison, NJ 08818-7816; 201/225-1900, fax 201/417-0482.

The University of Massachusetts/Amherst, the University of Vermont, and Clean Harbors, Inc. are holding the Ninth Annual College and University Hazardous Waste Conference, August 4-6, in Amherst, Massachu-

setts. The conference starts with the basics of **academic hazardous waste management**, and continues to cover waste minimization and recycling strategies for colleges and universities, toxic waste reduction and other hazardous materials management issues, innovative treatment technologies, and approaches to compliance with the EPA land ban, TCLP rule, and other new regulations. For more information, contact James Fox, University of Massachusetts, Division of Environmental Health and Safety, N-414 Morrill Science, Amherst, MA 01003.

Noyes Publications has published a number of **environmental engineering books**, including *OSHA Regulated Hazardous Substances*, *Hazardous Waste Management Facilities Directory*, *Hazardous Chemicals Data Book*, *Accidental Releases of Air Toxics*, and *Contaminations of Ground Water*. For more information, contact Noyes Data Corporation, Mill Road at Grand Avenue, Park Ridge, NJ 07656; 201/391-8484.

The Clean Air Act Amendments is BNA's recently published comprehensive analysis of the new law. The book is 450 pages and is available for \$95. The publication includes information on air toxics, acid rain, new permits/new source reviews, urban air, mobile sources, enforcement, and ozone. For more information, contact the Bureau of National Affairs, Inc., Circulation Department, P.O. Box 40947, Washington, DC 20077-4928; 800/372-1033.

The Asbestos Information Association of North America (AIA/NA) has recently published its fourth edition of *U.S. Federal Asbestos Regulations—1991*. This book includes recent developments and revisions by OSHA, EPA, and the Department of Transportation; complete regulatory text; and overviews before each section. This publication is available for \$125, plus \$6 for shipping and handling. For more information, contact AIA/NA; 1745 Jefferson Davis Highway, Suite 509, Arlington, VA 22202; 703/979-1150.

Indoor Air Review is a monthly newspaper that covers all the indoor air issues: indoor air quality, asbestos, and radon. A one-year subscription costs \$42. For more information, contact IAQ Publication Inc., 5335 Wisconsin Avenue, N.W., Suite 440, Washington, DC 20015. ■

REVIEWING THE CURRENT LEGISLATIVE PROGRAMS

As I talk to other government relations directors, they confirm the suspicion that an association's real challenge is to organize priorities and to target its resources for maximum impact. As APPA begins to participate more fully in environmental and regulatory legislation and rule making, we will be able to chart a course for more effective compliance.

I am looking forward to meeting you at the annual meeting and learning more about where the federal government affects you the most. In addition to APPA's Long-Range Plan, your insights will be essential to the success of the government relations program.

Of the three branches of government—legislative, executive, and judicial—the legislative branch is of the most concern right now. APPA's major thrust is on the appropriations process. Appropriations committees in the House and the Senate are scrutinizing the President's budget and the needs of each and every federal program. The overall search is primarily focused on places to cut.

Rather than submit to automatic cuts last year under Gramm-Rudman-Hollings, the government ran on emergency extensions. The haggling did not make Washington look very efficient, but expect a midnight-oil package this year too—both parties are looking for campaign issues for 1992. The typical scenario would include last-minute, unexpected changes during compromises. For facilities dollars, three current domestic programs need watching.

1. *The U.S. Department of Education Higher Education Act Title VII Construction, Reconstruction, and Renovation of Academic Facilities.*

President Bush's budget requested no funding for Title VII, as has every budget since the Carter Administration. No grant funding has been provided since 1986. (*ed note:* For more

Donna Wiesner is APPA's director of government relations. She was hired by APPA April 1 to track legislation and regulations of concern to APPA members and to coordinate APPA's governmental relations activities with the higher education community. She previously worked for the U.S. Department of Education.

Capital Notes

Donna Wiesner



information on Title VII see APPA News.) Secretary of Education Lamar Alexander wrote the position in his April 30 letter to the President of the Senate Dan Quayle this way:

"The Administration is proposing the repeal of all Title VII authorities except those required to administer and manage existing portfolios and to continue the operation of the College Construction Loan Insurance Association.

"The Administration believes that the current statutory authorities (1) do not reflect an appropriate Federal role, (2) displace the traditional and more appropriate State, local, institutional, and private sector responsibility for funding postsecondary capital projects, (3) are unnecessarily complicated, duplicative, and administratively cumbersome, and (4) are costly and involve excessive subsidies.

"The Administration does not believe that it is appropriate for the Federal Government to assume responsibility for financing the capital outlay needed to maintain the physical plant of institutions of higher education—especially in a period of fiscal restraint and therefore statutory authority is unnecessary. Responsibility for this type of fundamental institutional support lies with colleges and universities themselves, State and local governments, taxpayers at those levels, and private sector users and beneficiaries of higher education services. An amount of \$3,598,000 would be authorized to be appropriated for fiscal year 1992, and 'such sums as neces-

sary' would be authorized for fiscal years 1993-1996."

2. *The National Science Foundation (NSF) Academic Research Facilities Modernization Program.*

The President's budget did not fund this \$25 million program. Eighteen Senators have written Senator Barbara Mikulski (D-MD) regarding funding. NSF has just closed its office for this program and moved the staff into the Science and Technology Infrastructure Office in anticipation of no further funding. Dr. William C. Harris, the assistant to the director, said this move would help the agency see science research as an integrated situation rather than in a piecemeal, program-by-program manner. Harris felt his task would be to integrate the solutions with the needs, look at ownership of results, and look at partnerships and matching funds for higher education's needs. I offered our members as programs for partnerships and matching funds resources. The 1990-91 cycle received 425 applicants for Phase I. The 176 successful applicants competed in Phase II, resulting in seventy-eight funded applications.

3. *The U.S. Department of Agriculture (USDA) Competitive Research Facilities Initiative.*

This new \$25-million program would be funded with new funds; that is, separately from the land-grant and Historically Black Colleges and Universities funds at USDA. The program grew out of a panel appointed jointly by the Assistant Secretary for Science and Education and the President of the National Association of State Universities and Land-Grant Colleges. The panel concluded that a coordinated federal-state investment in high-priority research facilities is critical to the future health of the agricultural research enterprise. The National Research Initiative is calling upon these universities for increased effort on national research issues important to agriculture, food, and the environment. I am told that there is about a 50 percent chance that this new competitive initiative will be funded. When I asked the White House Office of Management and Budget why this new initiative would be funded and the other two programs dropped, they said they were unaware of the discrepancy in policy.

One of the more promising developments this year is the "Homefront

Budget Initiative" of Representative William D. Ford (D-MI), which would raise the spending ceiling for pre-school, elementary/secondary, and postsecondary programs by \$4.4 billion. However, the House Appropriations Committee is poised to undo the Congressional Budget Committee's priority for education, health, and childrens' programs. Budget increases intended for the departments of Labor, Health and Human Services, and Education are being distributed to other appropriation subcommittees.

Speaker of the House Thomas Foley (D-WA), House Majority Leader Richard Gephardt (D-MO), House Majority Whip William Gray (D-PA), and House Democratic Caucus Chair Steny Hoyer (D-MD) are the key players on this decision. If you would like an update on this activity, please call me. The House hearing is set for July 25.

The Reauthorization of the Higher Education Act (HEA) is another matter of concern. Knowledgeable estimates of the timeline for reauthorization differ, from this fall to next spring. The issue of indirect costs is expected to affect changes to HEA.

The American Council on Education (ACE), with eleven higher education

associations, sent an April 8 letter to Chairman of the Committee on Education and Labor William Ford (D-MI) regarding changes to HEA. The letter included specific Title VII changes, including a recommendation to combine Parts C (Loans for Academic Facilities) and F (Loans for Housing and Other Facilities).

Other proposed changes included modifying the undergraduate facilities program to provide a peer review process similar to that in the graduate facilities loan program and reducing from ten to five years the period an institution must wait before receiving a loan. APPA members can probably universally agree with Secretary of Education Alexander that "current statutory authorities . . . are unnecessarily complicated, duplicative, and administratively cumbersome." If you have specific experience with Title VII, members of Congress are interested to know how they can make this a better bill, so please let me know your recommendations. I can provide you with the suggestions that went to the Hill.

Representative William Clay (D-MO) has introduced HR 1503, a bill to help Historically Black Colleges and Universities finance capitalization projects. The bill is in the Education

Subcommittee now, with fifteen signatures.

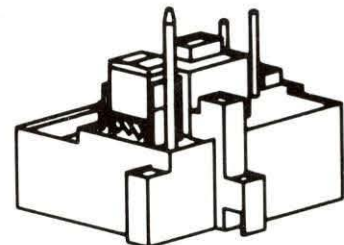
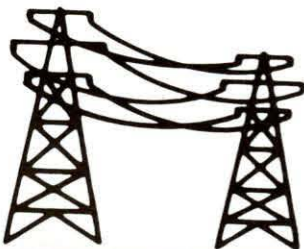
Finally, in May, Representative Frank Guarini (D-NJ) of the House Ways and Means Committee has introduced legislation that would help private institutions finance environmental infrastructure projects. The 1986 tax legislation put a \$150 million cap on private tax exempt bonds (or \$50 per capita, whichever is greater). If a private school wants to build a recycling center now, for example, it must compete with all other projects to fit under the cap for tax exempt bonds. Under this legislation there would be no cap.

Guarini's legislation would permit environmental bond issues to be advance refunded; would exempt interest paid on these bonds from the corporate and individual alternative minimum tax (AMT); and would allow a two-year spend-down exemption from arbitrage rebate requirements. This gives the bond recipient up to two years to spend the money from tax exempt bonds, including investing the money before it is paid out. Since the bill would not be revenue neutral (tax exempt bonds "cost" the government), cuts would have to be found somewhere else in the budget. ■



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APPA EDUCATIONAL CALENDAR

APPA offers educational/training programs throughout the year. There are many types of training programs. A brief explanation of the training programs and calendar for 1991-92 follows.

Executive Training Programs—Designed for senior facilities administrators, these programs focus on developing skills needed to play an effective role in the leadership of higher education institutions. Subjects covered include, management skills, budgeting, long-range planning, and institutional policy-making. Programs offered—Executive Development Institute and Institute for Facilities Finance.

Annual Meeting—This meeting features educational sessions, exhibits and social activities directed toward middle- and upper-level facilities managers. Highlights include the Keynote Speakers and the Critical Issues in Higher Education series.

Institute for Facilities Management—A week-long training program designed to benefit all levels of management. The Institute offers three successive and parallel program tracks that provide a comprehensive education in physical plant management and operations. In addition, the Institute features special programs which concentrate on specific subject areas. The program is offered every January and August.

Seminars—Short educational programs which focus on a single subject. There are 4-8 seminars per year. Topics may focus on current issues like the American Disabilities Act or general training information like Custodial Staffing and Guidelines.

AUGUST 18-23

APPA's Institute for Facilities Management

New Orleans, Louisiana

Features the three-track regular Institute program plus two special programs—Maintenance Management and Information Management.

SEPTEMBER 16-17

Facilities Compliance Seminar—Understanding the American Disabilities Act

Washington, DC

Focuses on requirements for compliance with the ADA act, including employment regulations and facilities accessibility standards.

OCTOBER 21-22 (TENTATIVE)

Facilities Audit Workshop

Indianapolis, Indiana

Program examines methods for performing a facilities audit and case study examples.

NOVEMBER 17-19

Institute for Facilities Finance in Higher Education

Washington, DC

Executive program on finance, budgeting, accounting principles, funding sources and other areas of capital asset management.

DECEMBER 5-6 (TENTATIVE)

Environmental Issues

Washington, DC

Focus on current and pending legislation and other issues in environmental management and compliance.



JANUARY 19-24, 1992

Institute for Facilities Management

San Antonio, Texas

Features the three-track regular program plus two special programs: Energy & Utilities Management and Facilities Management for Housing Officers.

Focus on Management

INTERNAL AND EXTERNAL FACTORS IN STRATEGIC PLANNING

Strategic planning is of increasing importance to colleges and universities. The chief financial and business affairs officers will be intimately involved in such planning; in turn, the director of facilities will also play an important role. In developing his or her contribution to the plan, the facilities director needs to have an understanding of the internal and external environmental factors that will influence an educational institution's strategic planning. These factors will have a major impact on the process, the plan that finally emerges, the people within the organization who will shape the process, and the results that will be obtained.

Fundamental to successful strategic planning is the need for the organization and its executives at all levels to assess where it is, how it got there, where it wants to be in the short- and long- term, and how to get there. In reaching an understanding of the here and now as well as the there and then, there should be a full analysis of the various internal and external factors that influence planning, decision making, action, and results.

Internal Organizational Factors Involved in Strategic Planning

- The organization's history, tradition, prior decisions, commitments, and relationships.
- The capabilities of present staff—their age, experience, morale, motivation, aspirations, skills, concerns, weaknesses, strengths, growth potential, productivity, and accomplishments.
- The ability to recruit staff to fill the gaps in present staff, to meet present and future needs.
- For the present and future—managerial and operating style, the reward and motivational structure, system and style, how the organization deals with individual, unit, division, and institutional success and failure.
- How the organization responds to

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Sigmund G. Ginsburg

dangers, risks, and opportunities, and how it might do so in the future.

- The manner and pace at which it is able to plan, assess, decide, implement, monitor, evaluate, and change course.
- The mood, momentum, and psychology of the institution, both now and in the future.
- The size and quality of the applicant pool and of the enrolled student body.
- Cost of meeting current and future facilities needs: new buildings, refurbishments, deferred maintenance, annual capital improvements.
- Quality of the faculty and staff—susceptibility to being "raided," retirement likelihood.
- The adequacy of technology within physical plant and capacity for present and future needs. The ability to expand, repair, replace, and substitute new technology.
- The scope, depth, quality, quantity, reputation, and cost effectiveness of the college or university's academic and non-academic programs and services.
- The ability to implement new programs, services, and facilities, or improve existing ones.
- The admissions, marketing, and public relations capabilities of the institution and the impact on attracting students, faculty, financial support, community esteem, alumni support.
- The college or university's various assets: financial, human, and physical.
- The past and projected performance patterns in terms of balanced budget, endowment growth and returns, asset preservation, enrollment, retention, and various types of ratio analyses—the bottom line.

External Factors Involved in Strategic Planning

- Reputation of the higher education industry.
- Reputation of the institution

within higher education and among students, principals, counselors, teachers, alumni, parents, general public, business, government, foundations within the community, geographic area, state, nation, and in foreign countries.

- Susceptibility to changes in the economy of the higher education industry and the economy of the community, region, state, nation, and of students and their families.
 - Impact of competition from other colleges, universities, and other means of providing education.
 - The impact of past, present, and probable governmental regulations, laws, and administrative actions and interpretations.
 - Availability of governmental, foundation, corporate, and individual financial support and financial aid.
 - Availability of qualified students and faculty (demographics, ability to pay/ability to provide financial aid to students, compensation and various benefits available to faculty).
 - Demographic trends of college age students and of the faculty and employee pool—locally, regionally, nationally, and the impact upon diversity in the student body and among the employees.
 - The impact of present and future technology on the institution, the industry, and on changing student-faculty preferences.
 - The impact of psychological factors—the definition of the good life by those in the organization at all levels, in the higher education industry, community, region, and nation—and individuals' expectations, fears, aspirations, pessimism, optimism about the present and future and about the organization, industry, economy, region, country, world.
- The past and present and views about the future do not necessarily pre-ordain or predict the future, but they can be helpful guides or benchmarks. There will, of course, be events for the organization, industry, and the nation that are difficult to predict, whether major economic or political upheavals, natural disasters, technological breakthroughs, or competitive factors. Nevertheless, one needs a detailed assessment of the internal and external factors cited above as the foundation for developing a sound strategic planning system. ■

One of the greatest challenges facing the facilities manager is that of managing the work force. Few, if any, areas of the job have grown more complex in recent years than that of balancing the needs of the organization with the needs of its employees. The purpose of this article is to address the especially difficult and sensitive area of job descriptions. More specifically, this article will define the job description and discuss its importance to any organization.

The workplace of the 1990s and the century to follow will be vastly different from what many managers are accustomed to, because workers' needs and expectations have changed so much. Therefore, this article will discuss the use of job descriptions to respond to the modern worker and the changing workplace in which he or

ENERGY ENGINEER

she must function. From there, job descriptions that are especially beneficial to the facilities manager will be discussed as well as using the job description to aid in establishing appropriate pay for all jobs and responding to the changing needs of the work force. Finally, we will address the job description's role in dealing with special issues such as layoffs, comparable worth, and employee claims of discrimination.

What a Job Description Is and Is Not

A job description is considerably more than a list of what an individual does during a work day. The job description is a written document designed to inform the reader about the duties, responsibilities, and expectations attached to a particular position within an organization. Although it should be reasonably specific, no job

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JOB DESCRIPTIONS: An Essential Management Tool

by John D. Rulfs
and Sherry L. Rulfs

description should be expected to specify every task that might conceivably be expected of the employee. The job description should delineate the environment or context in which the job is to be performed by describing that job's relationship to others in the organization from both an administrative and operational standpoint. The employee must know to whom he or she reports as well as how the job itself relates to other jobs in the organization.

