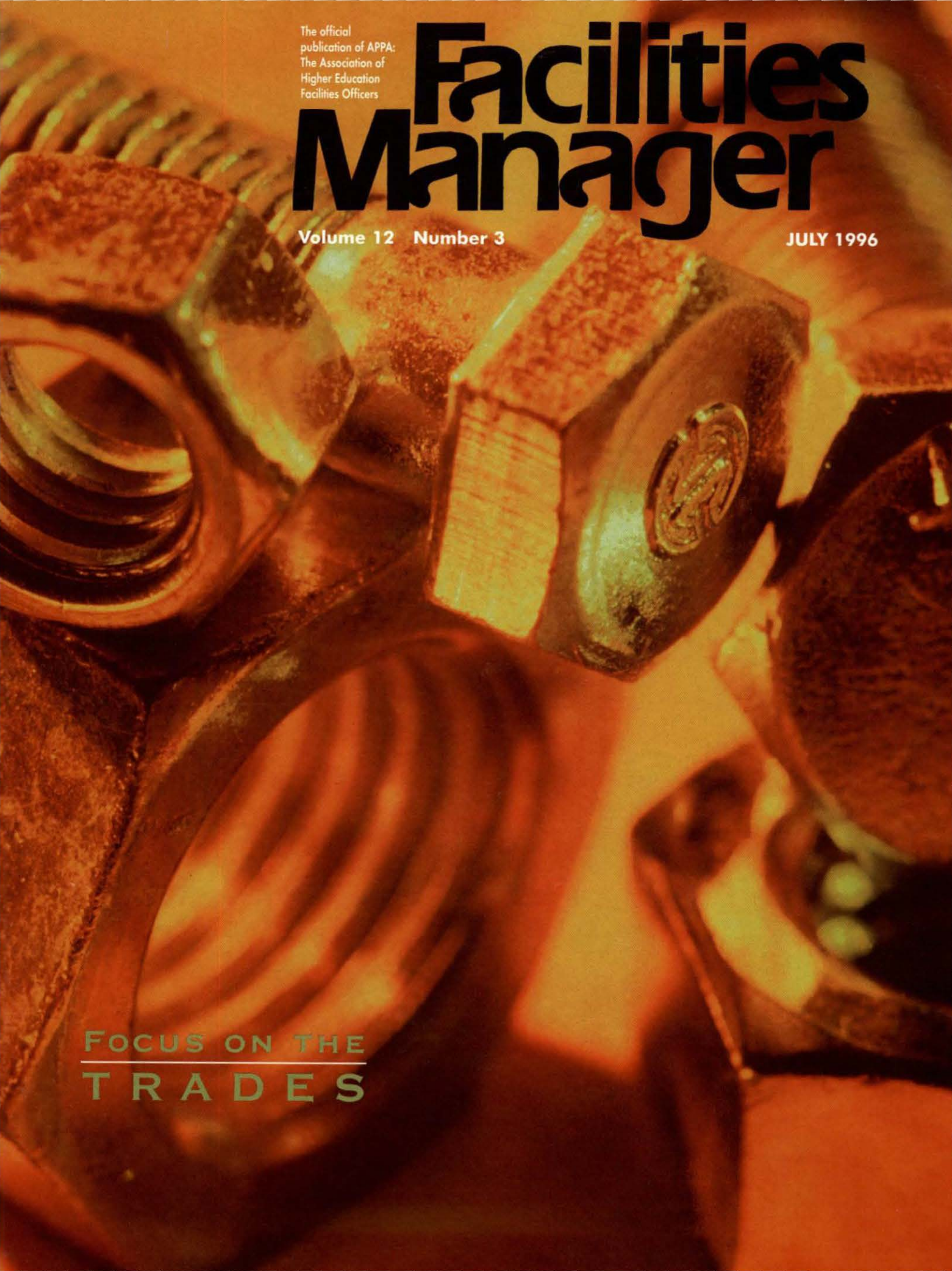
The official publication of APPA: The Association of Higher Education Facilities Officers

Facilities Manager

Volume 12 Number 3 JULY 1996



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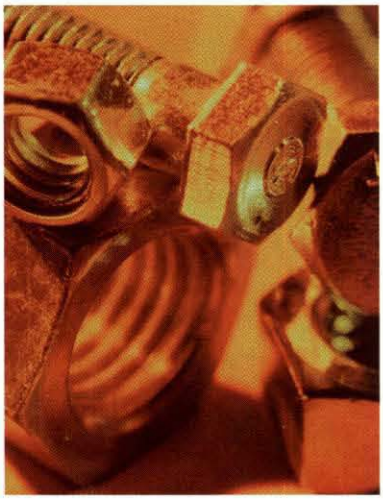

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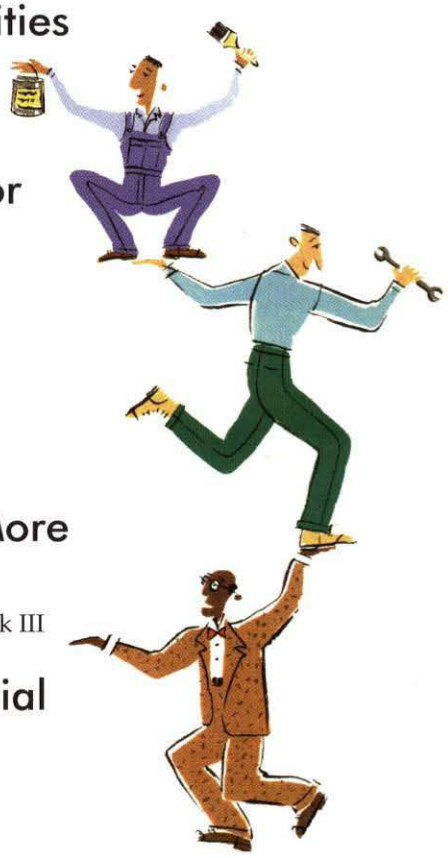
The Survival of the University Trades Shops