It Sets the Standard

The job description should set a standard and define expectations for on-the-job behavior. The job description is more than a list of what an existing employee has been doing. For this reason those writing job descriptions must approach the task from the point of view of describing the job itself rather than what a particular individual does in filling that job.

intended to be a statement of expected levels of performance. Nor is it intended to describe how an employee is to perform a particular job. Although the job description states the elements of the job, it is not intended to be a statement of rules and policies. Such statements belong in separate documents but should, of course, be available to all employees.

Other important items that belong in separate documents include state-

PROJECT MANAGER

ments of objectives, incentive and disincentive structures, work schedules, or rationales for the job (Grant, 1989). For the purpose of this article, a job description will be operationally defined as a document designed to provide a written description of the requirements of a given job. The job description works in harmony with all

ASSISTANT DIRECTOR OF PLANT MANAGEMENT

It Complements Other Documents

The job description may form the basis for instruments used to evaluate employee performance, but it is not

the items listed above, and at the same time it stands alone as an excellent source of direction for both employee and employer.

The Importance of Job Descriptions

Any organization benefits from having carefully conceived job descriptions; however, they are of particular importance to large organizations. Two unexpected advantages to having good job descriptions are that they provide an excellent basis for the evaluation of employees and for upgrading and/or restructuring an organization. An organization's job descriptions can aid the manager in planning for staff development and/or retraining.

Additionally, job descriptions are useful for documenting compliance with federal or state regulations as well as local policies regarding personnel. The hiring process is simplified when those involved in the search for a new employee are able to use the

or failing to take productive action at all. While the fighter actively resists, the minimal performing employee is using a passive form of resistance. Either approach is detrimental to the organization because it has lost the efforts of the unhappy employee, who frequently must watch helplessly as the active and passive resisters demoralize their coworkers and otherwise create havoc in the workplace.

Special Considerations for the Physical Plant Department

If asked to name the profession most like his or her own, the typical physical plant administrator will probably cite the construction industry. While physical plant's high numbers of skilled craftspersons and unskilled workers make this answer seem logi-

acceptable tradeoff to obtain good carpentry work.

By contrast, the hotel or restaurant manager knows that the employees' ability to meet the physical and psychological needs of the guests is the key to success, and he or she uses job descriptions that clearly state that the guests' needs are the employees' first

DIRECTOR OF OPERATIONS

priority. While physical plant cannot be as attentive to its clients' needs as a hotel must be, the plant administrator should understand the importance of the image projected by plant employees. Job descriptions offer the best means of stating the department's expectations in this critical area.

Beyond Physical Plant

In a much broader context, all areas of higher education must become more image-conscious. In a report to Harvard's Board of Overseers, its president Derek Bok analyzed a serious problem faced by Harvard and all other American universities. Bok noted that American higher education is considered superior by the rest of the world. In spite of this fact, "far from praising our universities, critics in this country have attacked them more savagely during the past ten years than at any time in my memory." (Bok, 1990)

CAMPUS TRANSPORTATION OPERATOR

job description to determine whether or not candidates are actually qualified for the job (Perreault, 1988).

Helps Clarify Expectations

Another more obvious advantage is that well-written job descriptions provide realistic expectations for work performance as well as a basis for appropriate and equitable compensation. The absence of either can create employee dissatisfaction, which results in one of three basic problems (Bartley, 1981). The most obvious of these is that the employee quits. Not surprisingly, many employers are hardly reluctant to part with an unhappy employee. Instead of celebrating such departures, however, the manager might be better served by retaining employees and avoiding the cost of searching for and training replacements. There is also the inconvenience caused by having a position temporarily vacant.

Helps Promote Harmony

The other two problems are far more insidious than losing an employee. Instead of quitting, the unhappy worker either fights back or performs minimally. Fighting back may consist of filing lawsuits and grievances or creating unrest among other employees. Taken to the extreme, fighting back can take the form of "throwing a wrench" into the organization's gears by actually taking action harmful to it or other employees,

cal, the college or university campus setting may make a seemingly unrelated field a more logical choice. In some ways, the hospitality and tourism industry is more closely akin to physical plant than construction; the facilities manager deals with clients who are laypersons, meaning that they know very little about the services they consume.

The Need to Please the "Customer"

In dealing with such clients, it is important to remember that their perception of how well the job has been

done is as important as how well it actually was done. For example, even first-class carpentry work is undervalued and unappreciated when the carpenter is gruff or taciturn with the secretary or faculty member who will be using it. Human nature dictates that when these clients interact with their

HEAD GARDENER

peers, they will discuss the obnoxious carpenter rather than the outstanding work done by the physical plant crew. The carpenter's supervisor is likely to view an unpleasant personality as an

DIRECTOR OF UTILITIES MAINTENANCE

While Bok places no apparent blame on the physical plant department, the public's loss of confidence stands to profoundly affect all aspects of higher education. Although a discussion of the public's loss of confidence has little meaning to many employees, even the most inexperienced custodian or naive junior faculty member understands what it means when public and private sources of funding begin to dry up. Certainly, no plant administrator is willing or able to replace carpenters with psychologists, or custodians with public relations specialists. However, a well-written job description can establish the expectation that all plant employees

are accountable for the tasks they perform as well as the image they project. Clearly stating this expectation in the job description sets the stage for staff development programs on that topic and employee counseling sessions when and if they are necessary.

Using Job Descriptions to Set Pay

One of the most important and dif-

CARPENTER

ficult tasks of management is to determine what each employee will be paid for his or her contribution toward helping the organization achieve its goals. The salary a person receives is difficult to deal with because what we

are paid is more than a matter of economics. For most people their salary is a statement of their worth as an individual. Social scientists view this as

ENERGY MANAGER

inappropriate and unfair, but it is nevertheless a permanent reality in American society.

Comparisons Are Inevitable

Experience tells us that no matter what standards are used in determining pay, workers will judge the fairness of their own earnings in relation to the pay earned by other workers. Organizations that have not reviewed their systems for compensating em-

ployees may find "irrationality between jobs and pay scales" which is the result of special situations or present or past political pressures (Livy, 1975). Also, the pay for a given job or group of jobs may be based on outdated job descriptions or those that were replaced without revising the compensation in accordance with the new job description.

Making the Pay Fair

By routinely reviewing job descriptions and the accompanying pay scales, the manager can ensure that employees are compensated in accordance with the jobs they perform. Job descriptions that reflect the differences between various jobs will enable employers to explain and justify pay differentials. A well-written job description should enable the employee to see the relationships between jobs and thus accept the differences in pay scales. Once the differences in jobs are made clear, the employee should more readily accept his or her own position on the pay scale and focus on pay as a reflection of the value of the work

WORK CONTROL MANAGER

performed rather than as an indicator of personal worth.

Responding to Changes in the Work Force

The workplace of the future will be vastly different from today's due to several factors. New paradigms for management, striking demographic changes, and sharply different employee needs and expectations are three especially important challenges that the modern manager must be prepared to meet. In order to respond appropriately to these concerns, an organization must be willing to relinquish some time-honored beliefs and practices. Surviving in the next century will require creativity, flexibility, and willingness to accept and implement change. The 1990s must be spent examining and ultimately replacing old ways of thinking.

New Paradigms for Management

Noted management expert Peter Drucker predicts that tomorrow's businesses will have less than half the levels of management and only about a

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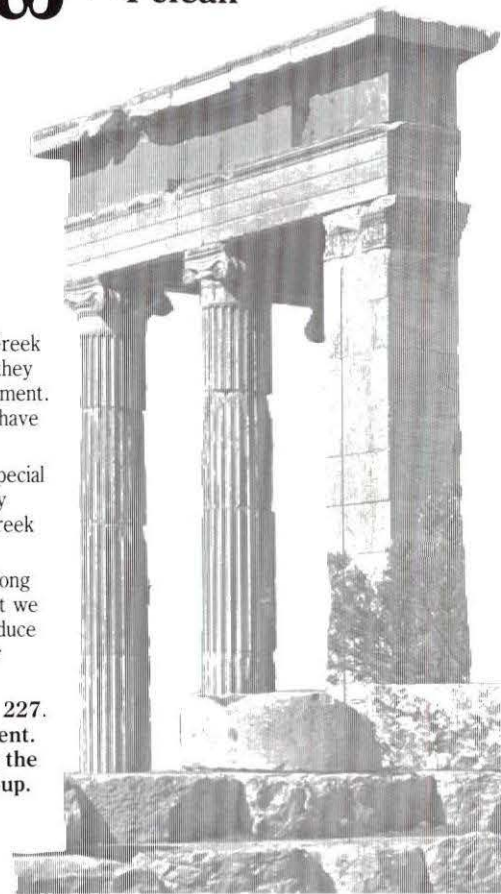
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third of the managers. For about the last century, the norm in most organizations has been the command and control model provided by the military. Drucker believes that in twenty years the typical large organization will function more like a symphony orchestra than a manufacturing company (Drucker, 1988). A symphony has only one conductor who gives leadership to all its members. There are no vice presidents for conducting because each musician is responsible to the conductor, who is the sympho-

ployees are likely to view such drastic changes with no small amount of suspicion; however, job descriptions that clarify the expectation for employee input and delineate the lines of authority will be invaluable in changing the culture of the workplace.

Demographic Changes Affecting the Workplace

The twenty-first century will bring numerous changes to the American workplace. Both the nature and the needs of workers will be drastically

make up about half of the work force. Between now and the year 2000, they will account for five-sixths of the net additions to the work force (U.S. Department of Labor, 1990). These changes in the pool of available workers will require changes in job descriptions. For example, supervisors may have to be bilingual to qualify for certain jobs, or in some cases, workers may have to be able to speak English. If the ability to communicate in a particular language is required to perform certain jobs, the job description must clearly state this requirement to simplify hiring and avoid discrimination.

Needs of Aging Workers

The aging worker presents a special concern for his or her employer. On one hand, the physical plant department has a worker whose skill,

ASSISTANT VICE PRESIDENT FACILITIES MANAGEMENT

ny's CEO. The organization of the future will be leaner, more streamlined, than its present day counterpart, giving each worker a more direct line of communication (and responsibility) to the CEO. As a result, its organizational structure must become less vertical and more horizontal in nature, and it must empower its employees by seeking their input and acting on their ideas.

A New Company Culture

One company that has already implemented the symphony orchestra concept is DuPont. DuPont's CEO Edgar Woolard believes that "employees have been underestimated. You have to start with the premise that people at all levels want to contribute and make the business a success." Woolard and other CEOs whose organizations have successfully involved workers, point out that the orchestra concept will not work unless the CEO is fully committed to making it work.

Such drastic changes call for what Darianne Dennis calls "creating a new company culture" (Dennis, 1990). In most organizations, employees have been given no decision-making responsibility; therefore, the manager who wants their input will have to demonstrate his or her interest in their input as well as the honest belief that they have something valuable to contribute. Making it work involves sincerely seeking and ultimately implementing employee suggestions.

Another part of changing the company culture involves managers who view themselves as facilitators who lead and coach their workers. Established, and in some cases new, em-

different due to five demographic trends that will become more evident in the 1990s.

1. Both the population and the work force will grow more slowly, with the population increasing at a rate of only 0.7 percent while the work force increases by 1 percent.
2. The average age of both the population and the work force will increase, and the pool of younger workers will decrease.
3. The number of women in the work force will increase to the point that almost two-thirds of new entrants will be female.
4. More minorities will enter the labor force, accounting for 29 percent of new entrants between now and the year 2000.
5. Numbers of immigrants will increase to about 600,000 per year, with about two-thirds of them expected to enter the work force.

DISPATCHER

knowledge, experience, and loyalty are great assets. On the other hand, the aging worker presents some special problems due to declining physical ability and/or health.

From a legal standpoint, the older worker may remain employed as long as he or she can do the job. Carefully written job descriptions will enable the facilities manager to meet the needs of both the department and the older worker by 1) identifying other jobs to which the older worker might be transferred; 2) redesigning some jobs to enable the worker to continue to perform at an acceptable level; or 3) justify the forced retirement of workers who cannot perform in any of the

MANAGER OF ENVIRONMENTAL SERVICES

These demographic trends combined with changes in the job market will require extensive changes in the traditional ways of defining and managing the workplace.

Future jobs will require more skills and education than those of the past, yet the available pool of workers may have fewer skills and less education than those of today. One of the most surprising predictions is that in the next decade only 15 percent of the new entrants to the work force will be native white males, down from 47 percent at the present time. Today, women, nonwhites, and immigrants

available jobs (Bemis, Belenky, & Soder, 1983).

Legal requirements aside, the effective manager understands that appearing to "cast aside" a once-effective older worker will have profound effects on the morale of the entire organization. Some other options for accommodating the aging worker are flextime and off-site employment, which are described in the next section.

Women in the Work Force

Past efforts at admitting women to traditionally male professions were of-

ten based on meeting the letter of the law; however, future efforts will be based on the actual availability of workers. Employers will find it more important than ever to rethink job descriptions with physical requirements that favor males over females. Higher education has a special responsibility

DATA SYSTEMS COORDINATOR

to challenge the norms because it has always provided a catalyst for change. The challenges of the next century will increase opportunities to serve as a role model. Physical plant organizations have already taken the lead in integrating women into traditionally male jobs, and they will be expected to continue providing leadership in this area.

An issue that especially affects female workers is the expense and availability of child care. Future employers will be considering the use of flextime and off-site work to accommodate the needs of workers who are parents of young children. The job description allows the employer to define and state the parameters of such arrangements (Bemis, Belenky, & Soder, 1983). Again, the diversity of jobs in physical plant will allow the plant administrator to give leadership and provide an excellent role model for the campus as well as other parts of society.

TRAINING MANAGER

The Challenge of Minority Workers

The document *Work Force 2000: Work and Workers for the 21st Century* discusses the future of minority workers in the United States. During the 1990s, minority workers will face both the brightest and the darkest of times that will continue into the next century. The predicted decline in the overall availability of new young workers is expected to open more doors for minorities who have traditionally been ignored by potential employers.

If, however, minority young people continue to lag behind in needed education and training, the increasing

sophistication of available jobs will leave them out in the cold. This is an unfortunate situation that must be addressed by American educators and employers, but is not within the scope of this article. Still, the job description does play a part determining whether any applicant is qualified to hold a particular position.

The physical plant administrator's responsibility is to accurately describe the requirements of positions and then fill them with the most qualified individuals available. Meeting this professional responsibility requires that he or she base the job description on a carefully conducted job analysis that provides the basis for hiring practices that are fair to both physical plant and its job applicants.

Special Issues in the Work Place

Changes in the American workplace and its work force have given rise to several important issues. The plant administrator must deal with disparities in pay for different jobs by assessing comparable worth while avoiding charges of discrimination. At the same time, he or she must recognize that

ASSOCIATE DIRECTOR OF WORK MANAGEMENT

modern American workers have needs and attitudes that differ from those of their parents. Finally, an unpredictable economy may call for some difficult and unpleasant decisions about cutbacks and layoffs.

Assessing Comparable Worth

The issue of comparable worth of jobs might not be so difficult if the United States didn't have a long history of discrimination based on race and sex. In deciding which jobs will receive higher compensation, any employer runs the risk that decisions will be made (or simply appear to be made) on the basis of having a higher concentration of women or other minority group members in certain types of jobs. A carefully conducted job analysis that forms the basis of all job descriptions will aid the employer in making wise decisions and allow employees to understand the logic behind them (Bemis, Belenky, & Soder, 1983).

New Times and New Attitudes

Many American workers have a

view of their jobs that would surprise their parents and grandparents. While some still "work to live," a surprising number want job satisfaction and believe that they should be able to enjoy their jobs. Many managers are apparently unaware of this change in attitude. A 1986 survey about worker motivation placed workers' priorities (in order of importance) as 1) interesting work, 2) being appreciated, 3) being part of the team, 4) job security, and 5) wages.

In contrast, managers perceived workers' priorities quite differently. They thought that interesting work was the employees' fifth priority, and that being appreciated was number eight. In their perception, being part of the team was number ten and job security and good wages were numbers two and one, respectively. Similar disparities were found in the areas of promotion/growth, working conditions, and help with personal problems.

Clearly, many managers do not understand their employees. Increasing numbers of modern workers expect to have more input and influence in their

jobs than their predecessors and will be restless without it. The job description has the ability to tell workers in advance the amount of influence and authority they can expect to have in a particular position as well as their chances for advancement, thereby providing a "better fit" for both employer and employee.

In the Worst of Times

Although no manager likes to think about it, hard times will come at one time or another. When the plant administrator is faced with an edict to "trim the fat," some difficult decisions must be made. For blue collar work-

ARCHITECT

ers, especially in a unionized setting, seniority (last hired, first fired) will determine who will be laid off.

In situations where an administrator is making the decision, he or she should use two basic criteria. The first is the job description, which will help

indicate a particular job's relative worth to the organization. Focusing on the job and its relative importance to the physical plant, rather than the individual filling it, will help enable the department to survive with reduced staffing.

The second criterion, the employee's performance, is determined based on the job description. Armed with well-written job descriptions, the ad-

DIRECTOR OF PHYSICAL PLANT

ministrator can be assured of making the right decisions and that those decisions will stand up under a legal challenge.

Meeting the Challenge

A properly written job description requires a great deal of work. This effort begins with the analysis and evaluation of each job in the physical plant organization and ends with the actual writing of the job description.

References Cited

Bartley, Douglas L. (1981). *Job Evaluation: Wage and Salary Administration*. Addison-Wesley Publishing: Reading, Massachusetts.

Bemis, Stephen E., Ann H. Belenky, and Dee Ann Soder (1983). *Job Analysis: An Effective Management Tool*. Bureau of National Affairs: Washington, D.C.

Bok, Derek (1990). "What's Wrong with Our Universities?" *Harvard Magazine*, May-June, 1990.

Drucker, Peter (1988). "The Coming of the New Organization." *Harvard Business Review*, January-February, 1988.

Gael, Sidney (1983). *Job Analysis: A Guide to Assessing Work Activities*. Jossey-Bass: San Francisco.

Grant, Philip C. (1989). *Multiple Use Job Descriptions: A Guide to Analysis, Preparation and Applications for Human Resources Managers*. Quorum Books: New York.

Livy, Bryan L. (1975). *Job Evaluation: A Critical Review*. Halstead Press (John Wiley & Sons): New York.

Manese, Wilfredo R. (1988). *Occupational Job Evaluation: A Research-Based Approach to Job Classification*. Quorum Books: New York.

Perreault, Joe (1988). "Developing Your Employee Handbook: Job Descriptions." *Child Care Information Exchange*, September, 1988.

Teare, Robert J. (1987). *Validating Social Work Credentials for Human Service*

Jobs. National Association of Social Workers, Inc.: Silver Spring, Maryland.

Tourism Education Corporation (1976). *A Hospitality Industry Guide for Writing and Using Task Unit Job Descriptions*. Cahners Books International: Boston, Massachusetts.

U.S. Department of Labor (1990). "Work Force 2000: An Executive Summary." ■

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Supporting a safe, capable work force and effectively controlling spending are primary issues in physical plant and facilities management, hereafter referred to as PPFM. Increasing knowledge about hazards in the workplace, new government requirements, advancing technologies, and the need to control nonessential spending present managers with seemingly no-win situations.

These issues—along with Right-to-Know requirements, conformance with affirmative action plans, asbestos and PCB concerns, cultural diversity in the workplace, inadequate language and mathematic skills, and a plethora of job skill requirements—create numerous and diverse training needs. The facilitation and funding of these training needs represent an often frustrating challenge for managers in competition for limited funds and resources within educational institutions. Generally, training managers/coordinators are charged to find ways to meet these needs with budgets that often amount to a few dollars (if not pennies) a year per employee, limited or nonexistent resources, and little or no staff to assist them.

In the spring of 1990, a group of Washington, D.C.-area universities and colleges formed what they believed was the most logical approach to addressing their mutual training needs: The Training Consortium. It began with individual trainers searching for effective means to conduct the wide variety of PPFM training required by their respective institutions, and the realization that they were not alone in the problems they faced.

The first meeting was held in March 1990 at Howard University. It brought together personnel responsible for training from the following institu-

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STAFF DEVELOPMENT AND EMPLOYEE TRAINING: A Consortium Approach

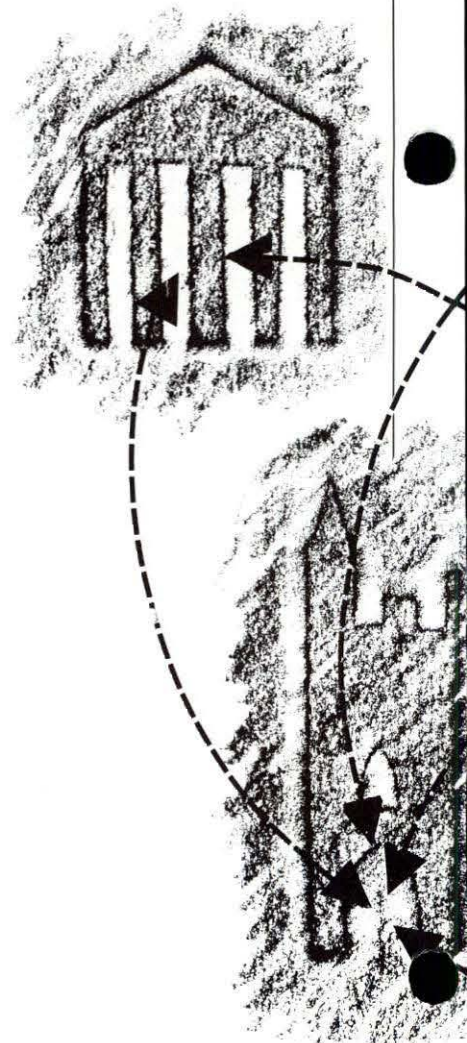
by Wilma M'pelo Worrell and
William G. Suter Jr.

tions: American University, The Catholic University of America, Gallaudet University, George Mason University, Georgetown University, Howard University, and the University of Maryland/College Park. The group discussed how their institutions' training needs were addressed (often in pieces), what needs were going unmet, and ideas for future training programs.

It was discovered, as expected, that each university tended to start with its own most salient problems. This resulted in a wide variety of training being conducted and/or available. For example, one university had a complete supervisory development program, one had a power plant operations series, and another had an English as a second language course.

Most of the institutions also identified in-house experts who could facilitate training courses. All present agreed that most programs on the market were usually beyond the budgets of individual institutions, and that in-house development of all the required programs was often beyond their resources. It was generally believed that networking—the sharing of ideas, experiences, and resources (media and personnel)—as well as codevelopment of programs could fulfill most of the employee development and training needs. The consortium approach to training went from a concept to reality in one meeting.

Additional meetings were conducted during the next few months,



and institutions were represented by an array of personnel responsible for training. When it became clear that this approach could work across the board, what began as a group concerned with PPFM training grew to include persons responsible for training on an institution-wide basis.

What is important to note is that most of the organized training being conducted was done within the PPFM departments, primarily because of union contractual agreements. Also, due to the PPFM organizational structure in several institutions, personnel was more diverse than in many other departments. For example, one institution's PPFM department included housekeeping, transportation services, health and safety, security (including commissioned police officers), parking, grounds, architectural and engineering services, recycling, trash removal, power plant operations, repairs of buildings, maintenance of buildings

(engineering shops), quality assurance and work control, an in-house general store, administrative assistant for personnel, computer services, and a financial management center.

This is a clear demonstration of the diversity of PPFM training requirements. As a result, a comprehensive program for a department of this nature would include training that would cross over as well as meet general university staff development needs, with the exception of certain programs for faculty and medical and research staff members. It was discovered that in several instances PPFM employee development and training programs were more comprehensive and affected a wider variety of employees skills levels than institution-wide programs.

Working With an Established Consortium

Most of the universities in the Washington area participate in a group called the Consortium of Universities of the Washington Metropolitan Area (CUWMA). The consortium is represented by the universities' presidents,

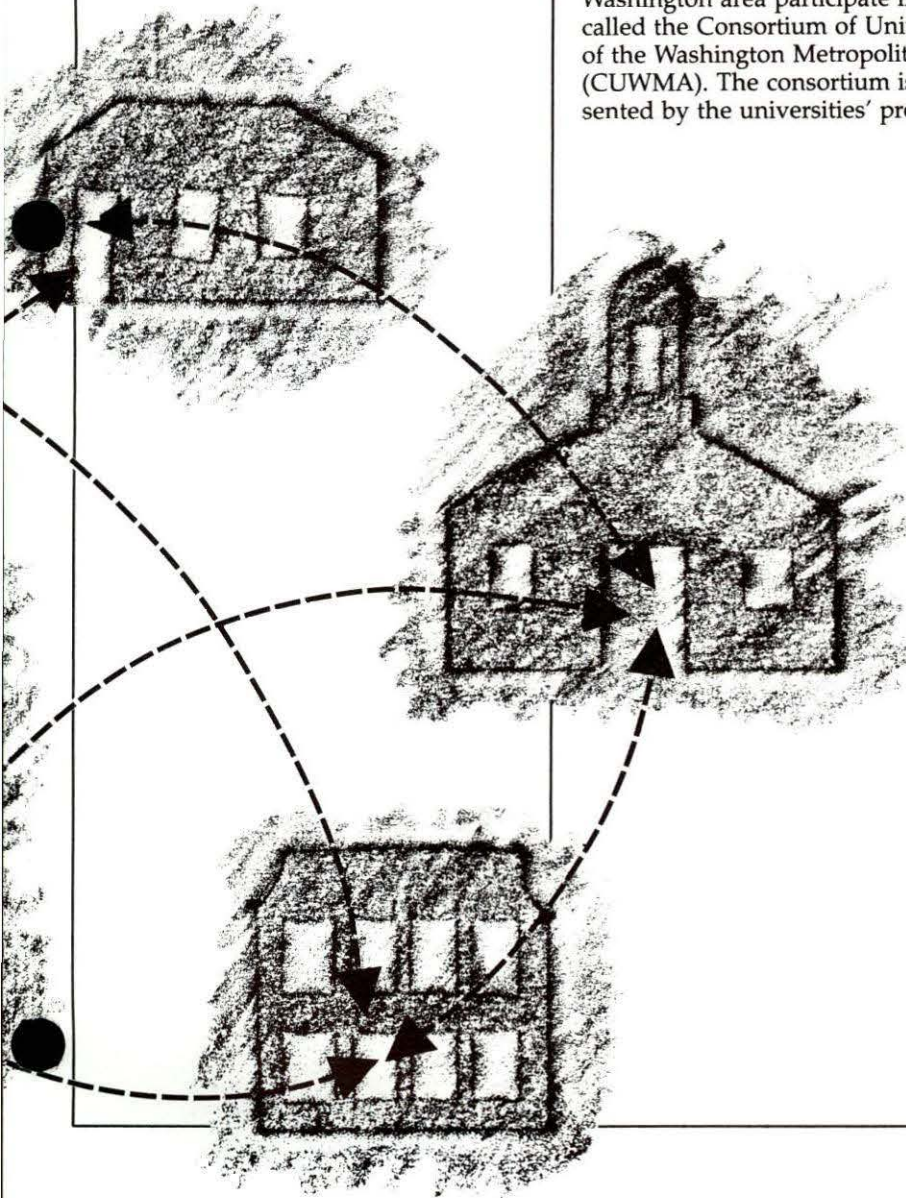
executive committee, provosts or designates, and administrative committee. CUWMA's vice president of programs and research was contacted to discuss the feasibility of a consortium approach to training.

The meeting proved fruitful; the vice president had been charged with presenting training programs, and he felt that the local university management would be responsive to the idea of a training consortium. CUWMA recently celebrated its twenty-fifth anniversary of sponsoring consortium-based faculty and student programs; therefore, the vice president felt he could provide some guidance that would enable the Training Consortium to succeed. The most important elements for success, outside of the belief in what we were doing, were mutual interests, participant follow-through, creativity, management support, and a bit of hard work. He also suggested that a working relationship between the Training Consortium and CUWMA would be possible if the trainers were amenable. The two organizations could also develop and cosponsor seminars and symposia. (One is scheduled for October 1991.) The offer of this support seemed to legitimize the Training Consortium's activities to many of its participants, and was enhanced when CUWMA began hosting the group's monthly meetings, as it continues to do.

Creating a Mission Statement

We soon realized that there would be other hurdles to clear before we could begin to meet some of our objectives. One of the first challenges was deciding the scope of the group's activities. A need for a mission statement around which to organize growth, as well as define activities and services offered, became apparent. The following mission statement, which we believe clearly outlines our vision, was developed:

The mission of the Training Consortium of the Washington, D.C. Area Universities and Colleges (The Training Consortium) shall be to further the scope of employee development and training excellence throughout college and university environments. To accomplish this, The Training Consortium shall act to facilitate the cross utilization of training resources and cooperative interaction among consortium participants for the develop-

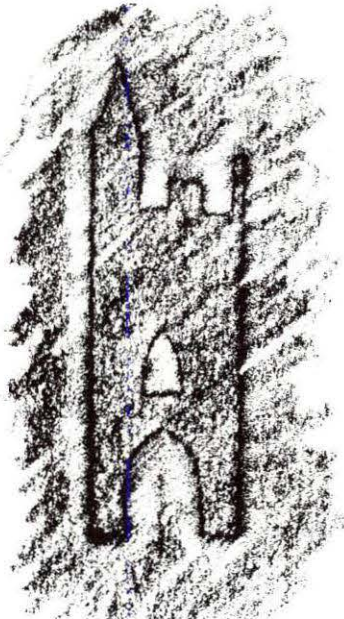


ment of productive personnel. The Training Consortium activities will be in compliance with the letter, intent and spirit of federal, other governmental and institutional mandates, regulations, and guidelines.

This mission statement addresses concerns relating to the different levels of training needed, as well as the plethora of laws that cover the institutions' jurisdictions (Virginia, Maryland, and Washington, D.C.). What is required in one jurisdiction may not be in another, and what is allowed in one may be prohibited in another. To avoid "dancing on eggs" the consortium decided to concentrate on training relating to federal mandates and areas not covered by any mandates, such as management skills.

Establishing Policies

Next, we all took turns playing devil's advocate, attempting to shoot as many holes in the consortium approach as possible. This was done in an attempt to head off as many problems as possible before they were presented by management. We recognized that all institutions have their own internal politics and often feel in competition with other institutions.



The activities would have to be established in such a way that they be seen as a win-win situation by all, and sensitive areas could be avoided. The problems we identified were as follows:

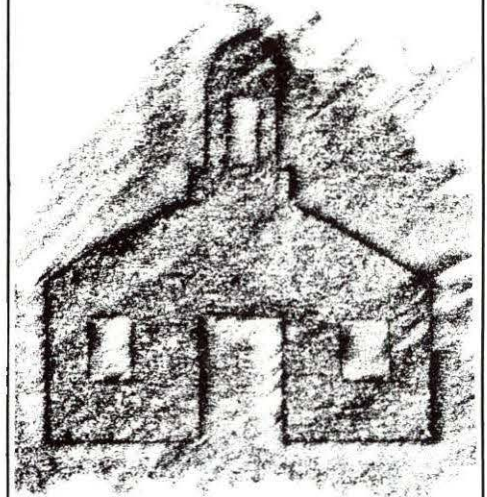
1. Would schools pay each other;
2. How would class space be allocated;

3. Was some type of credit system needed to track who was providing and who was receiving training;
4. What personnel resources would be shared;
5. What media resources could be shared;
6. How would the credibility of trainers be assessed; and
7. Would there be a fee mechanism for schools that have little to contribute, but much to gain?

We must admit that in looking back, it is hard to believe that we perceived these problems would be difficult to solve, when to date, as a result of our roundtable discussions, they have been relatively easy. The effects of all participants wanting to have the Training Consortium succeed has carried us a long way. In July of 1990, we agreed that

1. There will be no payment, except in cases where an institution charges its own employees for the courses. Consortium participants will be charged the rate paid by the host institution personnel.
2. A) Institutions will offer participants unused space in designated training programs (e.g.,; university X's management course can accommodate twenty-five, but only has fifteen registrants, it then makes available ten spaces to consortium participants). B) Institutions that codeveloped and/or cosponsored programs receive first preference; space is then made available on a first-come-first-served basis to the other institutions. C) Consortium-sponsored and -developed programs will be made available to all participating institutions.
3. Institutions exchanging services are responsible for tracking what courses were being attended by other universities and the names of their personnel attending courses at other institutions. This information would be given to the Training Consortium chair to be updated on a semi-annual basis.
4. Training services will be exchanged solely on a course-length basis versus assessing values on the variety of courses offered (e.g.,; supervisory skills versus computer skills).
5. Media shall be shared in the same manner as CUWMA's Inter-University Library Loan Services, which allows participating universities the use of each other's library resources.

6. Most of the trainers have years of experience in their field, received professional certification for many of the courses they teach, are active members of professional organizations relating to their field, and/or completed rigorous degreed pro-



- grams ranging from the BA to the PhD levels. These criteria, coupled with continuous interaction among the Training Consortium participants, led to respect and confidence in the trainers' skills. In-house experts will successfully complete a validated train-the-trainer program (when deemed necessary) prior to teaching other institutions' personnel.
7. All participants offer valuable resources to the consortium. Those with limited hard resources to offer generally feel they have more to gain and therefore are willing to provide more human resources and talent. They also tend to be persons with the most years of experience and highest levels of education. In order for the consortium to be successful all participants must feel as if they have something valuable to contribute as well as something valuable to gain. In short order, no fees will be assessed other than those previously mentioned.

Gaining Management Support

With these problems resolved the next hurdle identified was gaining management support for the consortium. The infrastructure of many institutions vary; some participants are at the level where they are able to make top level decisions (such as vice presidents and directors), while others have varying layers to slice through for the necessary support. An approach was

needed to obtain the level of support needed by all participants in one fell swoop.

We met with CUWMA's Administrative Committee and presented the reasons that led to the forming of the Training Consortium, our objectives, and current activities.