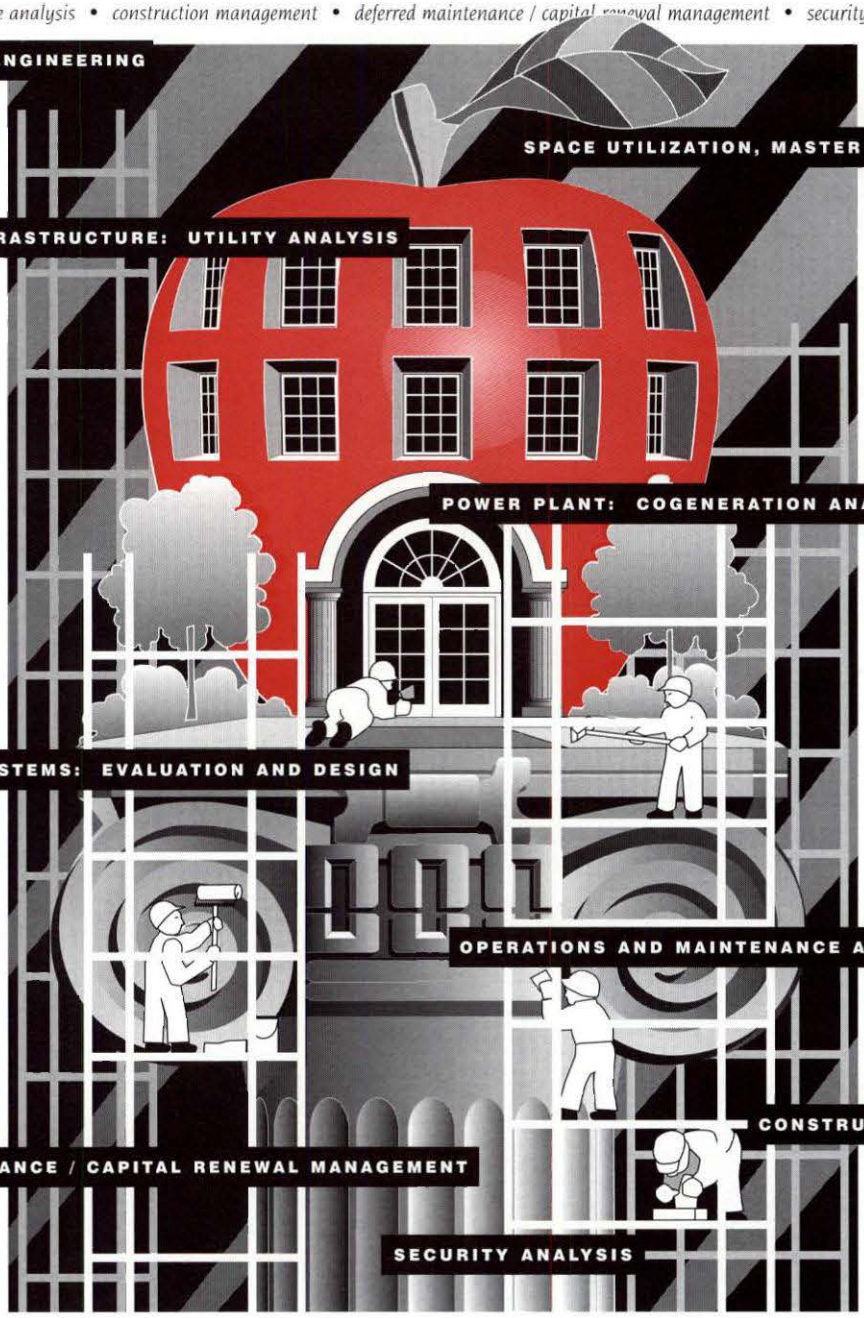
by Bruce Bush

FEATURES



DEPARTMENTS

FACILITY CONDITION ANALYSIS • *elevator engineering* • *infrastructure: utility analysis* • *energy systems: evaluation and design* • *power plant: cogeneration analysis* • *operations and maintenance analysis* • *construction management* • *deferred maintenance / capital renewal management* • *security analysis* • *facility condition analysis* • *elevator engineering* • *infrastructure: utility analysis* • *energy systems: evaluation and design* • *power plant: cogeneration analysis* • *operations and maintenance analysis* • *construction management* • *deferred maintenance / capital renewal management* • *security analysis* • *facility condition analysis* • **ELEVATOR ENGINEERING** *plant: cogeneration analysis* • *operations and maintenan* *analysis* • *facility condition analysis* • *elevator enginee* **SPACE UTILIZATION, MASTER PLANNING** • *operations and maintenance analysis* • *facility condition analysis* • *elevator engineering* • **INFRASTRUCTURE: UTILITY ANALYSIS** *nt: cogeneration analysis* • *operations and maintenance* *nalysis* • *facility condition analysis* • *elevator enginee* *ation analysis* • *operations and maintenance analysis* • *facility condition analysis* • *elevator engineering* • *infra* *operations and maintenance analysis* • *construction ma* *alysis* • *elevator engineering* • *infrastructure: utility an* **POWER PLANT: COGENERATION ANALYSIS** • *operations and maintenance analysis* • *con* *ondition analysis* • *elevator engineering* • *infrastructure* *ns and maintenance analysis* • *construction management* *s* • *elevator engineering* • *infrastructure: utility analysi* *nce analysis* • *construction management* • *deferred mai* *ing* • *infrastructure: utility analysis* • **ENERGY SYSTEMS: EVALUATION AND DESIGN** *nd maintenance analysis* • *construction management* • *engineering* • *infrastructure* *utility analysis* • *energy sy* • *construction management* • *deferred maintenance / cap* *structure: utility analysis* • *energy systems: evaluation* **OPERATIONS AND MAINTENANCE ANALYSIS** • *construction management* • *deferred mai* *ing* • *infrastructure: utility analysis* • *energy systems:* *construction management* • *deferred maintenance / capita* *structure: utility analysis* • *energy systems: evaluation a* **CONSTRUCTION MANAGEMENT** **DEFERRED MAINTENANCE / CAPITAL RENEWAL MANAGEMENT** *is* • *elevator engineering* • *infrastructure: utility analysi* *nce analysis* • *construction management* • *deferred ma* **SECURITY ANALYSIS** • *elevator engineering* • *infrastructure: utility analysi* *nce analysis* • *construction management* • *deferred maintenance / capital renewal management* • *security analysis* • *facility condition analysis* • *elevator engineering* • *infrastructure: utility analysis* • *energy systems: evaluation and design* • *power plant: cogeneration analysis* • *operations and maintenance analysis* • *construction management* •



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From The Editor

Steve Glazner

It was time to take a look at the basics.

In recent issues we have given attention to such topics as leadership, space management and optimization, activity-based management, benchmarking, capital planning and construction, and environmental stewardship. Important topics all, but we needed to reconnect to some of the issues and concerns currently affecting the maintenance and crafts trades within the facilities management function. We wanted to spend some time with what is for most facilities organizations their original and primary purpose—maintenance and operations.

Our focus on the trades begins with Bruce Bush's discussion of the familiar realities within our facilities organizations today and how Cornell University's trades shops are managing their human and financial resources to best serve the university community. Paul Tabolt puts a spotlight on the vital, yet little-known, Physical Plant Crafts Association and tells us its history, its goals, and its accomplishments. We urge our readers to support this important organization.

Also in this issue are features on leadership concepts for the trades, the dynamic innovation of multi-skill training, and working smarter with the use of project teams. Finally, Jon Ford and Judy Stead report on the current activity of APPA's new Custodial Analysis and Staffing Task Force, which is developing a comparative benchmarking survey for custodial operations, as well as updating and revising APPA's landmark publication, *Custodial Staffing Guidelines for Educational Facilities*.

APPA is working on other basics as well these days. Research findings on the status of capital renewal and deferred maintenance at U.S. colleges and universities are being presented this month at the APPA and NACUBO annual meetings. The published APPA/NACUBO/Sallie Mae report, *A Foundation to Uphold*, is scheduled for release in September, and a companion case study publication will also be made available.

Members have told us that they need a publication that helps them keep on top of current environmental regulatory issues. As a result, APPA now publishes *The Regulatory Reporter* on a monthly basis, keeping you informed of changes and alerting you to requirements you need to fulfill in order to remain compliant. For more information on this newsletter, contact Diana Tringali, APPA's director of member services, at 703-684-1446 ext. 228, or by e-mail at diana@appa.org.

In addition, APPA, in cooperation with Van Nostrand Reinhold Publishers, has published a special looseleaf edition of a new book, *Environmental and Workplace Safety: A Guide for University, Hospital, and School Managers*. Included are checklists to help you assess the status of your compliancy, as well as clearcut requirements. The cost for this book is $80 for APPA members, $100 for all others. For more information, call Cotrenia Aytch, APPA's communication services manager, at 703-684-1446 ext. 235, or by e-mail at cotrenia@appa.org. You may also request an order form through APPA's fax-on-demand service at 800-891-3965, document #41.

We know that these months before the beginning of the new academic year are extremely busy for facilities professionals at educational institutions. Because of that, we especially thank you for taking the time to read this issue of *Facilities Manager*. ■

APPA News

Annual Reports

President-Elect Ronald T. Flinn
Michigan State University

My year as President-Elect started when Doug Christensen telephoned to congratulate me and then strongly urged me to attend the May 1995 Executive Committee meeting, then only a few weeks away. Subsequently, Wayne Leroy suggested I attend the June meeting of the Council of Higher Education Management Associations (CHEMA). Agreeing to both of these suggestions turned out to be a wise decision in that they afforded me an early assessement of the key issues facing APPA and the importance of APPA's role as a key player in the CHEMA organization.