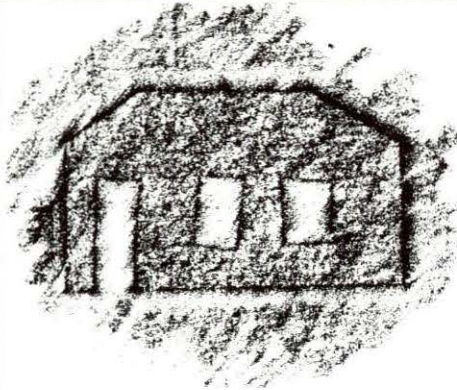
The presentation was more of a success than we could have imagined, ironically as a result of what proved to be perfect timing—the current economic downturn. Due to the decrease in available funds and the needs previously identified, the administrators realized that quality employee development and training programs could be presented within current budgetary constraints. The members of the administrative committee blessed the training consortium, and its activities were noted to several institutions' presidents. One participant received a memorandum from her university's representative commending her participation in the Training Consortium, stating that she represented her university well in the consortium's endeavors.

With the success of the presentation, many participants felt the Training Consortium was "fully legitimate." Support from top level management resulted in the increase of support from other levels of management. (This support is necessary for the Training Consortium to achieve their goals.) Consequently, we felt comfortable in proceeding with developing programs and activities.

Developing Committees and Sharing Programs

In compiling a list of programs and activities, discussed in the next paragraphs, we began to fully realize the growth potential of the consortium; as a result the need to establish committees became apparent. What also made the development of committees inevitable was that several participants wanted to concentrate their efforts in limited areas, others did not feel comfortable in large meetings, and some wanted to be involved only in specific projects. In the early fall of 1990, the following committees and their activities were developed:

- **Steering**—ensures that the goals of the organization are met and recommends activities and programs;
- **Technical**—responsibilities include PPFM job skills training and other technical skills such as computer skills;



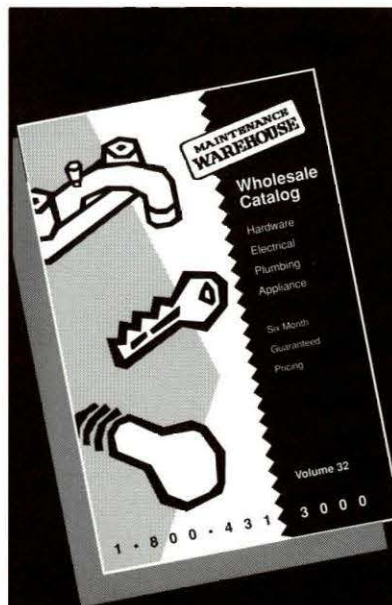
- **Administrative/non-technical**—addresses clerical support, general safety, supervisory/management skills, and language skills;
- **Consortium seminars**—involved in the total processes required to present Training Consortium seminars or symposia, from conception to inception.

Among the participants there was a strong desire to show productivity to managers who wanted results yesterday. While we were unable to provide results of the consortium approach yesterday, we were able to implement the media resource and training program sharing rather rapidly. George

Washington University made available a professional locksmith course; Georgetown University offered defensive driving; Howard University ran a seventeen-week power plant operator's course; University of Maryland shared an employee motivation program; and George Mason University offered to conduct courses in employee relations. These are just a few examples of the ongoing sharing of training programs.

To facilitate the sharing of media resources, CUWMA offered assistance in the development and publishing of a media resource catalog that would list training media institutions that were willing to share with consortium participants. The catalog would be used as a tool for planning training sessions and reduce the time needed to develop courses by lessening the time needed to identify and obtain training media. The catalog was to be shared with the president's office, the provosts or designates, and the Training Consortium participants.

The development of this catalog proved to be more difficult than expected, due mainly to the fact that many institutions had limited, if any,



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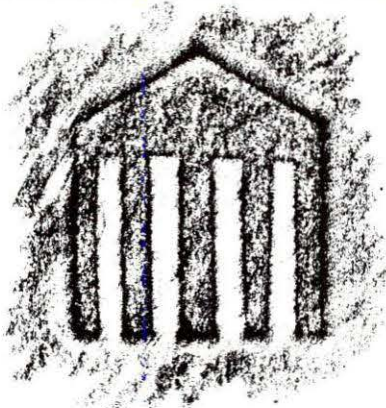
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training media, while others had relied heavily on training media. The rough draft of the catalog began to take on a lopsided look that CUWMA felt might not give the most favorable impression of all participating institutions. Even in light of the fact that all institutions are participating on a variety of levels, especially program development, the Training Consortium decided to reformat the catalog into a handout distributed only to participants.

The catalog will be developed at a later time, but will include courses offered as well as training media. Participants will still benefit from the handout in the same manner as the

catalog. In the interim, a brochure is being developed listing the Training Consortium's activities, its mission statement, and participating institutions. The brochure will be shared with the administrative levels at each institution, as well as the departments responsible for employee development and training.

Organizing Our First Symposium

Near the beginning of 1991 we began to undertake our most challenging program—a consortium sponsored symposium. We discussed a variety of topics and keynote speakers, assessed the talent represented in the consortium, and decided to proceed with a subject that covered several different departments and was a major concern of all institutions.

After researching and continuously discussing the issues, and placing labor issues and management development on the back burner, we decided to sponsor a symposium on health and safety issues in higher education. It is tentatively scheduled to be conducted in late October or early November 1991. It will be coordinated by the environmental safety officers of Georgetown and Catholic universities

and the vice president for risk management and environmental safety of George Mason University.

The final content of the symposium will be determined by the results of an interest-level questionnaire being sent to departments involved with institutional health and safety. The targeted topics include sessions on student health, office ergonomics, sick building syndrome, laboratory and research facilities, and health and safety issues relating to operations and housekeeping staff.

The symposium will serve as a litmus test to the consortium approach. Each institution will have to assume varying levels of responsibility in order for the symposium to be successful. Those who possess program and media development skills will be asked to assist in those areas—research regarding legislative issues and current trends must be conducted, presenters must be identified and contacted, brochures and course handbooks must be developed and mailed, and the list continues. We recognize this is a great undertaking, but the in-house development of such a program or sending the personnel who will be addressed in this symposium to outside conferences will exceed the trainers' resources and budgets.

Formalizing the Information Sharing Process

The concept of people with similar needs coming together to discuss needs is not new, nor is the informal sharing of resources. What the Training Consortium's participants have simply done is formalize the sharing process. It is a rather simple idea that works if there is management support and all participants are willing to participate in the sharing and receiving.

An institution with a program that has been in existence for eight to fifteen years is not necessarily better, nor does it have more to offer than a program of three to four years, if it lacks management support, resources, and creativity. The most valuable product of the consortium is the sharing of ideas, old and predictable ones as well as new concepts, as a means to approaching common needs.

As many people know, difficult problems become easier to manage when different perspectives are seen and new approaches are taken. If the consortium did nothing more than networking, it would be a success. However, current financial constraints

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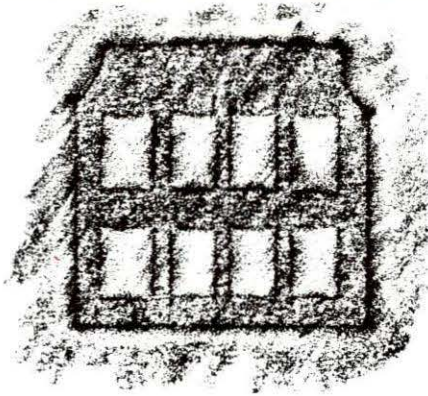
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prohibit many institutions from providing adequate employee development and training programs to achieve maximum productivity. Therefore, we believe a more comprehensive approach is needed.

As a result of participating in the consortium, the training cost per employee will decrease as employees "use empty seats" at other institutions, trainers exchange training services versus employing paid consultants (when possible), and less resources are used to develop and implement courses.

Evidence of this is already visible: a savings of approximately \$12,450 to date has been realized by consortium participants. This figure will increase sharply as the training cycle gears up for the summer. The course evaluations have rated the course content and the instructor's knowledge of the subject good to excellent. The overwhelming responses in the evaluation form's comment section have been as follows:

- "We need more of these types of courses with other schools."
- "I'm glad the universities are working together."



• "Without the consortium I don't know when or if I would have had this type of training."

Conclusion

Managers determine what training an employee needs, but in the end it is the employees who demonstrate how effective the training is by her or his job performance. Having adequate, quality training accessible is one means of ensuring that employees receive the training needed in order to improve their job performance.

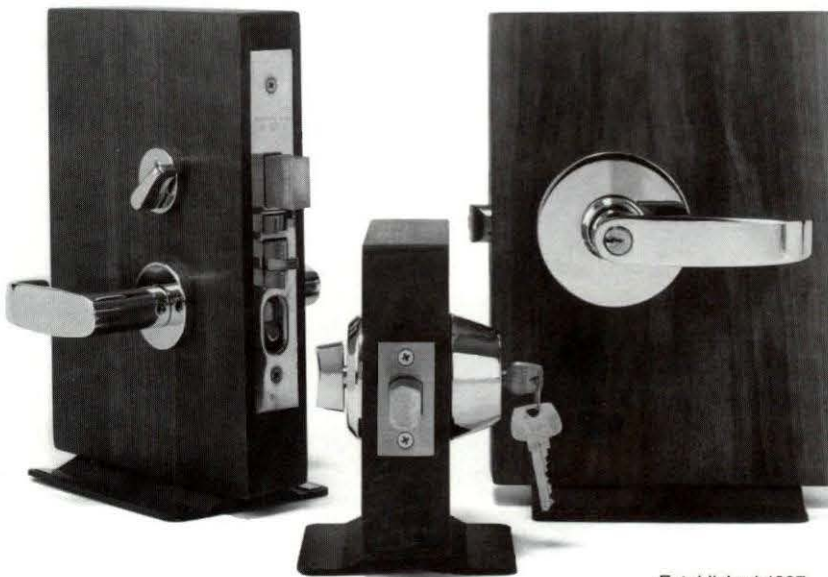
The consortium has also led many participants to take a closer look at the services other institutional depart-

ments can provide: Does the library have training media available? Does the business school have a professor who will be willing to conduct a management training session? Will personnel conduct a sexual harassment session? The examples are numerous.

The consortium approach can work within institutions and help foster a better relationship between the faculty and administrative staff. The primary objective is to increase employee productivity, and training is an integral component in achieving that objective.

The institutions currently participating in the Training Consortium are American University, The Catholic University of America, Gallaudet University, George Mason University, George Washington University, Georgetown University, Howard University, Montgomery Community College, Prince George's Community College, Southeastern University, University of the District of Columbia, and University of Maryland/College Park. The Training Consortium is open to all higher education institutions within the Washington, D.C. metropolitan area. ■

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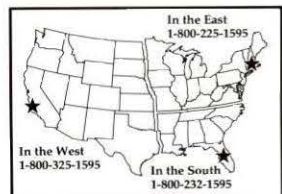


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Introduction

The need for more and better academic research facilities is substantial. Despite an annual average of \$1,737 million in expenditures on academic facilities between 1988 and 1989, a recent National Science Foundation (NSF) survey indicates \$12 billion in deferred construction and renovation needs. To address the financing of research facilities at universities and colleges, this paper outlines options for policy changes on which agreement and initial action may be possible in the near future.

Background Considerations

Several economic and political considerations, along with criteria for determining efficient and equitable policies and practices, are relevant to this review of options for research facility financing.

Zero Sum

Under the assumption that little new federal money can be expected for the science and engineering enterprise in the near term, it is clear that if more federal funding goes into facilities, less will be available for research projects and programs. If the zero-sum scenario holds, admission that facility needs are real and serious entails recognition that federal priorities must shift to provide more emphasis on investments in capital and less on labor. To some extent, the types of trade-offs being made at the local level to sustain current facilities expenditures mirror the trade-offs that will be required

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RESEARCH FACILITY FINANCING: Near-Term Options

by Anne Scanley

if the federal government shifts its priorities.

Cost Sharing and Distribution of Risk

Each sector—academia, state governments, the federal government, industry, and the public—has a stake in the vitality of research and hence in the quality of the physical plant that supports that research. These shared benefits imply shared responsibility for the costs and risks of providing research facilities. Also, the need for facility repair, renovation, and construction is too great to be met by any one sector.

Leveraging

Mechanisms that enable support provided by one sector to stimulate investments by other sectors will extend the limited resources of each sector and produce a synergistic effect.

Priority Setting and Merit Review

Each sector will have to determine which of its needs are most important and build priority-setting and merit-review processes into its facility financing mechanisms.

Balanced Needs and Objectives

The fact that not all needs can be met also means that competing demands must be balanced. Balance is needed between the objectives of research sponsors and research performers; between the objectives of renewing and sustaining current capacity versus selective growth; and between the needs of different types of re-

search-performing organizations.

Flexibility

Achieving balance requires flexibility. To meet the varied needs of research-performing organizations requires a range of funding mechanisms.

Options for Consideration

To meet the full range and magnitude of research facilities needs would require a comprehensive set of changes in facility financing. However, if not all needs can be met, choices will have to be made; some needs will continue to be deferred, others will be met only partially. Each of the options below addresses some aspect of facility needs better than others. Each would provide a different level of resources for those needs it does address.

While each option can and should be considered on its own merits, the collective impact (or lack of impact) of any set of options must be considered. The full range of implications is not explored here; however, a starting point for more detailed proposals is provided.

Option: Increase the Rate of Reimbursement for Facility-Related Costs of Sponsored Research

Means to Increase the Rate of Reimbursement

- Increase, from 2 to 5 percent, the use charge that establishes the rate of reimbursement for facility-related costs of federally sponsored research—that is, base use charges on

the assumption that buildings have useful life spans of twenty years rather than fifty years.

- Or, allow universities to scale use charges (perhaps at 2, 5, and 8 percent) based on the rates at which different groups of facilities deteriorate.

- Remove disincentives to use of depreciation schedules in recovering the cost of facilities used to perform federally sponsored research.

- Adjust the rates for reimbursement of facility costs in grants and contracts awarded by states, industry, and foundations to make them comparable to those that apply under federally sponsored research awards.

Additional Changes Related to Increasing the Rate of Reimbursement

- Require grantee organizations to dedicate facility-related indirect-cost reimbursement to facility renewal (e.g., set it aside in a reserve for future facilities investments, or tag it for service of debt incurred for facilities).

- Allow public institutions to retain facility-related indirect-cost recoveries, so that the funds can be set aside as described above, rather than passed back to their state governments. In addition, states could lift limits on the amount of retained reimbursements that can be held and carried over from year to year.

- Split the federal indirect-cost rate into two separate rates, one for facilities and another for "all else," e.g., libraries, administrative expenses, and utilities.

Purpose of Increasing the Rate of Reimbursement

- Increasing the rate of reimbursement for facilities costs would augment the funds available for upgrading and sustaining current research capacity at major research institutions.

Cost of Increasing the Rate of Reimbursement

- A rough estimate of the cost to the federal government of increasing the rate of reimbursement is an additional \$100 million per year. Verification of this cost impact is required for further exploration of this option.

Impact of Increasing the Rate of Reimbursement

- The additional reimbursements would account for 10 percent of the required increase in facility support.
- Based on current patterns of federal R&D support, the top twenty per-

formers of federal R&D would get 40 percent of the \$100 million or, on average, an extra \$2 million each per year. Other institutions would receive less—the amount would be in proportion to their success in competition for grants.

- Increasing reimbursement would help to prevent recurrence of large backlogs of facilities needs.

- Depreciation and scaled use charges would increase record keeping and accounting burdens and thus drive up administrative costs.

- Establishing a separate indirect-cost rate for facilities would assist institutions in obtaining full recovery of facilities costs from nonfederal research sponsors.

Trade-Offs Associated With Increasing the Rate of Reimbursement

- There would be less money for research, but more for facilities.

- Separating and increasing facility-related indirect costs would threaten full reimbursement of other indirect costs.

- There would be less flexibility in the use of recovered funds because dedication of the facility portion of indirect-cost reimbursement to facility renewal would constrain the use of previously unrestricted funds.

Option: Establish Multiple Rates for Reimbursement for Facility-Related Costs of Federally Sponsored Research

Continued on page 29



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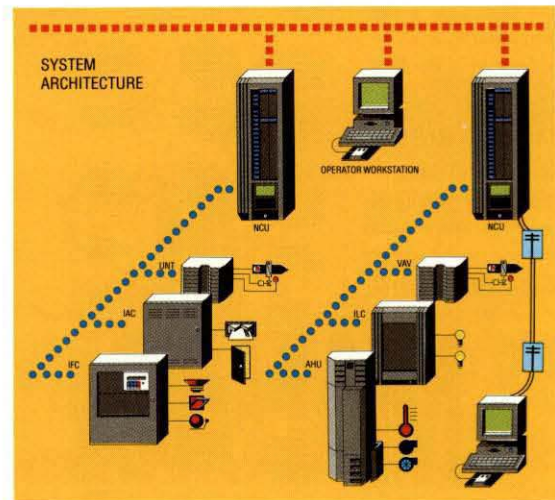


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Continued from page 25

Means to Establish Multiple Rates of Reimbursement

- Scale use charges (the rate of reimbursement for the facility-related costs of federally sponsored research), perhaps at 2, 5, and 8 percent, based on the pace at which different groups of facilities deteriorate; or
- Remove disincentives to use of depreciation schedules. (Depreciation schedules allow reimbursement rates to be tailored not only to each building but also to each building component.)