As President-Elect, I was asked to attend three regional meetings: Rocky Mountain in Whitefish, Montana, hosted by Bob Lashaway of Montana State University; Central in Manhattan, Kansas, hosted by Ed Rice of Kansas State University; and Midwest in Madison, Wisconsin, hosted by John Harrod of the University of Wisconsin. There is no doubt that attending the regional meetings is the most enjoyable part of a leadership position in APPA. Each region is unique, and all share a strong dedication to serving the mission of higher education, and their common interests were affirmed through the strategic planning exercise. I presented remarks that focused on the APPA vision, Global Partner in Learning. This was an adaptation of the keynote address that Gary Reynolds asked me to make at the August 1995 APPA Institute.

Attending the regional meetings as an APPA representative provides the opportunity to receive many comments, suggestions, and yes, criticisms and complaints—all of which need to be given appropriate consideration. Similar issues were voiced at all three regional meetings concerning regional involvement and participation in APPA events and activities; the overall cost and delivery of educational programs; the effective tool APPANet is proving to be; and the effectiveness of APPA's Government Relations program. I am pleased to report that these areas of concern are the focus of APPA's strategic initiatives as a result of the strategic planning effort.

It was rewarding to observe that at the November Executive Committee meeting, all attendees—members and staff—were focusing on APPA's financial situation. I look forward to assuming the presidency in July, and I very much appreciate the strategic planning exercise that has caused us to better focus upon our mission and core responsibilities. I credit my predecessors Charlie Jenkins and Doug Christensen with the wisdom to direct APPA into this effort along with great staff assistance. ■

Immediate Past President
Charles W. Jenkins
Saint Mary's University (TX)

Two significant events highlighted my year as Immediate Past President. The first occurred in September when Ann and I were out of the continental United States for twenty days attending the AAPPA meeting. Along the way we had the opportunity to visit two BYU facilities in Hawaii. We thank Judd Whetten and his associates for being wonderful hosts.

A long flight over lots of water took us to Melbourne, Australia, where we toured many sites thanks to our gracious hosts Arthur and Maureen Bradley, Nigel Postil, and Angela and Paul Riggs. Among the venues visited was the University of Melbourne campus, a beautiful plant combining venerable old structures with state-of-the-art lecture halls.

From there we departed for Hobart, Tasmania and the AAPPA/AITEA (Australasian Institute of Tertiary Education Administrators) annual meeting accompanied by Don and Wendy Long of Macquarie University (a super host and hostess). During the remainder of the week we heard several excellent addresses on the topic of partnering and made many new friends among the conference attendees. The Australasians impressed us as a fast-moving and enthusiastic group, full of good ideas and extremely motivated.

We returned to Sydney where Robert and Lana Kelly took care of our every need. We then flew on to Oahu where we were entertained by Kent Keith, former president of Chaminade University and keynote speaker at our annual meeting in Philadelphia. Finally we were homeward bound. I was ready, but it had been a great trip. We thank APPA for the opportunity and all our wonderful hosts and hostesses along the way for an experience of a lifetime.

Shortly after our return I was most pleased to find that publication of the monograph *Perspectives on Leadership in Facilities Management* was imminent and that the Nalco Chemical Company had agreed to underwrite the first printing. It is now available from the APPA office. Speaking immodestly (as I often do), I think our great publications staff did a superlative job of showcasing the ideas of several notable leaders in facilities administration as well as other areas of higher education. This publication filled the last square of my presidential agenda, and it is a bold, pleasing checkmark. Thanks to the staff for their diligent and excellent effort. ■

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Vice President for Educational Programs George F. Krell
University of Wyoming

1995 was a record-setting year for APPA Educational Programs. Both the winter and summer sessions of the Institute for Facilities Management had record enrollments, the Foundations of Leadership for Facilities Managers, the Institute for Facilties Management, and the Executive Institute continue to operate at maximum capacity. In addition, our workshops and seminars continue to be well attended. The sales of the video-assisted *Basic Tools for Facility Supervisors*, developed in partnership with Ogden Services, is exceeding our projected goals.

Gary Reynolds, Iowa State University, the program manager of the Institute for Facilities Management, is leading a group to study restructuring to course offerings for this program. The concept would be much like program offerings presented by colleges and universities. Certain courses in various core areas would be required, and others could be taken as electives. Prerequisite requirements would need to be completed and the prescribed hour requirements have been attained before certification would be awarded. The possibility of including all of APPA's educational offerings into such a concept exists.

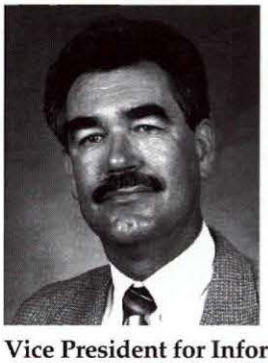
The Foundations of Leadership program continues to be an extremely popular portion of our educational offerings. The continued demand has prompted us to look into extending our current partnerships with the Covey Leaderhip Center and the Marriott Corporation, which ends in September 1996. Doug Christensen, Brigham Young University, is leading these partnering efforts. Due to many requests, the committee is looking into expanding our leadership programs for those individuals who have completed the foundations course.

The Institute for Facilities Finance, which has been offered in partnership with NACUBO, continues to be quite successful with almost half the attendees coming from NACUBO. John Harrod, University of Wisconsin, is leading a team that is looking into expanding the faculty.

John Harrod and Emily Wren, Indiana University-Purdue University/Indianapolis, have provided committee leaderhip while working with the University of Notre Dame to provide a more meaningful experience in the Executive Institute. These efforts include curriculum and instruction modifications that will better address the current concerns of the college and university facilities management profession.

We have continued to successfully present timely workshops and seminars on topics such as Planning for Master Planning, Contract Administration & Project Management, and Building Commissioning. These specialized presentations are managed by Jim Roberts, Campbell University.

I would be remiss in concluding this report without expressing the committee's appreciation to all the very talented individuals making presentations at the various APPA educational programs. Another group of true professionals that the committee could not operate without is the APPA staff. ■



Vice President for Information Services Pieter J. van der Have
University of Utah

I am proud to report that APPA's Information Services Committee had a terrifically successful committee meeting. Much of the focus of the past year, naturally, was on APPANet. APPA staff provided an update regarding our exciting enter-

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[1] National Power Laboratory study.
[2] EPRI estimates and Stratus Computer study.

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prise. In a nutshell, we delivered APPANet within budget and on schedule—launching its premier at last year's annual meeting in Philadelphia. There have been a pleasantly surprising number of "hits" on the home page, indicating substantial interest by many of our members. By assessing the profile of individuals who have tested our site, we are using this information in the development of future directions for the evaluation, education, and marketing to both members and nonmembers.

A focus for the committee and staff is to provide increasing incentives and opportunities for use of the APPANet by all potential users. Vehicles to achieve this, potentially, include *Job Express*, publications in general (including easy indexing), survey information, *Inside APPA*, and so on. In the process of reviewing our options, the committee also identified opportunities for generating a revenue stream from members and nonmembers, depending on who wants to access what. Toward the goal of eventually "Internetting" much of our resources, we agreed to modify the frequency on which both the newsletter and the magazine are published.

New initiatives for APPANet this year include the addition of a search engine that will allow members to interactively search some of APPA's research databases.

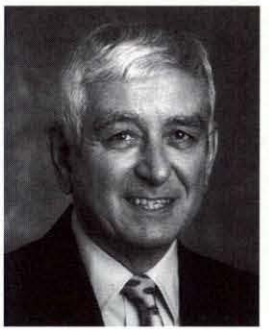
Custodial Analysis and Staffing is a project spearheaded by Greg Fichter of Indiana University. His task force met for the first time this spring, and he hopes to coordinate his request for data with the next generation of the Comparative Costs and Staffing (CCAS) survey. In addition, the committee will begin exploring the possibilities of developing a similar project for grounds standards.

The committee agreed to seriously examine the potential and benefits of combining data presently gathered from CCAS and the International Experience Exchange. We felt there are several sections of CCAS and the Experience Exchange that are of little or no value to a majority of our members. This question, and its relation to APPANet, will be our main focus during our meeting in Salt Lake City in July.