Note: Neither depreciation nor scaled use charges have to lead to multiple indirect-cost rates at an institution, but either could be the basis for multiple rates.

Purpose of Establishing Multiple Rates of Reimbursement

- Multiple rates for reimbursement would compel sponsored research that is dependent on expensive facilities to

carry its proportionate share of those costs.

Cost of Establishing Multiple Rates of Reimbursement

- Considered separately from an increase in facility-related indirect-cost reimbursement, the total cost of a multiple-rate system is the same as when indirect costs are averaged across an institution. However, for any one research sponsor, the cost would increase or decrease from the status quo depending on the particular facility-related requirements for conducting the research it sponsors.

Impact of Establishing Multiple Rates of Reimbursement

- The multiple rate option would prevent cross-subsidization of costs among research sponsors and therefore would eliminate resistance to increases in facility-related indirect-cost reimbursement from agencies that sponsor research that is not facility-intensive.

Trade-Offs and Political Considerations Associated with Establishing Multiple Rates of Reimbursement

- Loading facility-cost reimbursements onto individual grants and contracts, would discourage the conduct of facility-intensive research.
- Multiple indirect-cost rates could be difficult to manage given the increasingly multidisciplinary nature of research and the fact that research can move in unexpected directions.
- Multiple indirect-cost rates would increase record keeping and accounting burdens, thus driving up administrative costs.

Option: Develop, Fund, and Use Physical Plant Asset-Protection Formulas

Means to Establish Asset Protection Formulas

- Develop formulas that establish the level of financial reserves that must be set aside to assure sufficient funding (or debt financing) of physical plant repair, renewal, and adaptation.
- Determine sources of revenue for capitalizing these reserves, including state funds, such as general revenues, and funds under the control of research-performing institutions, such as indirect-cost reimbursement, set-asides from loan covenants, capital campaigns, and endowment income.
- Assure that the formulas are actually funded adequately, by dipping into operating budgets if necessary.
- Assure that the funds are used for their intended purposes.

Additional Changes Related to Establishing Asset Protection Formulas

- Changes in accounting standards for nonprofit groups issued by the Financial Accounting Standards Board now require private nonprofit organizations to show depreciation on their financial statements. This change will stimulate interest in physical plant asset-protection funds.
- Federal incentives for the creation and use of physical plant asset-protection formulas could be considered.

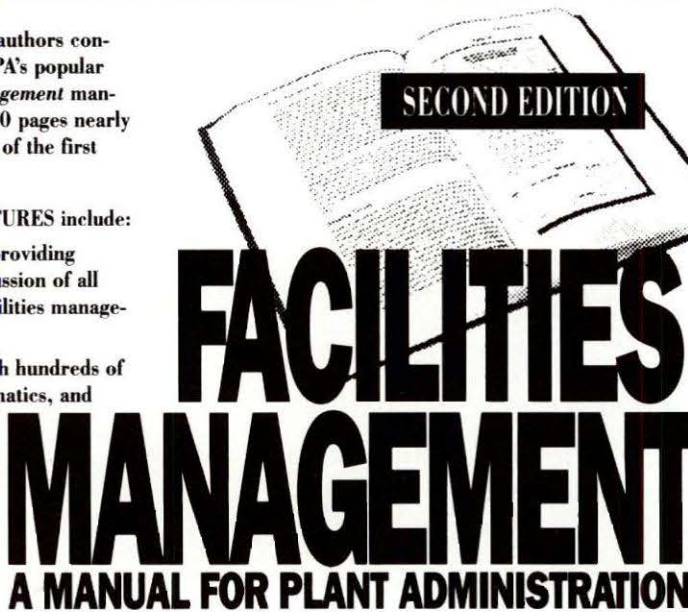
Purpose of Establishing Asset Protection Formulas

- Physical plant asset-protection formulas would address upgrading, sustaining, and adapting capacity at all types of research-performing organizations.

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Cost of Establishing Asset Protection Formulas

- For the total physical plant of universities and colleges, the cost of maintaining asset-protection funds is estimated to be, at a minimum, 2 to 4 percent of current plant replacement costs annually, plus catchup maintenance (perhaps double or triple current investments). This cost estimate is considered to be a floor. The comparable rate for research facilities, which become obsolete much more quickly than most other campus buildings, would be much higher, but it is not precisely known.

Impact of Establishing Asset Protection Formulas

- If calculated accurately, fully funded, and used, physical plant asset-protection formulas would address most facility needs. However, that assumes significant increases in financial support from all sources. Formulas, without funds, do not provide investments in facilities.
- Asset-protection formulas, like an increase in the rate of reimbursement of facilities costs, also would help prevent recurrence of large backlogs of unmet facilities needs.
- Asset-protection formulas would lead to better long-term planning based on systematic collection of information on the condition of research facilities. Development of such formulas would put the responsibility for forecasting at the institutions that perform the research.
- The use of physical plant asset-protection formulas would give research sponsors greater confidence in the management of facilities by research grantee organizations.

Trade-Offs and Political Considerations Associated with Establishing Asset Protection Formulas

- There would be less support for other academic, research, and state priorities as investments in physical plant increased.
- Immediate and short-term needs would have to be sacrificed to build reserves for the future.
- The feasibility of funding physical plant asset-protection formulas by "dipping into operating budgets if needed" is limited. Many operating funds cannot be used for other than their designated purposes for political and/or legal reasons.
- It would be difficult to obtain

state commitments to such asset-protection formulas, and even more difficult for states to sustain those commitments.

- While federal incentives or mandates for the funding of depreciation can be viewed as needed encouragement for good business practices, such mandates can also be seen as unwarranted intrusion in local affairs.

Option: Competitive Research-Facility Support Programs—Grants

Means to Implement Competitive Facility-Grant Programs

- Seek authority to establish competitive facility-grant programs for agencies that do not have such authority now.
- Increase support for federal and state programs that award funds for facilities on a competitive basis.
- Require recipients of facility grants to raise nonfederal or nonstate funds to match a percentage of the award, as appropriate.

Additional Changes Associated with Implementing Competitive Facility-Grant Programs

- Improve priority setting processes in research-sponsoring and research-performing organizations.
- Raise funds to meet matching requirements expected of facility grant recipients.

Purposes of Implementing Competitive Facility-Grant Programs

- The criteria for awarding facility grants can be tailored to meet diverse and specific needs, for example, to provide for:
 1. Catching up in fields with particularly serious backlogs of facility needs.
 2. Sustaining research capacity at institutions that do not have the volume of sponsored research that makes indirect-cost reimbursement a useful mechanism.
 3. Building research capacity, e.g., supporting selective growth in capacity for research in fields of special interest to state or federal agencies and at institutions with special needs, such as those that exist at historically black colleges and universities.

Cost of Implementing Competitive Facility-Grant Programs

- The cost would depend on determination of the number, type, and funding level of facility grant programs.

Impact of Implementing Competitive Facility-Grant Programs

- A \$100 million program would provide 200 small (e.g., \$500,000) awards, which, if matched 1:1, would provide \$200 million, or 20 percent, of the required increase in facility support.
- States might look to follow the example of Ohio, which has established the Action Fund, a program that matches institutional capital expenditures made in order to leverage federal or other external research awards.
- Competitive grant programs would create an alternative to funding facilities through targeted congressional appropriations.

Trade-Offs and Political Considerations Associated with Competitive Facility-Grant Programs

- Competitive facility-grant programs would mean less money for research, but more for facilities. For ex-



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ample, under some extreme scenarios:

1. If all of the cost of a \$100 million facility grant program at NSF came out of project grant funds, it would reduce the number of project grants by about 1,600 (22 percent of project grants).
2. If all of the cost of a \$100 million facility grant program at the National Institutes of Health came out of research program and project grants, it would reduce the number of grants by about 480 (about 3 percent of grants).
3. A \$50 million-facility-grant program at the Cooperative State Research Service of the U.S. Department of Agriculture would represent 10 percent of the service's program funds.
 - Funding facility grant programs by redirecting monies earmarked by Congress for facilities at specific institutions, although desirable, would probably be precluded by the complexities of the congressional process.
 - A facility grants program is the only option that can speak directly to the needs of emerging research institutions for external support of facilities. Thus, it is the only option that

can balance the options (increasing reimbursement of facility costs and facilitating debt financing) that provide for the facility-related needs of institutions with established research programs.

Option: Competitive Research Facility Support Programs—Debt Service

Means to Implement a Competitive Debt-Service Support Program

- Establish a federal program to support facility-related debt held by institutions.
 - Base awards for support of debt service for research facilities on results of national competition.
 - Provide support for debt over a twenty-year period on the condition that the supported space is used continuously for research in federally designated areas of inquiry and that the institution maintains its overall research effort.
 - Require commitment of matching funds as a condition of the debt service awards, as appropriate.
 - Exclude debt service supported by competitive federal programs from calculations of institutions' indirect-cost

rates.

- Provide government funds for a debt-service support program either 1) through interest from a trust fund, or 2) by annual appropriations.

Additional Changes Related to Debt-Service Support

- Eliminate the \$150 million ceiling on tax-exempt debt that can be held by private institutions, or compensate for the additional cost of taxable debt by adjusting the amount of awards for debt service.

Purpose of Debt-Service Support

- Criteria for awarding debt-service support could target various objectives, e.g., addressing the backlog of facility needs in specific fields, renewing and sustaining capacity, and stimulating selective growth in research capacity. Similarly, the criteria could target the needs of various types of institutions.

Cost of Debt-Service Support

- The cost would depend on the size of the program to support debt service.



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- The expense would be partially offset because debt service supported by the federal government would not be included in indirect-cost calculations.

Impact of Debt-Service Support

- Productive investment in facilities under a debt-service support program would be assured by establishing competition under predetermined criteria, requiring performance over a period of years, and putting institutions at appropriate risk.
- The risk of facility investment, and control over the nature of the investment, would be shared between the federal government and the research-performing institutions.
- Costs to the federal government could be spread over a longer period of time than would be possible with facility grants.
- There would be an alternative to federal support of facilities through targeted congressional appropriations.
- Results would include lower interest rates and an increased willingness of creditors to lend because of federal backing for loans to institutions.

Trade-Offs and Political Considerations Associated with Debt-Service Support

- A competitive debt-service program would remove increased federal support for facilities from the politically charged debate about indirect-cost rates.
- Nonetheless, the program would still shift the relative priorities of facilities and research projects, leading to less money for direct research costs.
- In contrast to a federal loan-guarantee program, a debt-service support program would avoid the kind of sensitivities created by events such as the savings and loan crisis.

Option: Facilitate Debt Financing

Means to Facilitate Debt Financing

- Remove, raise, or index to inflation the \$150 million federal cap on tax-exempt debt held by private institutions.
- Facilitate pooling of small bond issues to enable institutions with modest needs to use debt financing.
- Adapt the authorities of the Student Loan Marketing Association, "Sallie Mae," and the College Construction Loan Insurance Corporation,

"Connie Lee," so that more than 25 and 50 percent of their business, respectively, can be done with institutions that have high credit ratings. Yet, ensure that their missions of assisting institutions with lower credit ratings are not slighted.

- Create state loan programs where they do not already exist.

Additional Changes Related to Facilitating Debt Financing

- Increase federal reimbursement of the facility-related costs of sponsored research (see Option to Increase the Rate of Reimbursement for Facility-Related Costs of Sponsored Research).
- Allow public institutions to retain federal reimbursements of the facility-related costs of sponsored research (see Option to Increase the Rate of Reimbursement for Facility-Related Costs of Sponsored Research).
- Change attitudes toward debt; i.e., increase the perception of debt as a reasonable risk—an acceptable means of promoting selected goals.

Purpose of Facilitating Debt Financing

- Facilitated debt financing would provide funds for catchup or growth,

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mainly at major research institutions, but with some assistance to other institutions as well (i.e., through pooling, Sallie Mae, and Connie Lee).

Cost of Facilitating Debt Financing

- By definition, debt defers payment. This is not a source of facility funding. Rather, it is a financing method.

- The "cost" includes prevailing interest rates and, when tax-exempt financing is used, forgone federal and state revenue.

Impact of Facilitating Debt Financing

- There is no currently available estimate of the level of additional borrowing that would be stimulated by these changes. However, twenty-three institutions have reached the \$150 million ceiling on issuance of tax-exempt debt, and twelve expect to reach the limit in the next two years. Eliminating or raising the ceiling would enable these institutions to increase their use of tax-exempt bonds and decrease their use of taxable debt.

- Debt financing forces institutional priority setting and risk taking; it is likely that institutions would borrow for facilities in areas of research where

continuing activity and special strengths were anticipated.

Trade-Offs Associated with Facilitating Debt Financing

- Debt obligates institutional income from states, capital campaigns, indirect-cost reimbursements, endowment income, tuition, and other sources.

- Debt increases federal indirect-cost rates and hence reduces funds available for research project grants. This is true of all nonfederal financing of research facilities, but it is particularly true of debt financing because interest costs are also reimbursed.

- Although debt may make a facility more expensive because of interest costs, the value of having a facility today, rather than years from now, needs to be considered.

Option: Continue Present Policy

Means to Continue Present Policy

- Make no changes in current facility financing policies and practices.

Purpose of Continuing Present Policy

- Continuing present policy would maintain the status quo.

Cost of Continuing Present Policy

- Current costs would continue, but no additional cost would be incurred.

Impact of Continuing Present Policy

- Annual expenditures for research facilities would remain relatively static. For example, academic institutions collectively would expend approximately \$1,700 million.

- Funding for research programs and projects would be maximized, and thus the current productivity of the academic and nonprofit research enterprise also would be maximized.

- The backlog of facilities needs would remain unmet and perhaps would worsen.

Trade-Offs and Political Considerations Associated with Continuing Present Policy

- In the short term, by preventing diversion of money from research projects to facilities, continuing current policy would prevent exacerbation of present problems stemming from low rates of research awards and reductions in award amounts.

- In longer terms, continuing current policy would restrict the type of research questions that could be investigated in fields where the condition of research space is inadequate, and would limit the number of projects that could be undertaken in fields where the amount of space is inadequate. Thus, continuing current policy would bequeath an inadequate physical plant to the next generation of investigators.

- In the political sphere, continuation of current policies would maintain the pressure for targeted congressional appropriations, thus leading to continued erosion of the principle of merit review and less than optimal allocation of funds.

Conclusion

If the adequacy of research facilities at academic and other nonprofit institutions is to improve, the constituencies with a stake in the research enterprise need to reach consensus on appropriate changes in facility-financing policies and practices. These constituencies include the executive and legislative branches of federal and state governments and academic administrators and faculty members. The above outline of options is a possible starting point for the dialogue required to reach such consensus. ■

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1986 are a confirmation of the above risks.

Today in the United States, more than 328 chemicals are identified as toxic. This means that the impacts of these regulations are of such magnitude that they can no longer be viewed as an ancillary matter. In other words, to be a successful maintenance manager of the 1990s, one needs the wisdom of Solomon, the strength of Samson, and the guile of Joe Isuzu. One must recognize the deep interrelationship between maintenance management and environmental concerns



by developing sound strategy to confront these challenges. In order to better appreciate the impact of environmental laws on maintenance management, we should first summarize a few regulations.

Underground Storage Tanks

A large number of underground tanks are made of bare steel or are covered with tar or a lead-based paint and were installed in the boom years of the 1950s and 1960s or possibly during the energy crisis of the 1970s. Since these units did not have adequate protection, with age they have corroded and are likely to leak. If at least 10 percent of the volume of a tank is underground, it is considered an underground tank. The Environmental Protection Agency's (EPA) final ruling regarding these tanks, which became effective in December 1988, requires one or more of the following leak detection techniques:

- Inventory control by manual daily measurement and tank tightness testing every five years.
- Automatic tank gauging system.
- Monitoring the vapor in the soil, monitoring the liquids in the ground water, or monitoring the area between the tank and a second barrier.

The following records must be readily available during an EPA inspector site visit:

- Past years' monitoring results and most recent tightness tests including records of recent maintenance, repair, and calibration of leak detection equipment.
- Last two inspection records of the corrosion protection system.
- Record of any other repair or upgrade on the system.
- Closure record for three years after tanks are taken out of service.

Asbestos

Asbestos is the name for a family of minerals found in nature as masses of long, compact, silky fibers. Since asbestos fibers have good electrical and thermal insulating properties, asbestos was used as a common building material prior to 1977. Today, there are about 3,000 asbestos containing material (ACM) products that were used in building trades. Asbestos was used in making sealants, caulking compounds, insulation materials for steam pipes and hot water pipes, vinyl floor tiles, vinyl floor adhesive, house shingles, and siding.

According to California's OSHA standards, no employees should be exposed to an airborne concentration of asbestos more than 0.1 fiber per cubic meter of air for an eight hour, time weighted average. This is known as the permissible exposure limit (PEL). Employers are required to provide at least annual training for employees.

A management plan for handling any sudden release and cleanup procedures of ACM must be developed. Accurate monitoring of employee exposure to asbestos must be maintained for at least thirty years after any exposure, including medical surveillance of such employees. These new regulations pertaining to asbestos have significantly affected maintenance and renovation costs with significant impacts on building repairs. When more steps are added to a maintenance activity, the time required to complete a task increases as well.