We examined, in depth, the Strategic Assessment Model (SAM). We reviewed the parameters and agreed on some specific recommendations. The committee recommended eliminating a couple of the criteria, and modifying the tiers somewhat on others. Generally, the committee felt extremely positive about SAM and its potential. If time permits in July, we will discuss SAM further. However, the committee expressed hope for its future development. The high enthusiasm expressed at the Philadelphia meeting by 150 participants, as well as what we have heard from the individual regions, strongly suggests that work must continue on the project. We feel that APPA would be remiss if it failed to nurture a project that has received that kind of excitement!

The committee also reviewed the progress of the deferred maintenance study conducted jointly with Sallie Mae and NACUBO. Results will be announced at this year's annual meeting, to be followed by the published report and a companion case studies book.

I can honestly state that this committee is a group of hard-working and hard-thinking members. I feel sincerely honored to have the luxury of working with these individuals, every one of whom consistently takes the challenges facing this committee seriously, and works hard toward consensus and resolution. Simultaneously, I appreciate working with all of the APPA staff during these exciting times. ■



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

The Professional Affairs Committee meeting was held in Dallas, Texas in March 1996. Prior to discussion of specific committee topics, I briefed the members on the status of the new building and the Board's decision regarding the

Government Relations program. In addition, I discussed the reports made by the Board of Directors Strategy Work Groups, with particular emphasis on the one that affected our committee.

The following is the status of the topics discussed:

1. The committee is presently reviewing three applications for the Award for Excellence in Facilities Management. A final determination on each application will be forthcoming this summer.

2. The committee discussed the possibility of giving consideration to changing the "official" name of our organization. Several possibilities were explored, but in the final analysis, the committee agreed unanimously to take no action at this time.

3. Tom Harkenrider briefed the committee about changing the criteria for the Award for Excellence in Facilities Management. Tom and Bob Collins agreed they would bring a proposal based on an interpretation of the Baldrige Criteria applied to facilities in higher education for committee review at its meeting in July 1996 in Salt Lake City.

4. The committee was briefed on the status of FMEP activity as well as the Upward Bound/Mentoring program.

5. The committee discussed at length the strategic initiative assigned to our group, "Increase awareness of APPA by senior officers of the institutions served by facilities management personnel." We identified two areas where this strategy applies. The first is general in nature, and the second is as it applies at our own institutions. The tactics we identified toward achieving this strategic initiative were:

a. In General:

- Go where they go (meetings & conferences);
- Publish in what they read (association news);
- Send them copies of our publications (news & information);
- Attempt to get on the speaker's list for their associations' conferences;
- Offer joint sponsorship of programs;
- Advertise in their publications;
- Identify benchmarking/best practices results.

b. At Your Institution:

- Invite them to walk around the campus with you and members of your staff;
- Solicit their opinions of service quality levels;
- Provide them with copies of your customer feedback forms;
- Prepare a self-evaluation for them similar to what one would put together for an APPA Award for Excellence in Facilities Management;
- Empower employees to make decisions;
- Put yourself in their position and supply them with the material feedback you would think you would want if you were in their position.

6. The committee analyzed the text published to assist members in understanding the APPA vision statement, Global Partner in Learning. A lengthy discussion was conducted on the implications of our analysis. Highlights of this discussion follows:

We discussed the primary difference between organizations like APPA. Basically there are two types: an organization of MEMBERS each having equal status; the second is an organization of INSTITUTIONS with multiple categories of membership with varying rights. We decided that APPA should remain an organization of institutions and that nothing in the vision statement precluded us from reaching that conclusion.

Next we reviewed the text that explains the APPA vision statement and expressed our opinion on the meaning of the words. We proceeded to look at the rights and restrictions we place on our various categories of membership, and it is our opinion that our current arrangement is in conflict with our vision statement when one considers the meaning of the single word *partner*.

Our final point of discussion was related to the concept of developing a mechanism(s) whereby we could provide equal rights and privileges to all member categories without significantly impacting the balance of power in our organization.

Although not completely fleshed out at this point in time, one idea was to create "regions" out of various member categories utilizing our existing procedures that are not geographic but represent member categories. While we did a lot of work on developing a vision state, it is the committee's opinion that we did not go far enough back to begin our thoughts about visions. Unless those are firmly defined, it is difficult to build a real vision. ■

Executive Summary

Wayne E. Leroy, CAE

Campus Memories

With graduations a recent memory, I ask you to reflect on the hustle and bustle of graduation week... parents and grandparents walking around the campus looking at buildings, pointing to the multicolored flower beds, admiring stately old or unusual trees. And kids, of all ages and family relationship; brothers, sisters, sons, daughters, nieces, and nephews all running across the lawn, hiding behind the trees and around the corners of the next building. And of course, the students; some saying permanent goodbyes to a place they have spent the last four or more years of their lives. Others, only saying temporary goodbyes as they carry personal items to waiting cars, vans, trailers and rental trucks—promising to keep in touch during the summer, and looking forward to seeing each other in the fall.

The college and university experience, and its many and varied memories, does not just happen—people make the experience become a memory. Without a doubt the many fine professors and teachers play a significant role in the preparation of students for the lifetime of opportunities and challenges that lie ahead of them. There were also friendships made and nurtured during those many hours spent together in classes, learning to live together as roommates, or doing the multitude of other student activities available on campus. But there is also another group, one that is an integral part of campus life, and who affects students every hour of every day, of every year they spend on campus. Of course you know who that group is—the staff of the facilities department.

The facilities staff are that talented and dedicated group of people who nurtured and trimmed the trees that the parents and grandparents proudly walked beneath, and who fertilized and mowed the grass through which the kids so gleefully ran. It was the facilities staff who cleaned and maintained the classrooms and laboratories where students and faculty embarked on a multitude of learning adventures. It was the facilities staff who provided warm water for morning showers, electricity for both studying and enjoyment, security on the walk back to rooms after a late night at the library or athletic event, and more.

The college and university experience, and its many and varied memories, does not just happen—people make the experience become a memory.

Go into practically any community throughout the world and one will find some type of educational institution. Many of these facilities are indeed magnificent structures, truly architectural works of art. The unsung heros responsible for these educational edifices are the people who build, maintain, protect, and preserve these valuable community resources—the facilities craft and trades personnel.

The challenges faced by trade and craft professionals during the past decade have indeed been of rapid changes, exploding new technologies, and the ever increasing demands for controlling costs and increasing efficiency. This dilemma is evidenced by three factors:

1. *Increased Square Footage.* The recently completed study to update statistics regarding deferred maintenance determined the amount of square footage on college and university campuses has increased from 3 billion square feet in 1988 to over 4 billion square feet in 1995. To put a billion square feet into perspective, that represents the equivalent of 100

Wayne Leroy is APPA's executive vice president.

campuses, each with 10 million square feet of space!

2. *Enhanced Technology.* Just review the design and specifications for your last building project, and reflect on the changes in recent years. Things like electronic ballasts, integrated control systems, variable speed motors, new floor, wall, and ceiling materials, card access and security systems, and other systems.
3. *Human and Financial Resources.* With ever-increasing pressures to do more with less, the facilities trades and crafts workforce has been under intense pressures to be more productive. This is evidenced by recent statistics from the National Center for Educational Statistics.

However, all these challenges do not negate the fact that the higher education facilities workforce is the largest segment of the population. But more important than the number of skilled professionals employed by higher education institutions, is the stewardship and institutional memory provided by the cadre of trade and craft workers.

Like those parents, grandparents, brothers, sisters, sons, and daughters visiting campus during graduation week, many of us are fortunate enough to have the campus environment as an integral part of our daily lives. And, no group demonstrates their commitment to a job well done than the campus craft and trades workforce. There are not very many industries in today's world that can boast of having generations of workers. On many campuses grandfathers and fathers were employed by institutions where sons and daughters now carry on in the tradition of providing commitment to an institution and the community it serves.

Walk around any campus and observe the multitude of people who take real pride in their workmanship—the cabinetmaker with the skills of a sculptor, the carpenter able to hang a new door in an opening that's not quite square, mechanics who keep equipment operating long past its useful life, grounds keepers who truly care about weeding flower beds and trimming grass, and custodians who take real pride in clean floors and windows.

The challenge for facilities administrators and managers is how to maintain balance given the financial pressures of the day, coupled with the need to provide high quality services to campus stakeholders. Perhaps part of that answer can be found in APPA's vision statement, being a Global Partner in Learning. To maintain a competent, dedicated, and motivated workforce, it is essential that appropriate education and training be provided.

APPA's strategic initiatives stress the importance of establishing International Resource Centers, whereby partnering with various stakeholders to provide information, materials and educational programs in the core competencies required for building, operating, and maintaining our institutions rich architectural, cultural, and community heritages can be protected and preserved. By combining all these things, then and only then will APPA become the Association of Choice for the educational facilities workforce. ■

Focus on Management

Discount Maintenance is No Bargain

H. Val Peterson

Everybody likes a bargain...right? When it comes to building and systems maintenance, however, it may be well to heed the advice of John Ruskin, who said: "It is unwise to pay too much, but it is worse to pay too little. The common law of business balance prohibits paying a little and getting a lot...it can't be done. When you deal with the lowest bidder, it is wise to add something for the risk you run, and if you do that you will have enough to pay for something better!"

This simple fact regarding cost was written over 100 years ago and is as true today as it was then. John Ruskin was an English author, art critic, and social reformer, but he may have made a darn good facilities manager as well. I have another of his statements hanging on my office wall. It reads: "There is hardly anything in the world that some man cannot make a little worse and sell a little cheaper, and the people who consider price only are this man's lawful prey." I have found that this bit of sage advice can come in handy when an irate customer drops by to complain about costs.

"It is unwise to pay too much, but it is worse to pay too little."

There are oodles of companies and contractors who claim to offer discount building and systems maintenance service for colleges and universities. The claim is that services can be provided "cheaper" than the costs for doing the same work with in-house staff. In reality, many of these companies perform what might be termed as "breakdown maintenance." What happens is this: the facilitites manager calls for service (oftentimes, it is an emergency situation), the "discount" company or contractor sends someone out to patch things up, and the facilities manager is led to believe that everything is working fine. A short time later the system fails again, and this cycle continues until the system is in such bad shape that it must be replaced. Now the facilities manager, through no fault of his or her own (except for using the "discount" company in the first place), is faced with a large unexpected expense. And, guess who's standing at the front of the line to cash in on the misfortune? The same company or contractor who's been offering "discount" service.

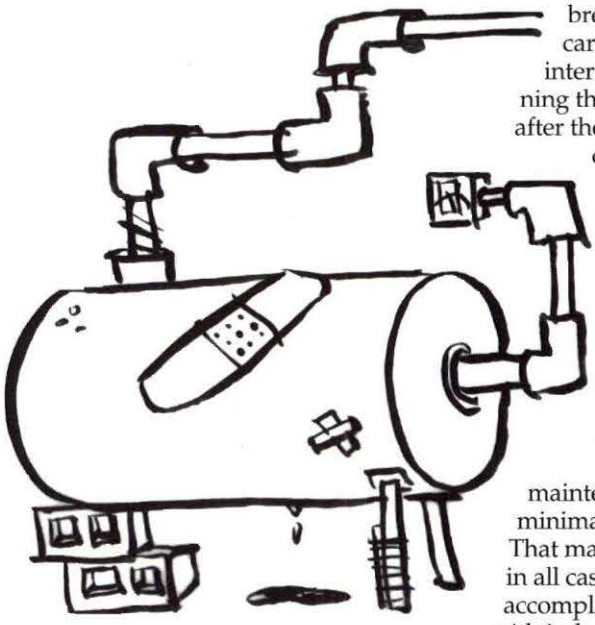


illustration by Sarah Sloane

Maintaining buildings along with their complex mechanical, electrical, and controls systems in such a manner is like putting a bandage on a cancer. Without routine preventive maintenance and routine testing procedures, there is no way of knowing what trouble lies ahead. Most automobile owners would not think of continually driving their vehicles without changing the oil, greasing the fittings, checking the tire pressure, fan belts, and the engine coolant. Sometimes when it comes to a building's mechanical and electrical system, which are more complex and represent a much larger investment than the family auto, those in control of budgets sometimes fail to realize that these systems will not perform adequately if preventive and routine maintenance services are ignored.

Maintenance staff who know they must fix the system when it breaks down, usually are more caring, more attentive and more interested in keeping things running than in making costly repairs after the system fails. Maintaining a cadre of well-trained and skilled trades workers is essential to well-maintained facilitites. Somewhere within the facilities management operation there needs to be an "institutional memory," and that cannot reside within rotating contracted services.

All of this assumes that maintenance budgets are at least minimally adequate to do the job. That may not be a valid assumption in all cases. But whether the work is accomplished through outsourcing or with in-house staff, an inadequate budget will result in rapidly deteriorating buildings and their systems.

I suspect that most facilities managers are in favor of free enterprise, but I question whether or not the wholesale outsourcing of building and system maintenance will produce well-maintained buildings in the long run. Firms that live and die by the profit motive only usually do not think the same long-term manner as do in-house staff. After all, they may not be "low-bid" next year.

While there are numerous instances where well-managed outsourcing can benefit the facilities manager, as a general rule "privatization" of building maintenance services will never receive the same degree of attention and dedication as that provided by in-house career-oriented staff. I make this statement knowing full-well that exceptions may be found for every rule.

So, do you want to save money on bargain maintenance provided by a "discount" company or contractor? I don't think so! ■

Val Peterson is director of facilities management at Arizona State University, Tempe, Arizona.

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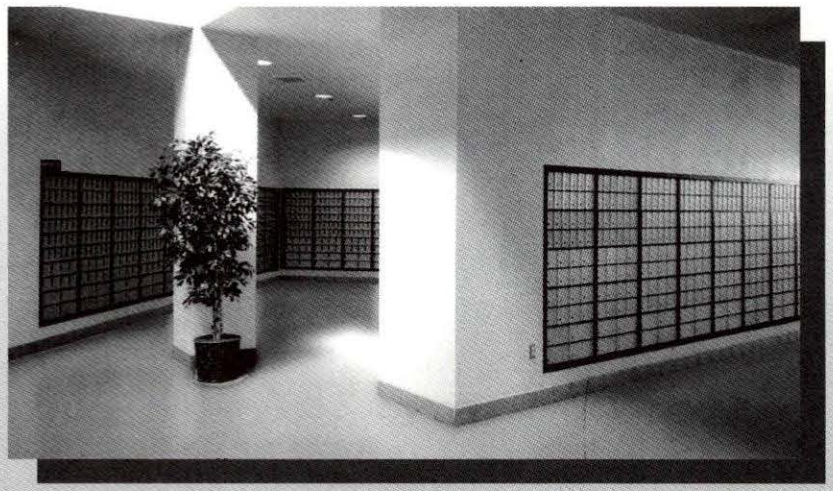

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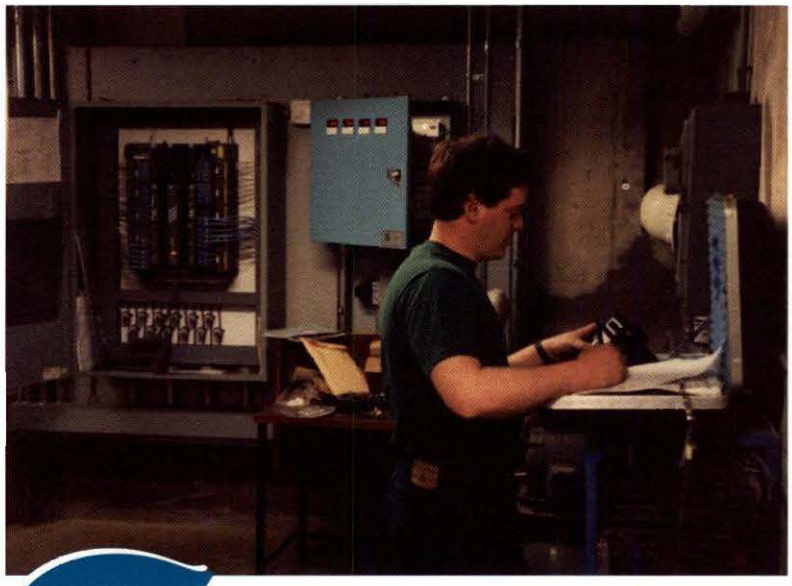