Polychlorinated Biphenyls (PCBs)

Polychlorinated biphenyls are a family of more than 200 different chlorinated organic chemicals. Due to their desirable electrical and thermal properties and chemical stability, PCBs were extensively used as a dielectric fluid in transformers and light ballasts from the 1920s until the mid 1970s. In 1976, Congress enacted the Toxic Substance Control Act (TSCA), which required the EPA to establish rules governing the disposal and marketing of PCBs. The final rules were published in 1978 and the PCB ban with subsequent rules in 1979. Based on these laws, civil penalties of up to \$25,000 per day and imprisonment of up to one year may be imposed for willful or knowing violations. Some of the EPA requirements for PCBs include the following:

- PCBs must be stored in an EPA-approved facility.
- PCBs can only be disposed of in an EPA-approved incinerator.
- Regular periodic inspections and record keeping is mandatory.
- Spills and cleanups must be reported.
- Curbs and dikes must be built around the transformer to contain a spill of all PCB fluid contained within the device.
- PCB labeling is required.

Later concerns with the fire risk related to PCB resulted in additional restrictive rules published in 1984.

Fluorescent and Mercury Vapor Lamps

In the United States, 500 million fluorescent tubes are used annually. Among other materials, these tubes contain mercury, arsenic, and cadmium. The State of California alone uses about 50 million tubes a year. According to Section 66699(b) of the California Code of Regulations (CCR), spent fluorescent lamps and mercury vapor lamps contain sufficient mercury to qualify as a toxic hazardous waste. The EPA has also concluded that fluorescent lamps can, in sufficient quantities, cause a localized toxic hot spot in a landfill.

Interim directives, which are in effect now, hold one ounce of mercury per week as a dumping limit. So, in California no generator may dispose of more than twenty-five spent fluorescent tubes in one day as nonhazardous waste. This adds new disposal cost on relamping projects for any institution. Final rules could have a significant impact on monitoring and tracking these lamps because of the sheer numbers that maintenance managers must deal with when managing a facility of even modest size.

Chlorofluorocarbons (CFCs)

Chlorofluorocarbons have been widely used as a refrigerant, fire suppressant, solvent, and chemical compound. CFCs are extremely stable in the lower atmosphere, but will break down when they reach the upper layer of the atmosphere, where CFCs release chlorine atoms that destroy ozone. The Montreal Protocol on substances that deplete the ozone layer called for a phase-out of CFCs with a likely ban before the end of the century. Since that time, there have been numerous bills proposed at national and state levels to prohibit venting and disposal of CFCs.

For instance, one pending bill in the California Senate calls for reporting an inventory of in-service and decommissioned CFC equipment, volume of CFC consumed, date of equipment installation, comprehensive history of equipment services, records of CFC purchases, and CFC leaks. Also, if CFCs are not recycled or reused on site, the waste CFC must be handled as a hazardous waste.

Impact of Such Regulations

Traditionally, maintenance manage-

ment has been concerned with the anticipation and correction of possible equipment failure before it occurs. The underlying reason for this is to extend the useful life of the equipment, minimize equipment failure and service interruptions, and improve system liability. Maintenance engineering has utilized both deterministic and random techniques to quantify equipment reliability by such indices as mean time between failures, mean time to detection, mean time to repair, and mean time to failure.

The new environmental rules have profoundly affected maintenance organizations and routine maintenance issues. This has resulted in organizational uncertainty, lower budgets for maintenance, and profound shifts in organizational policies.

In other words, some of the maintenance and inspections are performed, not necessarily for reliability reasons but, to comply with environmental regulations. Moreover, in doing maintenance, additional precautionary steps are required to ensure the safety of maintenance personnel and compliance with regulatory requirements.

With today's environmental regulations, however, maintenance organizations are required to retain inspections and maintenance records of hazardous materials for extended time periods. Therefore, there has been a significant shift from paradigms underway in maintenance management that appear to be contrary to the views held in the past. To elaborate on this, a look at the concept of paradigms is in order.

Paradigms

Paradigms came from the Greek word "paradeigma," meaning model or pattern, and is a set of fundamental assumptions that are adopted by a professional community. This allows its members to share practices and similar perceptions. In other words, a paradigm is a collection of rules that define boundaries by telling one what to do to be successful within these boundaries.

For instance, the underlying objective of preventive maintenance is to reduce equipment downtime, production loss time, and improve reliability. This has been the dominant paradigm of maintenance management professionals. Therefore, a paradigm is what members of a professional community are sharing; conversely, a professional

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community consists of a group who share a paradigm.

In due time, every paradigm will create a set of problems it cannot solve. This raises the need to overthrow or transcend the limitations placed by an existing paradigm. In other words, it will focus on all forms or barriers to emancipation which sets the stage for the new paradigm.

Thomas C. Kuhn, in *The Structure of Scientific Revolutions*, states that such changes sometimes occur not gradually or predictably according to strictly logical patterns, but in spurts. Kuhn demonstrates that the transition from one paradigm in crisis to a new one, where a new set of beliefs emerge, is not necessarily a cumulative process. It is, rather, caused by a combination of peaceful interludes combined with intellectually violent revolution. An example of this would be the transition from Aristotelian Dynamics to Newtonian Physics to Einstein's Theory of Relativity.

Future Agenda

To address these concerns in view of the paradigm shift, maintenance management systems of the 1990s must develop new and innovative

techniques to address these environmental and other new challenges. Along these lines, the following concepts offer some possible solutions to these challenges.

Relational Data Base for Building Materials

There are thousands of different materials used in constructing modern buildings. These materials range from basic substances found in nature to complex synthetic compounds. Today, as health concerns are raised about the adverse health effects of a specific building material, owners end up spending significant sums of money and time to find the extent and location of a particular substance that has been declared hazardous. A good example of this is the large sums spent to determine the extent and location of asbestos in building materials.

On the other hand, when a new building is built, if the owner requires the contractor to give a list and location of all the materials used for the structure, and the owner saves the information in a relational data base, materials like asbestos could be managed more effectively. Such a proactive measure could reduce the cost of audits should any other chemical compound used in construction materials be regulated as a hazardous substance in the future.

In order to keep the size of the data base reasonable, one could potentially make educated decisions on which materials should be included and which materials ignored. Such a tool would be invaluable in determining the cost of building modifications and renovation, and would enhance the efficiency of maintenance functions.

Staying Current With New Regulations

The environmental rules and regulations at the federal, state, and local levels change so frequently that it is difficult for most professionals to stay current. In today's litigious era, liability exposure for most institutions is awesome. One potential way to address this problem is to develop an expert system where resources are dedicated to keeping the knowledge base current on all of these regulations for use throughout the institution, including the maintenance staff.

Document Management

The underlying theme of most envi-

ronmental regulations requires facilities owners to retain large quantities of data for considerable time periods. For instance, the medical history of any employee who is exposed to asbestos fiber must be retained for at least thirty years. There are stringent requirements for keeping inspections records in many areas, such as asbestos, PCB transformers, and tank level readings for underground storage tanks. The records must be readily accessible by regulating agencies upon request. Therefore, institutions are required to address all aspects pertaining to document management, such as storage, ease of access, etc.

Use of Expert Systems For Emergency Response

During any emergency, the first few minutes are usually the most critical. This is especially the case if potential release of any toxic chemical is in question. For instance, the Bhopal disaster started with a small leak from a tank of methyl isocyanate. If there had been an expert system developed for responding to emergencies, a dispatcher would have made decisions that could have controlled the damage quickly. In such emergency situations an expert system might even function better than human expertise. Afterward, the expert system could also help diagnose and document the fault and quickly reduce downtime and contain other adverse effects.

Conclusion

It was less than a quarter century ago that the concept of "spaceship" was introduced as a metaphor to underline the country's sensitivity toward the environment. As we saw in the last U.S. presidential election, the environmental issues played a major role. Since then, it has become clear that the political spectrum has shifted such that now almost all candidates are scrambling to show that they are interested in protecting the planet.

The regulatory climate concerning environmental issues is complex and dynamic, where performance standards can be numerous and diverse. It is not surprising, therefore, to see the impacts of environmental issues on facilities maintenance. These impacts are creating new challenges for maintenance management. There is no relief in sight, but our role is to find innovative ways to successfully meet the challenges ahead. ■



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Resource Management

Recycling

As you all know, recycling is a hot topic at present. Because everyone is involved in recycling or will be some time soon, part of this column shares some ideas on the subject.

Arizona State University suggests cutting down on office waste and staff time by following these simple actions: use both sides of the paper when copying, typing, or as scratch paper; reuse file folders; review multiple-part forms to make sure all copies are really needed; review distribution lists for reports and memorandums; when possible, circulate one copy rather than duplicating several; be sure all information sent to printers, plotters, and data processing is accurate because reruns waste paper, electricity, money, and energy.

The school's grounds department is also pitching in by reusing plastic bedding plant flats and recycling one-, five-, and fifteen-gallon containers. The department has developed a compost operation for grass, leaves, tree trimmings, and sawdust from the carpenter's shop and art department. Large tree limbs are given to the art department for art projects.

Saving money, space, products, and the environment is what recycling is about. The **University of Wisconsin/Stevens Point's** award-winning recycling program saved more than \$15,500 in its first nine months of existence. This savings was realized through selling aluminum cans, mixed paper, and corrugated cardboard (\$3,500) and by avoiding \$12,000 in tipping fees.

The University of Wisconsin/Stevens Point was the "Colleges and Universities" winner in the U.S. Environmental Protection Agency's national award program designed to recognize excellence in efforts to work toward a cleaner environment. The awards this year were dedicated to achievements made in municipal solid waste management through recycling. The university's recycling program uses "3Rs: Recycling, Reuse, and Reduction," involving the student body and university management.

The program saved 113.75 tons of waste from going to the landfill. The university also saved money by ap-

Stephanie Gretchen

plying 304 tons of the power plant's ash to road surfaces instead of bringing it to the landfill. The school is composting brush, leaves, and grass clippings and recycling waste metals, aluminum cans, cardboard, consolidated papers, glass, and plastic. And, the University of Wisconsin/Stevens Point is the only major recycler of tin products in the area. It supplies 1,200 to 1,500 pounds of used cans per week to DelMonte.

Within the program's first quarter, 7 percent of the university's waste was recycled; in the second quarter 17 percent was recycled; in the third quarter 22 percent was recycled.

The university began this program on a building-by-building basis in the fall of 1989. The school's refuse contract was up for rebid and the state auditors asked them to consider what effects recycling would have. The university became a pilot for the state while adhering to impending state and local recycling mandates.

The program has been implemented through "trial and error," said Sharon Simonis, business manager for the physical plant department. "We're still doing that. We keep trying to make things easier and more effective."

In an effort to continue to improve, the university has installed a compactor, which will save space and loading time. They had been using boxes, but now all they do is compact the paper and a truck hauls it.

Simonis said the key to a successful program is support. "We got the campus going on this program with the cooperation of our assistant chancellor of business affairs. We've had a lot of support from the administration and that's what made it all possible."

The **University of Guelph**, Ontario, Canada, has figured out a way to cut down on all the wasted paper that is sent to landfills when old telephone books become outdated and are replaced by new ones. The univer-

sity is shredding its phone books to use as bedding in their cattle, sheep, pig, and chick stalls in place of straw and wood shavings. Many institutions have been using newspaper, but here is another alternative.

How do you please students' culinary likes and dislikes while remaining environmental benign? **Miami University (OH)** decided the answer was fast food on Styrofoam.

During the renovation of Shriver Student Center, the university decided to make the food court fast-food-style to serve the students' needs. Disposable plates and utensils were to be used not simply because that is what fast food is usually served on, but because there were space restrictions in the facility and the cost of a dishwashing operation was prohibitive.

It was decided that polystyrene products were to be used since they can be recycled, unlike paper products. Paper products cannot be recycled because of the food contamination and the wax coating.

One obstacle in the operation was how to clean the polystyrene. No one had developed a method for the small user of polystyrenes to clean and process the material for recycling. This is important because food must be removed from polystyrene within twenty-four hours. Miami's physical plant department worked with a firm that specializes in industrial washing processes to determine how the polystyrene could be cleaned.

They decided on a drum washer normally used in the auto industry. The washer has a twenty-four inch diameter perforated drum that is eight feet long. Welded to the inside of the drum is an elliptical auger that pulls the product through the drum. Mounted in the center of the drum is a series of high-pressure water nozzles that spray 125°F water onto the material. The water then flows through a filtration system into a holding tank that is equipped with a water heater. Located at the end of the drum is a series of air nozzles that blow dry the product. The process takes about three minutes. Four cubic yards of material can be processed in about two hours.

After the polystyrene is washed, it drops into an auger-type granulator that shreds the product into confetti-sized particles. The washer cost approximately \$14,000 and the granula-

tor was purchased used for \$2,500. The end product is a clean flake with a low moisture content that is not too different from virgin stock. The product can be marketed to companies that furnish post-consumer plastics to manufacturers for about \$.20 per pound.

The university saved \$6,000 by avoiding disposal costs. A dishwashing facility would have added \$150,000 to the renovation costs of the project. The labor for the recycling is about 10 percent of what the labor costs would be for personnel to clear tables and wash dishes.

Stetson University (FL) has also implemented an innovative recycling project that involves foam cups. The university's cafeteria uses only foam cups, which students put into special recycling containers. The university has leased a foam densifier that can compress 8,000 foam cups into a 40-pound cylinder. The foam cylinders

are transformed into polystyrene chips, which are then sold to companies making such things as plastic coat hangers, cassette tape casings, park benches, combs, and toys.

The university's recycling program began with a student-initiated aluminum can program, and has grown into an all-out recycling effort. The school recycles computer paper, aluminum, plastic bottles, and cardboard.

Innovative thinking is often imperative in these days of budget crunches, stricter environmental legislation, and rising costs. **Pennsylvania State University/Harrisburg** found a way to cut costs while doing a completely different type of recycling—in-house chalkboard resurfacing. Waxy buildup renders chalkboards useless. Since wax is the binder for chalk, blackboards (and greenboards) eventually build up a glaze of wax that results in chalk not adhering to the boards and a glare that make it difficult to see

anything that did stick to the board.

Over the years, as instructors use chalk and custodians remove it from the chalkboard, the wax binder seeps into the pores of the slate which results in a wax finish. The facilities and maintenance operations staff was unable to remove the buildup with any commercial products, and it seemed as if the chalkboards would have to be replaced.

Costs for natural slate boards were too high and porcelain boards were unacceptable to faculty. The next option was to have the boards commercially refinished by a diamond grinding process; however, only two vendors were located within 300 miles of the college, and scheduling also created a problem.

The university decided to rely on its in-house staff to create a solution. The staff dismantled the chalkboard and laid the slate board, stripped of its trim and chalktray, on the floor. The staff used a commercial floor stripper to remove the wax buildup, and then the slate was again sponged with clean water and to remove all stripping materials. This process works well and returns the boards to a useful state. Following this procedure the boards were replaced on the wall.

The facilities and maintenance operations staff not only met this higher education need, but they accomplished the job using existing resources that would have been impossible due to monetary constraints.

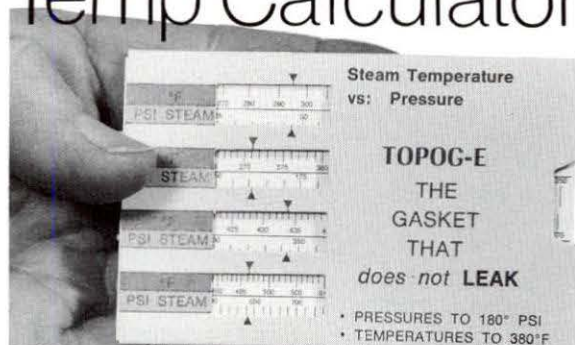
With a total of seventeen boards reconditioned, the direct cost for new slate would have been \$24,684. To use the commercial diamond grinding it would have cost \$4,012. The total in-house reconditioning cost for the boards is \$147.89 per board.

Training

The **University of Idaho** physical plant has been working on a new organizational plan—The Physical Plant Training Development Task Force. The task force was implemented in August 1990 to produce task analyses for every job within the physical plant and help employees who want or need further training.

According to the physical plant's newsletter, the task force determines the exact duties involved in each position. They then take the analysis to other employees in that position to add and revise. Following that, re-

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PHOTO: PEGGY BRISBANE, CMU NEWS BUREAU

Central Michigan University electrician Jan Zygomontowicz, right, shows Anne Brabow, left, and Shawn Kolonich how to troubleshoot faulty outlets and switches.

quired knowledge, skills, and abilities (KSAs) are identified for the position. Specialized training and a list of any equipment or tools needed to complete tasks are compiled, along with a list of safety procedures on a KSA list.

These task analyses are used to determine the requirements for positions. The task list can be used in yearly evaluations and to determine if an employee needs more training. This concept ties in with career pathing. By using this program, employees wishing to move on to another position know what is required, and the task force will guide them in the steps that need to be taken. The employee must identify career goals, outline a training schedule with the task force, and contact his or her supervisor and Ken Hall, physical plant director, to determine how goals are to be met.