The Survival of the University Trades Shops

by Bruce Bush

Competition has hit our institutions of higher education. It's a fairly safe bet that if you are part of an in-house construction and maintenance department, it has been a few years since you have considered yourself "overstaffed." Middle management has been lean for years now, and to many of us, "empowerment" is upper administration's way of saying that you are going to do a lot more with less. Chances are that trades supervisors, project planners, and estimators can barely keep up during the traditionally slower times of mid-semester. When the summer construction season arrives there are not nearly enough hours in the day. Budget cuts are forcing us to conduct business differently than in the past. Inventories are reduced to only the most common items, and the pressure to outsource services, even those you provide, are everywhere.

RIFs (reduction in forces) and budget cuts are only a small part of the challenges facing in-house trades shops. High-tech buildings require maintenance dollars as soon as they are turned over. The good news is that many of the "bugs" have been worked out of microprocessor-based controls, variable speed drives, and other electronic systems. Initiatives like BACNET and cooperative efforts between the major controls manufacturers and building HVAC equipment suppliers have our fans, chillers, boilers, and pumps all working together. However, that has not lessened the need for trained mechanics to keep these new buildings operating efficiently and reliably beginning their very first year.

The enterprise-versus-appropriation debate could be the subject of lengthy discussion as it applies to construction and maintenance shops. There are advantages to both approaches. However, when you combine the enterprise system with a union setting, you had better be ready for the competition that any construction company faces with the added bureaucratic processes that your institution will undoubtedly require of you. It is possible that your department can survive these challenges, and even grow, while the "rightsizing" continues around you. With some creativity, team building, and hard work, it is possible to come out on top.

Bruce Bush is superintendent of shops at Cornell University, Ithaca, New York.

The Givens for In-House Shops

Cornell University is located in upstate New York and has a combined graduate and undergraduate enrollment of approximately 18,500. Its academic and research buildings total over 14 million square feet. The nine union trades shops respond to more than 27,000 repair calls a year and compete against outside contractors for renovations up to $2 million. As indicated in Chart 1, the majority of work performed is routine maintenance (45%) or repair work, followed by planned maintenance or renovations (37%). Temporary trades people are recruited from the union halls during the busy construction periods of summer and semester break. The regular full-time trades people number 125, plus an additional 150 or more temporaries brought on during the summer. Additional information about Cornell can be obtained on-line through the university's Web page (http://www.cornell.edu).

In our business, safety and quality go hand-in-hand. The top construction and maintenance firms in the country all have strong safety programs in place, and our university settings must also. There can be no compromise on safety issues no matter how small. This must be a collective effort, from the director to the student hired to clean up the shop during spring break. No unsafe condition can be overlooked, and no unsafe act can be condoned. Shop safety representatives attend mandatory monthly training sessions and then schedule and conduct individual shop meetings. It is up to the shops management to see that required OSHA training occurs for every person in every shop. This same framework

allows the representatives to cover other necessary topics, including personal and protective equipment and laboratory fume hood repairs, to name two.

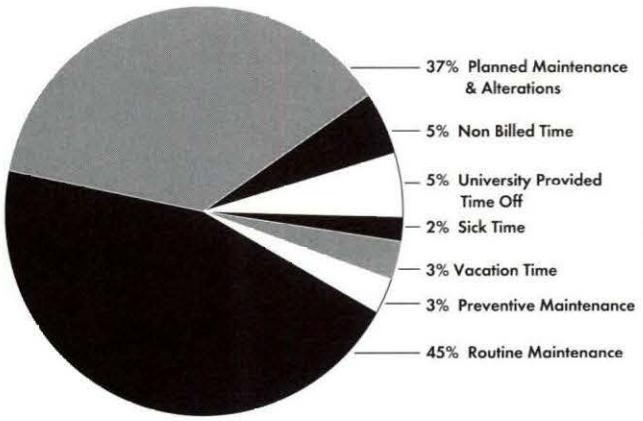
The impact of accidents and resulting workers' compensation costs must be held to the absolute minimums. A full-time department safety manager can provide the coordination of safety topics along with other sometimes overlooked responsibilities. Every accident/incident must be investigated and logged for follow-up and corrective action. Routine safety inspections are critical and must be performed in the shop areas, on the job sites, and with in-house and outside contractors. The competition must be held to the same standards as the shops, which includes job site housekeeping and construction practices. Incentives should be in place to get the injured worker back to work as soon as possible.

Less strenuous tasks can be identified and defined so that injured workers, with their doctor's approval, can return to the workplace as quickly as possible. Maintaining inventories, ordering materials, and performing estimates are tasks that can usually be performed by workers with less severe injuries. It may be weeks or months before they are released for full duty. Chances are very good that the injured employee is receiving at or near full salary, so it presents an opportunity to do some cross training or complete other tasks that will benefit the trades person and the department.

Much has been written about the importance of quality. If it is not part of your department's culture, you might want to consider making major changes. If the majority of your phone calls are from customers complaining about workmanship, the future of your shops might be questionable. You must use quality materials installed with quality tools and equipment, by skilled trades people who take ownership of their work and pride in their institution. Enough about the importance of quality.

Chart 1

Planning, Design & Construction
Trade Shops • 7/1/95 - 3/30/96
Distribution of Labor Hours by Work Type
All Billing Employees



	Hours	
Preventive Maintenance	11,705.2	3%
Routine Maintenance	176,750.1	46%
Planned Maintenance & Alterations	141,880.4	37%
Total Billed	**330,335.7**	**86%**
QIP	8.0	0%
Non Billed Time	18,122.6	5%
University Provided Time Off	19,227.1	5%
Sick Time	7,943.6	2%
Vacation Time	10,340.2	3%
Total Nonbilled	**55,641.5**	**14%**

Trades supervisors are the key to any in-house construction and maintenance department. They must be the best in their trade, be able to see the big picture (the university's mission), and have a work ethic that is above all others. It's not a nine-to-five job anymore, and many days it is more like six-to-six. These shop supervisors must know the latest in tools, technologies, and techniques. They must be willing to take risks, know the market, and manage people. These front-line managers require many skills and display differing styles. But above all, they must be effective leaders, respected by their direct reports, as well as by personnel from other shops.

Managing the work flow is another important factor. Investing in project coordination is money well spent. From the smallest repair ticket to the $500K renovation takes intricate planning. Working with the campus community to level the peak construction periods and having a strong design-build capability improves scheduling with customers. As we all know, resources will be stretched when the power goes out or the water main breaks, but many occupants learn to understand that their project will suffer some inactivity while emergencies are being taken care of. It is part of the price that must be paid to have trained mechanics on staff who know the campus systems and be available when trouble strikes.

Partnering With Your HR Department and Local Unions

Operating a large construction and maintenance company requires quick responses to market conditions, fast personnel actions, extensive technical training, and authority to make decisions shifted to the front-line trades supervisor. Chances are, few of these are in line with the day-to-day operating philosophy of a university's human resources department (see Thomas A. Stewart's "Taking on the Last Bureaucracy," *Fortune Magazine*, January 15, 1996). While Stewart's recommendation is to "deep-six" your HR department altogether, that's not likely to happen no matter how much some of us would like to see these services outsourced. So shake hands and work together to recruit the best trades supervisors possible, then train them to manage people and be true leaders in your shops management team.

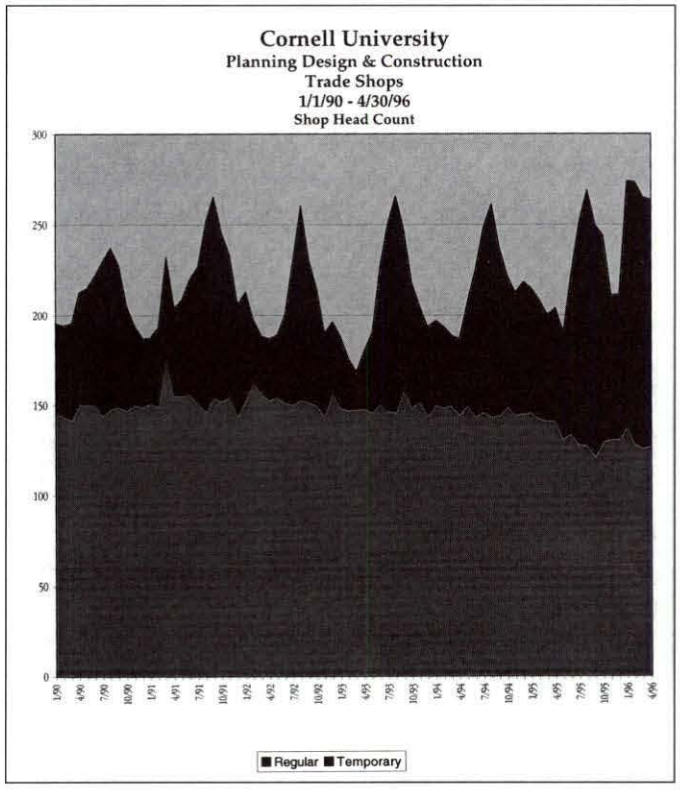
Recruiting for trades supervisors should be approached with the importance it deserves. Searches should be extended regionally and applicants screened carefully. Establish interview teams early on and try to include someone from the shop, a few peer trades supervisors, a customer or two, and the position's immediate supervisor. The final selection committee should also include someone from HR and management. First-round interviews should include clear expectations of this demanding position. For those invited back for a second interview, include a half-dozen interview questions covering several interesting scenarios and a few light topics to be answered in up to three pages of writing. This information can be very informative. If computer skills are important for daily operations, set up a PC in a separate room for them to type up their responses. Ninety minutes should be sufficient, unless you

want to turn up the pressure by shortening the time. Strong internal candidates will have to endure the same gauntlet.

Promoting from within can be both a morale booster and motivator in a relatively flat department with little turnover. These openings do not come along often and hopefully several people have been "groomed" for the opportunity to run the shop. The cream rises to the top, and it is not surprising to find many trades supervisors were once the top trades person in their shop, respected for hard work and quality workmanship. Now it's time to equip this manager with some new tools for a trade that might be as foreign to them as programming a DDC system would be to a mason.

A few years ago, Cornell's Division of Facilities and Campus Services initiated a program that would change the culture of our entire service-oriented organization. The ultimate goal was to achieve our divisional vision: "to be the home of best practices and people committed to quality." This program, known as the Leadership Development Program or LDP, began with the senior vice president and directors. The goal was to have every person who supervises, in any capacity, go through the program. Each class consisting of twenty-four people spent a total of nine days together—two consecutive days of class, with two weeks in between. One of the first exercises was to have each participant hand out twenty surveys to three groups: direct reports, coworkers, and friends whom they believed would give honest feedback to some frank questions. These surveys were anonymous, with the exception of coding for the three groups. Areas of supervision and behavior were numerically rated, and some open questions were asked to provide each supervisor with detailed information about areas that may need improvement. The information gathered was often humbling, but was something that many supervisors go their entire career without ever receiving. What each of us does with this information is an individual decision, some will share it with the people who were asked to fill them out and then make plans to adjust in the future. The sessions included effective team building exercises, active listening techniques, time management, and conflict resolution.

Chart 2



As a division, we have changed the annual performance appraisal process to a dialogue between supervisor and direct report. This series of questions, filled out by both parties in advance, promotes conversation that leaves no question as to what is expected by the supervisor and what is required for the goals of the direct report to be achieved. The process is time consuming and was totally foreign to union trades people, some of whom are still not sure what to make of it. There is not time to put our entire temporary staff through the process, but it is required of all regular full-time employees. No more thirty-minute performance reviews with scores of 1 through 5 to be filed away until next year when an almost identical sheet is handed out again. Accountability is everything in this process, and it applies to both the supervisor and direct report.

One of the earliest benefits of LDP to emerge was the formation of departmental front-line teams. These teams have been tackling real problems with impressive results. Small groups of trades people deciding on issues such as, what capital equipment to purchase, which training should be scheduled first, and better procedures for paging emergency response mechanics. Decisions made by these teams have been good ones and, interestingly, much quicker than the process burdened TQM teams of a few years ago. One thing is certain, LDP is not another "program du jour." It has changed the way we manage.

After completing LDP, the trades supervisors focused on our crew leaders, the lead people. Customer surveys have indicated for some time, that managing our small to medium multi-trade projects was where we needed to improve. With 300+ projects going at any given time there is a lot to coordinate. We found that we manage the large projects quite well, usually assigning a project superintendent as a single point of contact for our customer to work with. Scheduling and sequencing of trades usually goes smoothly, and in most cases, projects are completed on time and within budget.

Single-trade projects are usually conducted with the same amount of success. It is the one-or two-week job with several shops required to coordinate closely where improvement is needed. Periods of inactivity and improper sequencing of trades often resulted in extended completion dates and exceeded budgets. To find out why and what could be done to improve, the trades supervisors worked together to develop a series of discussions that address the issues. Twenty-five key lead people were identified and sessions were planned to focus initially on four areas; safety, project planning, project communication, and taking ownership.

The project planning segment focused on project coordination and scheduling requirements. Material and equipment acquisitions and delivery to job sites were also covered. The project communication session detailed the different contract types (time-and-material, bid, and fixed-price) and the change order process. Another key to project success is the early identification of customer contact. This is important because those who will occupy the spaces usually want more than those who can authorize change orders are willing to pay. Identifying the shops contact is equally important. In these situations the shops must act as a general contractor and not like

independent shops, each caring about their own trade alone. Appointing a project superintendent, where all communication for the shops is channeled, will help prevent an architect from directing several shops in different directions. These discussions continue today and probably will for some time.

Utilizing temporary trades people from the unions affords us the opportunity to work with those who may eventually become permanent employees. Long-term temps with leadership qualities are often offered positions when they become available. We try to maintain our temporary crews with a work cushion that prevents layoffs for our regular full-time trades people. It's been longer than most can remember, in the early 1980s, since a regular employee was laid off.

Chart 2 shows our workforce for the last six years. This clearly shows the flexibility offered by the unions to increase our work force during the summer construction season. We continue to work toward leveling off those summer peaks, unfortunately, budget cycles and class schedules will prevent a level line from ever being achieved.

This type of recruiting works well for most of the trades but not for the technical fields like refrigeration and controls. The unions have not kept pace with the training required to keep journey people proficient in these ever changing fields. Recruiting trips to the two-year technical colleges for apprentices has worked well. Five-year apprenticeships are credited with a couple of years for the associate's degree, and this puts starting salaries more in line with the competition.

Over the years, negotiations with the Building Trades Council have gone relatively well. The BTC collectively bargains for the seven skilled trades represented at Cornell: painters, plumbers and pipefitters, laborers, masons, electricians, carpenters, and sheetmetal workers. While the unions have been resistant to move ahead with multi-trade practices or reduced residential or light commercial wages, they have worked with management to find creative ways to increase the workload. Specific project agreements have been negotiated, that in many cases had we not, probably would have been canceled. An example of this would be a recent $2 million relamping project where shift differential pay and crew structures were negotiated, allowing additional apprentices to work. This lowered the unit pricing to a point where the reduced energy payback made the project feasible.