Hall explained, "We were short on providing ourselves with adequately trained people. We have a very small employee pool; there just aren't that many people here. We hire good people at the entry level, ones who are good learners and people-oriented.

Then we train them as they follow their career path." Hall said this program has been successful. "We have seen a number of individuals who are progressing, and it has reduced our turnover significantly."

Central Michigan University students are learning practical aspects of park maintenance through an unusual course. The students spend two hours a week following the university's facilities management employees to learn about such areas as HVAC, plumbing, masonry, electricity, painting, and carpentry. The students also meet for one hour a week to hear guest speakers from the facilities management or parks profession talk on safety, waste management, mechanical and electrical systems, and vehicles and equipment.

The goal of the project is to allow students to experience the work conditions of different trade areas and become familiar with the vocabulary, tools, equipment, and processes in each trade, according to John

Hohman, coordinator of professional development. He determined which areas to include in the job "shadow" program.

Kaylynn Fox, a graduate assistant in the recreation and park administration department, thought of the idea for this class. The course fills the gap between facilities management and academic departments, thus giving the students knowledge of maintenance, an area in which the students were lacking expertise.

Eighteen students, most of whom are studying recreation and park administration, are taking this course in hopes of bettering their chances of getting a local, state, or federal parks job. Sixty facilities management employees have volunteered to help. "Many employees have gone out of their way to show the students some aspect of their trade," said Hohman. The facilities management supervisors agreed to the program "without hesitation," said Hohman. A course like this only helps the profession since it will place more qualified people in the field. ■

LA TROBE UNIVERSITY

La Trobe University took its first students in 1967, and its main campus is situated about 14 kilometers from central Melbourne, Australia, in the suburb of Bundoora. It is well served by public transport and is easily accessed by car from Melbourne International Airport. It has two other small campuses in the inner city suburbs of Carlton and Abbotsford, a country campus at Albury/Wodonga, and an affiliated college (La Trobe University College of Northern Victoria) situated at Bendigo. All of the latter campuses have been acquired by amalgamation with other institutions.

The climate in this part of Australia is temperate, often referred to as Mediterranean or Californian in comparison. It never goes below the freezing point in the winter months, but summer can bring temperatures up to 40°C. Due to funding restrictions, none of our buildings are air-conditioned (except those housing books or animals), so passive climate control of our buildings in design and construction terms is imperative for survival, not to mention comfort!

To limit the high cost of maintaining a landscape in such a climate, we have devised a program that we call a dry landscape design. This doesn't mean that the campus looks like the Arizona desert! On the contrary, it is a lush landscaped parkland filled with trees and shrubs. This vegetation is selected so that the species are hardy enough to withstand the natural climate; that is, they do not need artificial watering to survive the seasonal changes. This has achieved a significant saving of recurrent funds compared to caring for plantings requiring physical attention and the cost of water.

The university is mostly supported by Commonwealth government funds, and has approximately 12,000 students on its metropolitan campuses. It provides teaching and research to a wide range of faculties including health sciences, agriculture, behavioral sciences, biological sciences, physical sciences, economics and commerce, humanities, mathematics and

Denis Stephenson is manager, buildings and grounds at La Trobe University in Bundoora, Victoria, Australia. This is the first article in our new Global Exchange column.

Global Exchange

Denis Stephenson

information sciences, education, and social sciences.

The Bundoora campus is 220 hect-

ares, and from its inception was master planned in physical facilities terms. All buildings, services, roads, carparks, and the landscape conform to an overall plan of siting and design that is currently about two-thirds complete. The major development period was between 1966 and 1976. The typical academic building is four stories, concrete framed construction, clad in brickwork with an underground services tunnel connecting it to a central source of energy and other



PHOTO: LA TROBE UNIVERSITY

Aerial view of campus with administration building in foreground, science facility buildings on right of central facilities (lecture Theatres, Library) with non-sciences facilities on right.



PHOTO: LA TROBE UNIVERSITY

Aerial view of campus showing interlinked academic group of buildings

services. At second level, a concourse system also connects all buildings to one another and the central campus facilities (library, administration, lecture theaters, etc.).

Grouped around the central academic core of the campus are residential colleges, and sporting and recreational facilities. Encircling these are a series of carparks and access roads. The land offered the university in 1965 was subject to annual flooding, so a major establishment in civil engineering terms was undertaken, consisting of a series of lakes passing through the campus draining to a peripheral river. These lakes have added a scenic element to the landscape and wildlife environment while providing an engineering solution to flood mitigation.

All buildings are heated for winter comfort. A central gas-fired boiler system produces high temperature hot water that is reticulated via the tunnel system to each building. Currently, the Bundoora campus uses \$611,250 of gas annually, and \$1.176 million of electricity to maintain its operations on this campus.



Glenn College and Thomas Cherry Fountain in formal landscape setting.

PHOTO: LA TROBE UNIVERSITY

The department of buildings and grounds, of which I am the manager, encompasses physical planning, capital works project management, design and construction of all other building works, maintenance, landscaping, cleaning, traffic, and security. I report

to the vice-principal.

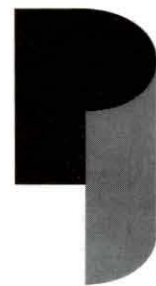
My primary concerns are providing satisfactory services at a time of diminishing budgets and trying to cope with an increasing amount of maintenance on a campus that is now just over twenty years of age. ■

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THE CHIEF REVISITED

First introduced nearly a decade ago, the Chief has undergone four major revisions providing enhancements ranging from minor to monumental. The fifth revision to this maintenance management program, due this July, transcends the previous upgrades. Release five represents the electronic equivalent of cosmetic surgery, a brain transplant, and amphetamine injections combined. Candidly, the improvements were sorely needed. To the credit of Maintenance Automation (the vendor), they recognized that it was time to rebuild the program from the ground up, and they did.

With one major exception (more on that in a moment), the only traits the new version retains from its predecessor is the name. As part of its total transformation, the Chief's new features include numerous thoughtful, nice touches such as:

- Automatic graph creation. The Chief extracts the data from internal files to create two-dimensional bar, line, and pie chart graphs. You tell it what data to use. While simpler (and consequently easier to use) than the complex graph generating programs found in Lotus 1-2-3 and Quattro, the Chief's graphs will nevertheless help readers to quickly assimilate the information your reports contain.
- Links with popular graphic formats (including PCX), so you can now display and print equipment or floor plan drawings of which you (or the equipment's quick-sighted vendor) earlier scanned in. Given the increasing complexity of new equipment, handing a drawing to a mechanic will increase their familiarity with specialized equipment and diminish the probability of mistakes. Since these drawings are just dime-a-dozen printouts, you generate them as needed. By extension, you also preserve your valuable, often irreplaceable, file drawings and documents.

- Release 5.0 now links directly to Control Systems International energy management controllers. CSI's sensors, alarms, and run time clocks transmit their data directly from CSI's

Howard Millman is a frequent writer and consultant for facilities management and computer issues. He designs and installs computer systems for universities and hospitals. He is based in Croton, New York.

Data Base Update

Howard Millman

System 7000 controller into the Chief. The Chief analyzes the incoming data and issues preventive and routine work orders based on service limits that you establish. In all work orders, a list of assigned personnel, suggested spare parts and needed supplies, as well as accounting codes appears on the form. Incoming data indicating that an emergency situation exists or is imminent receives priority handling, and the Chief generates an immediate work order.

- Predictive maintenance forecasts when maintenance will be required based on a formula factoring in the equipment's run time, usage, performance history, plus a projected mean time to failure. Agreed, this is a little like trying to legitimize fortune telling, but every little bit helps in avoiding

crisis calls. Since predictive maintenance appears as if it will require ongoing fine tuning, my assessment of this feature is to use it for vital, expensive equipment.

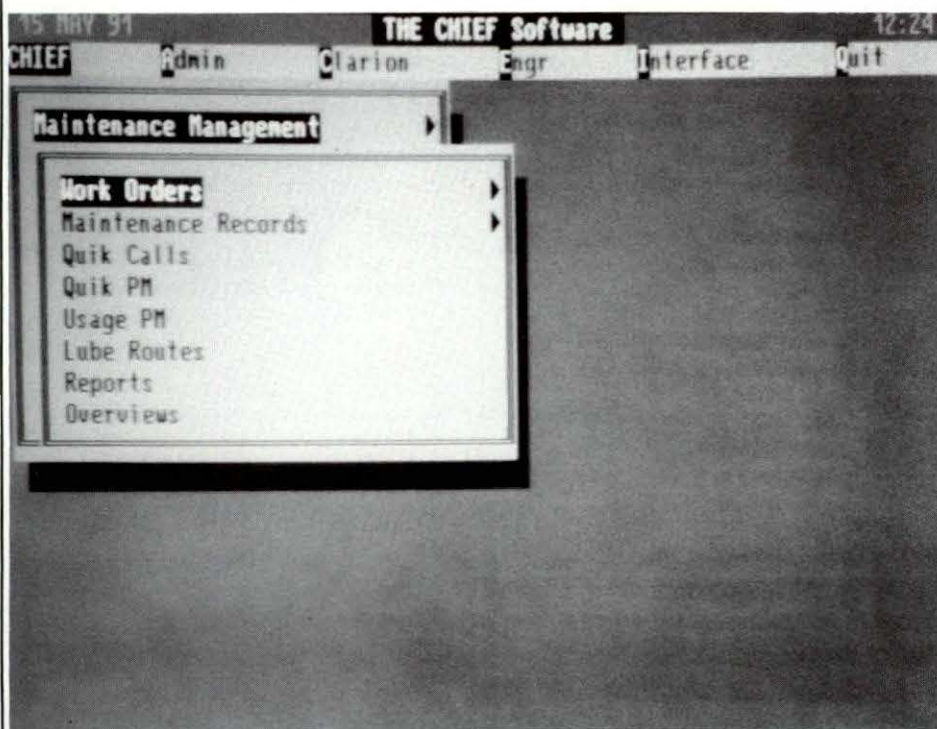
Predictive maintenance will prove inestimable to managers of campuses containing medical facilities. Beginning this year, the facility inspectors performing surveys on behalf of the Joint Commission for the Accreditation of Hospitals will want this kind of information available to them in accordance with the JCAH's newly adopted regulations concerning prioritizing of equipment maintenance.

- Complete reports to provide just about any combination of actual, budgeted, or projected totals expressed in dollars, hours, or by physical location.

Easier to Learn and Live With

In a addition to its many new features, Chief 5.0 is programmed in what is called a fourth generation language (4GL). Unlike its predecessor, written in BASIC, Chief 5.0 adheres to the industry's new graphic user interface standards. A fully programmable data base development application, this 4GL from Clarion (they call it their Professional Developer) deserves its well-earned reputation as a responsive, easily customized data base developer. In time, as you become more

15 MAY 91		Maintenance Automation Corporation		12:15	
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Open Date:	3/20/91	Time:	16:16		
Operator Id:	EA	Kevin	Anderson		
Requestor Info:	Y Yes No	Med Meyer			
Accounting Info					
Routine Account:		Routine Account 1			
Special Account:	1	Special Account 1			
Special Account:					
Ext Request: Y Yes No			Target Date: 3/28/91		
Note 1:			Note 2:		
Add Assignment Info:	Y Yes No	Safety Proc.:	Y Yes No		
Add Accounting Info:	Y Yes No	Work Permit:	Y Yes No		
As Found/Left:	Y Yes No	Shut Down:	C Complete Partial None		
Parts List:	Y Yes No	Cad Drawing:	Y Yes No		
⌘-Next/Previous Field ←-J=Accept Ctrl-P=Process Diagrams F1=Help F2=Exit F10=Save Record will be Changed					
					61,728K Free



Version 5.0 of the Chief will be provided free to all customers who presently have an annual technical service policy in effect with Maintenance Automation. The standalone upgrade cost, for customers without contracts, runs about 30 percent of the cost of a new program. The price is expressed as a percentage since the cost of the program depends upon the number of modules you purchase.

Like all graphic-based programs (and that includes the thousands of new Window's applications), 5.0 runs best on a 386 computer with a fast (28Ms or less) hard disk and 2 Megabytes of RAM. Yes, it will run on less sophisticated hardware, but at a penalty in performance. Shop wisely and you can buy a 386SX/16 for less than \$2,000, and that often includes hundreds of dollars of free software.

A computerized maintenance management program will work for you. But you have to help it by making a conscious commitment to maintain the program. Remember, the quality of effort you put into a project determines the quality of the results you get out. And that's one thing that will never change with time. ■

comfortable with the Chief's underlying data base, you can create your own menus and modules and link them to the base program.

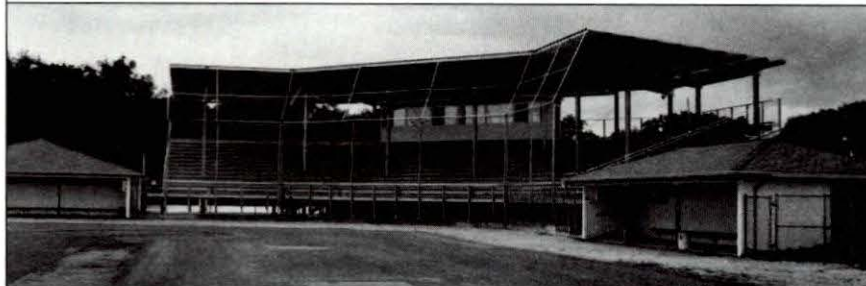
My earlier statement concerning the differences between the old and new versions of the Chief needs one important qualifier: to help ease the transition from the old to the new, version 5.0 contains the old version (including its Spartan menus). Having both versions coexistent will enable you to familiarize yourself with the new version at a more comfortable pace. Chief 5.0 directly imports data from previous versions.

Why bother to learn the new version? What's the return on your investment in time? This version is much easier to use; your staff can learn to use it without completing two additional years of graduate computer science courses. In this version, when you enter data, the progression flows logically. The program prompts you for required information. Online, context-sensitive help will contribute to reducing new-user training time. Since there is access to these help menus, you can customize them so they more accurately describe your facility's procedures.

What benefit will any data base do you if you can't get the data out that you want? This new version enables you to specify predestined data fields for inclusion in highly customized re-

ports. This precludes wading through lines and columns of irrelevant data, typical of the something-for-everyone data base report.

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Customer Service

Delivering Quality Service: Balancing Customer Perceptions and Expectations, Valarie A. Zeithaml, A. Parasuraman, and Leonard L. Berry. New York: The Free Press, 1990. 226 pp. \$24.95, hardcover.

If you and your employer really care about customer service, this is your book! It uses research results to lay out specific and practical guidelines for improving service. The study that underlies the book involved more than fifteen major U.S. companies. The researchers used customer focus-group interviews, employee focus-group interviews, in-depth executive interviews, customers surveys, manager surveys, and first-line employee surveys in six service sectors: appliance repair, credit cards, insurance, long-distance telephone, retail banking, and securities brokerage, all of which are heavily dependent upon the quality of their service for their continued profitability, and thus their existence.

The book identifies the major service-quality shortfall as the discrepancy between what service customers expect and their perceptions of the actual service they receive.

That gap between customer expectations and perceptions is caused by four underlying discrepancies: the gap between customers' expectations and management's perception of the organization's service; the gap between management's (correct) perceptions of customer expectations and the organization's service-quality specifications; the gap between service-quality specifications and service delivery; and the gap between service delivery and the promised service as communicated through media, representatives, etc.

Much of the book analyzes these gaps using the fascinating findings of the research effort. Throughout this analysis are tantalizing tidbits that no doubt will cause you to exclaim, "Aha! I've got the answer to our service-quality problems!"

Well, don't assume you're at the bottom of it all until you have read the authors' recommendations on how to get started on service improvement. The authors consider top management to be primarily responsible for service quality, so the recommendations focus on management initiatives. In a nutshell, they urge management to get ready to work hard, not just delegate; base decisions on data gathered selectively from numerous sources; organize for change, creating new roles and teams; leverage the freedom factor, starting with a thinner rule book; symbolize service quality through behavior, policies, and cultural enhancements; and promote the right people into management positions by looking at track records of people's accomplishments, beliefs, and priorities.

By the time you read this review, my boss will have read my executive summary of the book, and he and I will have met to

The Bookshelf

begin planning how to use the ideas in it. I urge you to follow a similar route to improving the service quality at your organization. Good luck! Read the book!

This book is available from The Free Press, 866 3rd Avenue, New York, NY 10022.

—Paul Schneller
Coordinator, Training and
Communications
Indiana University
Bloomington, Indiana

Productivity

Productivity in Organizations, by John P. Campbell, Richard J. Campbell, and Associates. San Francisco: Jossey-Bass Publishers, Inc., 1988. 477 pp. \$31.95, hardcover.

Productivity in Organizations is the second book in the *Frontiers of Industrial and Organizational Psychology* series. The book is a collection of fifteen chapters exploring what productivity is and tactics for increasing it. Productivity is surveyed from an individual and group perspective, but the overall focus of the volume is from the group point of view.

Chapters one and two provide the objectives of the volume and a definition of productivity. Basically, the author defines productivity conventionally, as a performance concept, but also examines performance effectiveness. These chapters provide a perspective on the formulation of productivity measures and how they can be linked to the effectiveness of a group.

Chapter three describes the Japanese employment system. This chapter includes the development of the productivity movement from the postwar era to future projections. Some of the topics addressed include the Japanese industrial organization, role of labor-management relations, national productivity policy, the quality control circle, and the Japanese personnel system. The chapter presents a good theoretical background of the Japanese system.

Chapter four is a summary of what we

know about the effects of training, recruitment and selection, goal setting, financial incentives, participation, work redesign, work scheduling, and large-scale organizational change efforts on productivity. Overall, training appears to be one of the most effective methods for improving productivity of managerial and non-managerial employees.

The focus of the sixth chapter is on how the process of personnel recruitment, selection, and classification procedures affect individual productivity in an organization. The fundamental point of the chapter is that recruitment, selection, and classification can contribute to increased productivity. This can be accomplished at comparatively little cost to the organization.

In the next chapter the authors present several theories of motivation and applications within the work setting. The guidelines for productivity enhancement outline where and how motivational considerations can influence productivity.

Chapter eight describes the association between training and productivity. The training model provides a good guide for analyzing training goals and job design.

Chapter nine provides an analysis of job enrichment and performance improvement. This chapter presents some arguments that question whether improved performance will be an outcome of enriched jobs.

Quality circles, one of the most popular forms of participative management, are described in chapter ten. The chapter considers the history of the quality circle approach, the performance of the quality circle, and the design and organizational context that influences quality circle effectiveness. The most important factors in the success of quality circles are management commitment, job security, and trust between management and employees.

The next chapter provides a different perspective on productivity by focusing on the intersection of human, organizational, and technological variables. Quality of equipment, inventory and purchasing policy, and quality of support services determine why some groups are more effective than others.

In chapter twelve, the author describes profit sharing, gain sharing, and employee ownership, why they have become popular, and what is known about their influence on productivity and organizational effectiveness.

Chapters thirteen and fourteen are written by two practicing behavioral scientists. Chapter thirteen provides a description of flexible job models, and chapter fourteen describes the labor-management initiative at Ford Motor Company.

The volume is intended for teachers, researchers, and practitioners in industrial and organizational behavior. The writing style is technical and is not easily transferred to the day-to-day workings of facilities management. The book contains an ex-

tensive bibliography and numerous references of other works. It will provide a good starting reference to investigate the use of various programs and their effect on productivity.

This book is available from Jossey-Bass Publishers, Inc., 350 Sansome Street, San Francisco, CA 94104.

—Tom Sichko

Management Engineer
University of North Carolina/Chapel Hill

Computers

Artificial Intelligence Applications in Engineering, by Richard K. Miller and Terry C. Walker. Madison, Georgia: SEAI Technical Publications Press, Inc., 1988. 369 pp. \$15, softcover.

Artificial intelligence (AI) is one of the terms that entered our vocabulary with the computer and the revolution in information processing it created. Although the term was not defined by the authors, we understand AI to be the attempt by computing systems to think and provide rational instructions or alternative answers to problem statements.

The thinking machine has long been a supporting actor in science-fiction stories.

Today, we know that expert systems developed using AI are the major enhancement to computerized maintenance management systems. *Artificial Intelligence Applications in Engineering* catalogs present-day AI applications in business, government, industry, and academia loosely grouped under the heading of "engineering." Incidentally, this volume is one of a family of seven dealing with other application groups such as manufacturing, R&D, and business management.

At first impression, the book reads like a doctoral thesis in need of professional editing. However, the sheer quantity of information contained in this seven-volume series is clearly beyond the scope of any single doctoral candidate's efforts. In short, this book was not intended to be read by the casual cogitator, but to be a viable reference source for a broad audience. Because of the breadth of topic coverage the book is often superficial. It does present additional sources of information in a bibliography for each engineering field.

The engineering fields touched upon by this single volume include aeronautics, agriculture, automobiles, biology, chemistry, civil, construction, electrical, energy, environmental, food processing, industrial, maintenance, manufacturing, mechanical, metallurgy, nuclear power, petroleum, process, quality assurance, telecommunica-

tions, transportation, and welding. Whew! What did we overlook? Unfortunately, the information presented within each field is not developed to a consistent level.

The electrical and mechanical engineering chapters were disappointing in that they addressed specific applications in electronics and machine design with virtually no coverage of the topic of interest to the facility manager. The civil engineering section was brief, but pertinent. One of the most informative chapters focused on the topic of maintenance engineering.

The authors report that "several hundred expert systems for maintenance have been developed." Most of the systems are oriented toward specific functions within an industrial process, such as diagnosing malfunctions in canned food product sterilizers. The amount of computing power and codes necessary for these expert systems appears to have limited their application to highly critical or cost beneficial components of large operations. Again, within this chapter the level of information supplied about the various expert systems presented was inconsistent. A matrix comparison of the systems would have had many empty cells.

The greatest value I received from the book was the authors' general discussion of AI usage benefits. For example, other factors that encourage the development of



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expert systems for O&M engineering and management include

- Demographic trends predict a shortage of skilled labor in this country. Expert systems make available the depth of experience and judgement rules of skilled engineers for an ad hoc inquiry by less-skilled technicians. Truly, the expert system can be viewed as an on-the-job-training vehicle.

- The diminished pool of skilled workers will be unable to keep pace with the increasing number of inquiries and demands upon their time.

- Today's skilled workers will someday leave the work force and take much of the information relating to their facilities into retirement.

- Physical plant technology is advancing in complexity and skill requirements, which increases the complexity and quantity of O&M data and maintenance requirements.

The authors did not report any comprehensive expert maintenance systems for the O&M profession that would be applicable within a campus setting. However, it appeared that the research underpinning this book was conducted in the mid-1980s and new developments have undoubtedly occurred. Apparently, the need for expert systems at APPA institutions exists and will grow in the near future. While I can recommend our readers' investigation of

the AI topic for application to APPA institutions, I hesitate to recommend more than a cursory review of this particular volume.

This book may be purchased through SEAI Technical Publications Press, Inc., Madison, GA.

—Eugene A. Simko

Project Manager
Anderson DeBartolo Pan, Inc.
Tucson, Arizona

Managing Change

Managing Change in Higher Education: Preparing for the 21st Century, ed. K. Scott Hughes and Daryl Conner. Washington: College and University Personnel Association, 1989. 100 pp. \$35, softcover.

The concept of change and its management has interested academicians and practitioners for many decades. All organizations and institutions are confronted with the need to change sooner or later, and the ability to cope successfully with this requirement is necessary for survival in most environments. Not surprisingly, the notion that managing change is an important task for all colleges and universities has emerged in literature on higher education. *Managing Change in Higher Education*

is a report to the entire academic community that analyzes this concept.

The book's goal is to describe and promote the use of a structured methodology to facilitate successful change in higher education institutions. This change model is based on organizational development principles that apply to behavioral science techniques of an organizational setting. The editors contend that this methodology is ideally suited for academic institutions, since its underpinnings and philosophy are rooted in the same principles that form the justification for higher education. Describing change as a constant process that promotes self-renewal, they suggest that each institution should develop a continually adjusted process for dealing with emerging opportunities and challenges.

The methodology is described in seven chapters, each written by a separate author. The first deals with the effect of disruptions and changes on human behavior, citing the presence of significant internally and externally initiated changes in higher education today. The author claims that when a change-induced crisis develops in an institution, people respond in one of two ways: type D (danger oriented) or type O (opportunity oriented). By harnessing the principles of type O behavior, managers can act as effective change agents to promote proactive change strategies.

Chapter two describes change as a pro-

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cess, comprising a present state, a transition state, and a desired state. This process involves an unfreezing (pain) period from the present to the transition state, and then a refreezing (remedy) process from the transition to the desired state. By considering change as a series of discrete states, the author suggests that the organization can more effectively manage the pain that inevitably accompanies change.

The third chapter discusses the roles of those involved in the change process, in order to concentrate on the human rather than the technical components of a change project. The model identifies the nature and role of sponsors, agents, targets, and advocates, and discusses how various organizational structures affect these participants. Three basic change relationships among these roles highlight the inability of certain arrangements to promote successful change; the author suggests other relationships that promote synergy in a change project.

Chapter four stresses the special and most important role that the sponsor plays in the process; as has been demonstrated in most environments, the ultimate success of any organizational project is primarily dependent upon the credibility and commitment of the sponsor.

In the next chapter the nature and extent of the inevitable resistance to change is discussed thoroughly. The human reaction to both positive and negative change is displayed over time, in order to allow the change agent to recognize the way individuals respond. The author suggests that the reasons for resistance to change are many, but that these tensions can be eased if management takes positive steps.

The sixth chapter ties together the concepts of organizational change and organizational culture. The author places the understanding of the culture of an institution at the center of any proposed change—that culture is so powerful that if a conflict exists between culture and a proposed change, culture will always win.

Chapter seven presents a case study of a fictitious university's attempt to reorganize its enrollment management department utilizing the management concepts proposed in the other chapters.

While this book was written for college personnel managers, the principles involved in managing change effectively are applicable to all areas of academia. Every institution of higher education is faced with the need to change frequently. Surely higher education administrators can consult conceptual maps and checklists before attempting to embark on sea of change.

Managing Change in Higher Education is nothing more than an excellent planning guide to consult before attempting to adapt to specific crisis or opportunity. The authors of this book have spent considerable time and effort to help systematize the chaos that accompanies unplanned change in higher education's unique environment;

they are presenting their findings for the benefit of all institutions. Physical plant administrators are no strangers to change, and should benefit from the book's suggestions. Each critical issue facing APPA institutions, especially the capital renewal/deferred maintenance dilemma, involves significant potential changes that require carefully planned change projects.

On balance, this book is an excellent resource that all administrators should consult periodically. It is an especially impor-

tant publication because it not only reminds the administrators that positive change is possible, but also successfully melds institutional culture with higher education management. In the long term, being a prudent steward of the culture of a higher education institution is the trump card of physical plant operations, since the institution needs excellence in facilities management to succeed in its mission.

Even though the lack of an index is an egregious omission, and the need to hire



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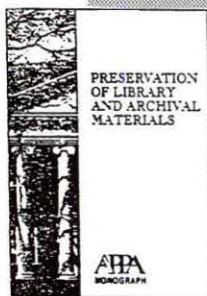
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an outside consultant may be overstated, *Managing Change in Higher Education* should be in every APPA member institution's library.

This book may be purchased through College and University Personnel Association, 1233 Twentieth Street, N.W., Suite 503, Washington, DC 20036.

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

Training

Managing the Training Enterprise: High Quality, Cost Effective Employee Training in Organizations, by Manual London. San Francisco: Jossey-Bass Publishers, Inc., 1988. 341 pp. \$27.95, hardcover.

The theory that underlies this text is that there is a link between training and accomplishing organizational objectives. Professor London offers us the benefit of his experience at AT&T and his research in employee development by suggesting how to improve the quality of employee education and training. The book has implications for training at many different organizational levels, ranging from that offered by specific units or departments, to the institution's training department, to the business and industry training programs offered by your institution to the community.

The need for enhanced training opportunities may be self-evident to most of us, but a strong case is made here for those needing a better rationale or justification to convince an institution's administration. Training and development may be viewed as elements of a larger human resource system. Training can be fit into the organization's structure in a variety of ways. Training that is applicable to the entire organization is usually run by the human resources department, and the more specific training needs are usually supplied by the specific departments themselves.

The concept of the human resource plan is introduced as a way to ensure that all personnel efforts are aimed at helping the organization and its employees achieve organizational and job goals. The responsibility for developing this human resource plan begins with the line manager. For example, the IBM company policy is cited, which dictates that every employee will have a training plan that must be revised each year by the line manager.

The unique aspects of training today's adult learner are identified, with several suggestions on how to reach older people, who learn differently than younger people. The need for training in different languages may soon become a reality with our changing work force. Self-paced learning programs through video or computer-

ized instruction are recommended as a useful component of a training program. Development costs for these technology-based forms of instruction may be higher, but lower delivery costs and the potential numbers of trainees reached justify their use.

The author cites IBM's goal for electronic training, which is to provide 50 percent of all training using computer-based methods. It is anticipated that these measures will increase the cost effectiveness of training programs.

Tracking the return on investment is a major focus of this text. In addition to the technological approach, more conventional methods such as student opinion surveys and enhanced productivity measurements are presented. The instruments presented were particularly thorough and provide a good starting point for anyone trying to develop their own instruments.

A sample education and training policy in support of organizational strategy is presented that demonstrates one approach to achieving this link. The sample policy makes a clear statement about the continuous learning/employment security connection that binds individual and company goals in a resilient way.

Training efforts and organizational strategies in the corporate world are reviewed with several interesting company approaches being featured; quality improvement efforts at IBM, Xerox, and Ford are discussed; labor/management cooperative efforts are profiled; and the role of training and changing behavior to match new directions of the organization is emphasized.

The final chapter, "Future Challenges for Employee Education, Training, and Development," should be of interest to all of us because of the direction that it provides, both for the facilities service organizations that we manage and for the larger role that our educational institutions play in the employee education field.

Each chapter includes a useful summary of key points and a series of policy opportunities and recommendations. In addition, the book includes three "resource" appendices. The first resource focuses on administrative functions in the training unit. The second is entitled "Premier Training Programs: How IBM and Motorola Do It." The third resource focuses on choosing the best training and evaluation methods.

This book will serve as a useful tool to those who are developing or fine-tuning their organizational training program. It also has useful information for the continuing education and the contract training departments in our institutions.

This book is available from Jossey-Bass Publishers, Inc., 350 Sansome Street, San Francisco, CA 94104.

—**Nick Cimino**
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Jul. 21-24—78th Annual Meeting. Orlando, FL.

Aug. 18-23—Institute for Facilities Management. New Orleans, LA.

Nov. 17-19—Institute for Facilities Finance in Higher Education. Washington, DC.

Other Events

Jul. 25—Professional Grounds Management Society Facilities Management Seminar. Columbus, OH. Contact: PGMS, 10402 Ridgland Road, Suite 4, Cockeysville, MD 21030; 301/667-1833.

Jul. 28-Aug. 2—39th Annual College Business Management Institute. Lexington, KY. Contact: CBMI, University of Kentucky, 204 Frazee Hall, Lexington, KY 40506-0031; 606/257-3929.

Aug. 4-6—Ninth Annual College and University Hazardous Waste Conference. Amherst, MA. Contact: University Conference Services, CS-92-41N, 918 Campus Center, University of Massachusetts, Amherst, MA 01003; Jim Fox 413/545-5116.

Aug. 4-9—WACUBO-Business Management Institute. Santa Barbara, CA. Contact: Don Scoble or Patricia Armstrong, WACUBO-Business Management Institute,

San Francisco State University, Office of Business and Finance, 1600 Holloway Avenue-Adm 469, San Francisco, CA 94132; 415/338-1323.

Aug. 5-6—Theater and Performing Arts Design. Cambridge, Massachusetts. Contact: Office of Development and External Relations, GSD, Harvard University, 48 Quincy Street, Cambridge, MA 02138; 617/495-4315, fax 617/495-5967.

Aug. 12-14—The Changing Regulatory Environment: Meeting the Challenges of the 1990s. Alexandria, VA. Contact: Debbie Baillargeon, NCSBCS, 505 Huntmar Park Drive, Suite 210, Herndon, VA 22070; 703/481-2012, fax 703/481-3596.

Aug. 12-14—Environmental Scanning Seminar. Chapel Hill, NC. Contact: Rachel Davies, Environmental Scanning, Division of Continuing Education, CB#1020 The Friday Center, University of North Carolina, Chapel Hill, NC 27599-1020; 919/962-1124, fax 919/962-2061.

Aug. 15—Professional Grounds Man-

agement Society Facilities Management Seminar. Fort Worth, TX. Contact: PGMS, 10402 Ridgland Road, Suite 4, Cockeysville, MD 21030; 301/667-1833.

Aug. 15-16—How to Meet New Ventilation Standards: IAQ and Energy Efficiency. Lake Tahoe, NV. Contact: Association of Energy Engineers, P.O. Box 1026, Lilburn, GA 30226; 404/925-9633, fax 404/381-9865.

Aug. 20-21—Total Quality Management Seminar. Chapel Hill, NC. Contact: Rachel Davies, Environmental Scanning, Division of Continuing Education, CB#1020 The Friday Center, University of North Carolina, Chapel Hill, NC 27599-1020; 919/962-1124, fax 919/962-2061.

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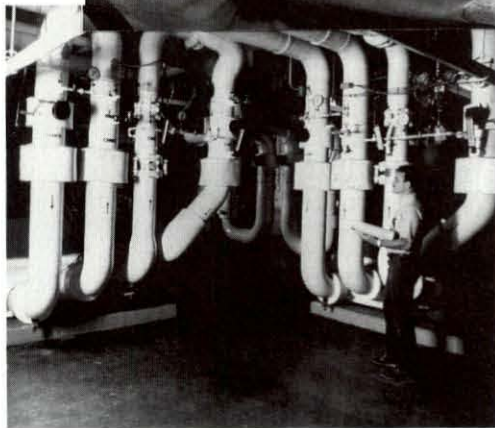


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