Negotiating flexible start times and reduced shift pay has resulted in our customers requesting more work during off hours. Obviously, demolition and painting in areas where noise and fumes are a problem are jobs better performed while the occupants are not in the building. Our current shift differential pay is an additional 9 percent for second shift and 12 percent for third. Rates are even lower for anyone hired after our last contract was negotiated. In some cases this has allowed work that would normally be performed during the busy summer season to be done during the academic year. Leveling those peak times allows for better managed projects and improved customer satisfaction.

The unions' apprenticeship programs provide good training for their respective trades people. The technical trades offer a five-year apprenticeship, and the general construction trades are four years in length. Several of our trades supervi-

sors are instructors, which serves to enhance working relations between the university and the trades. The only weak area continues to be in the specialty fields of controls and refrigeration where we usually recruit externally and provide in-house training. Some examples of this are: air and water balancing, variable speed drive maintenance, water treatment, chiller maintenance, and ultra-low research equipment. We have been quite successful bringing in the manufacturers of this equipment for in-house training with our trades people and design engineers.

The importance of setting up teams within shops must not be overlooked. Making time is never easy, and with an average billing rate over $40 per hour, you can't afford to have large numbers of trades people sitting around a table. However, you also cannot afford to be without input from those in the field performing the work. Who knows better what tools and equipment, training, and materials are needed than those who are on the work sites? Sharing relevant budget information allowing everyone to know what is available for tools, training, and capital equipment will allow for better decision making and "buy-in" from everyone. Small teams that have been identified will choose the best equipment to purchase and the most relevant training needed for their shops. Having control over these important decisions, the trades people soon realize they directly control the level of success in their shop.

Our quality teams saw only moderate success in the shops. The process was cumbersome for trades people who like to see the task and get on with it. The most successful shops teams were made up of peers and given a problem to solve. Those cross-functional teams that were allowed to choose their own theme with no time constraints often drifted. The university's quality improvement program continues but has been modified for the shops. Our teams are focused with limited membership that is decided on early, even for team projects that solicit volunteers.

One of our most successful teams has nearly completed a new training facility for our shops. Shop representatives from each shop identified funding, designed, and constructed a training facility for their own use. This training facility includes three computers (IBM and Mac, complete with Internet access), a video library (topics include computers, safety, and technical information) with TV and VCR, and a conference area. This opportunity for shops trades people to take the owner's perspective on a renovation from idea to completion was an enlightening experience. Walking through the project approval process, design approvals, building permit process, and finally coordinating and scheduling the work was an eye opener for many of the team members. Using volunteer labor and apprentices from the unions will make this training facility a proud addition to our shops' work area.

Marketing

One sure way to increase your market is to offer trained trades people equipped with the best tools and techniques. Specific certifications are required to continue doing business in some trades; e.g. commercial driver's licenses for those driving commercial vehicles, EPA-required CFC certifications for refrigeration mechanics, pesticide applicators licensing for water treatment technicians, asbestos training and certification for working in those areas, and so on. Also, there are certifications that can increase work for your shops. Having painters certified for lead paint abatement has prepared them to be ready as laws change the procedures for removing lead-based paint. Manufacturer's certifications can also allow trades people to perform work they might not be able to perform otherwise. Repairs to warranted roof systems, ultra-low research equipment, and variable speed drive repair and start-ups could not be performed without manufacturer's certification.

Figure 1

There are some tasks that our shops have not been competitive in, and for those we subcontract. Some examples include carpet installation, excavation work, and parking lot striping. We have been successful in recruiting trades people with specialized skills that have made us competitive in areas where, in the past, we were not. Our trades supervisors recognized markets in areas of specialty coatings, sprinkler work, and insulating pipes and ducts. These areas offered little risk because there was limited equipment to invest in. Advertising openings paid off and we now offer these and other services that have increased our market substantially.

There are endeavors that offer more risk because of the cost of equipment that must be purchased. Recently our paint shop invested in a rather costly sign making machine that was a bit risky because we were unable to measure the market. In the beginning, requests were slow, but orders have steadily increased and now provide full-time work for two trades people. Another example of equipment that has been successful, was the purchase of an edgebander for our carpenters to offer low-cost countertops. Our pipe shop invested in a tee-pulling system that allows copper pipe mains to be quickly tapped for smaller take offs. Figure 1 shows 4" copper mains with 3/4" take offs for chilled water fan coil units. At a cost of around $4,500 it paid for itself on the first project it was used on. This will save our customers money in the future and will make our shop more competitive against the outside plumbing contractors. And laptop computers allow controls technicians to communicate with building direct digital control systems, as well as for record keeping and quick communication.

Enhancing a university's design-build capabilities is a tremendous plus to in-house shops organizations. Working with in-house design sections can only help strengthen the shops' market on campus. Customers who once bid any pro-

ject over $50K are now requesting design-build from our department. Reduced bid documentation, greater flexibility in working around occupant's schedules, and hopefully higher quality are all selling points for keeping this work in-house. Routinely under bidding outside contractors increases customer confidence in shops' pricing. Having successfully completed similar projects around campus is the other selling point, that applies to both the bid projects and those time-and-material jobs that were handed over to the shops.

You don't know how you are doing if you don't ask, and you don't know if your getting better if you don't measure. Customer surveys can be used to measure customer satisfaction levels. Job closure sheets should be sent for every project before the final bill is sent. These sheets should be reviewed by the lead shop or project manager for jobs that are too small for a final walk through or official punch list. This way any remaining issues are addressed.

The other feedback measure is the anonymous survey sent out every six or nine months. Ask the tough questions in several key areas. Use ratings of 1 through 5 so that your effectiveness can be measured and tracked over time. It should be kept short and allow space for open comments to each question. As an example:

Communication
- I was kept well informed about the status and schedule of the project.
- I was advised of any delays.
- How could we do a better job of communicating?

Contact
- It was clear to me who the key single point of contact was for the shops' efforts.
- How effective was this person?

Quality
- The final quality level of workmanship and materials matched my expectations.

Timeliness & Coordination
- The work overall was executed in as timely a manner as reasonable.
- The scheduling and sequencing of trades appeared organized.

Cleanliness and Impact
- The level of cleanliness and disruption was within reason.
- The impact on other areas was kept to a reasonable minimum.

Overall Satisfaction
- What was your overall satisfaction rating for this project.
- What is it that we need to hear that no one is telling us?

Members of the department's management team should identify customers and set up schedules for mutual concerns meetings. These informational meetings are a good opportunity to review projects and discuss upcoming work the shops may be able to perform, or at the very least, assist with. In-house shops are often asked to provide support for things like utility shutdowns or provide quick renovations for surge spaces while buildings are being renovated. The larger customers will require monthly meetings and those who do less work with the shops should be scheduled quarterly or annually.

Our shops play an increasingly important part of ensuring quality in new buildings. Shops personnel have been asked for input to the university's design and construction standards as well as design reviews for large renovations and new construction. Working with the design engineers on

these reviews gives the shops an opportunity to point out areas of concern regarding maintainability. The shops are also being used to perform field inspections during construction. Reports are generated by shops personnel identifying areas of poor workmanship or noncompliance with the specifications. The construction managers cannot be experts in all areas of construction, but with the help of shops personnel many often overlooked details are discovered while there is still time to make corrections.

Using in-house shops to perform air and water balancing is another function the shops have been able to provide for the university. By having highly trained sheet metal and controls technicians, the shops can perform the final balancing for new buildings. All too often this balancing did not receive the needed attention when it was part of the general contractor's responsibility. When the shops provide this service it is often more accurate and includes the necessary supporting documentation. Design flaws are often discovered and dealt with rather than evaded just to get the job closed out.

Another service the shops can provide for new buildings is commissioning. Often, using controls technicians to work with the controls contractor to perform building system checkouts has worked well. This requires a good working relationship with the controls contractor. The process is detailed and often tedious, but every control point must be verified. This can be a bonus to the contractor during the first year warranty period as most of the problems have been taken care of and the in-house crews are already familiar with the building systems. Transition to the owner is often much smoother because of this process.

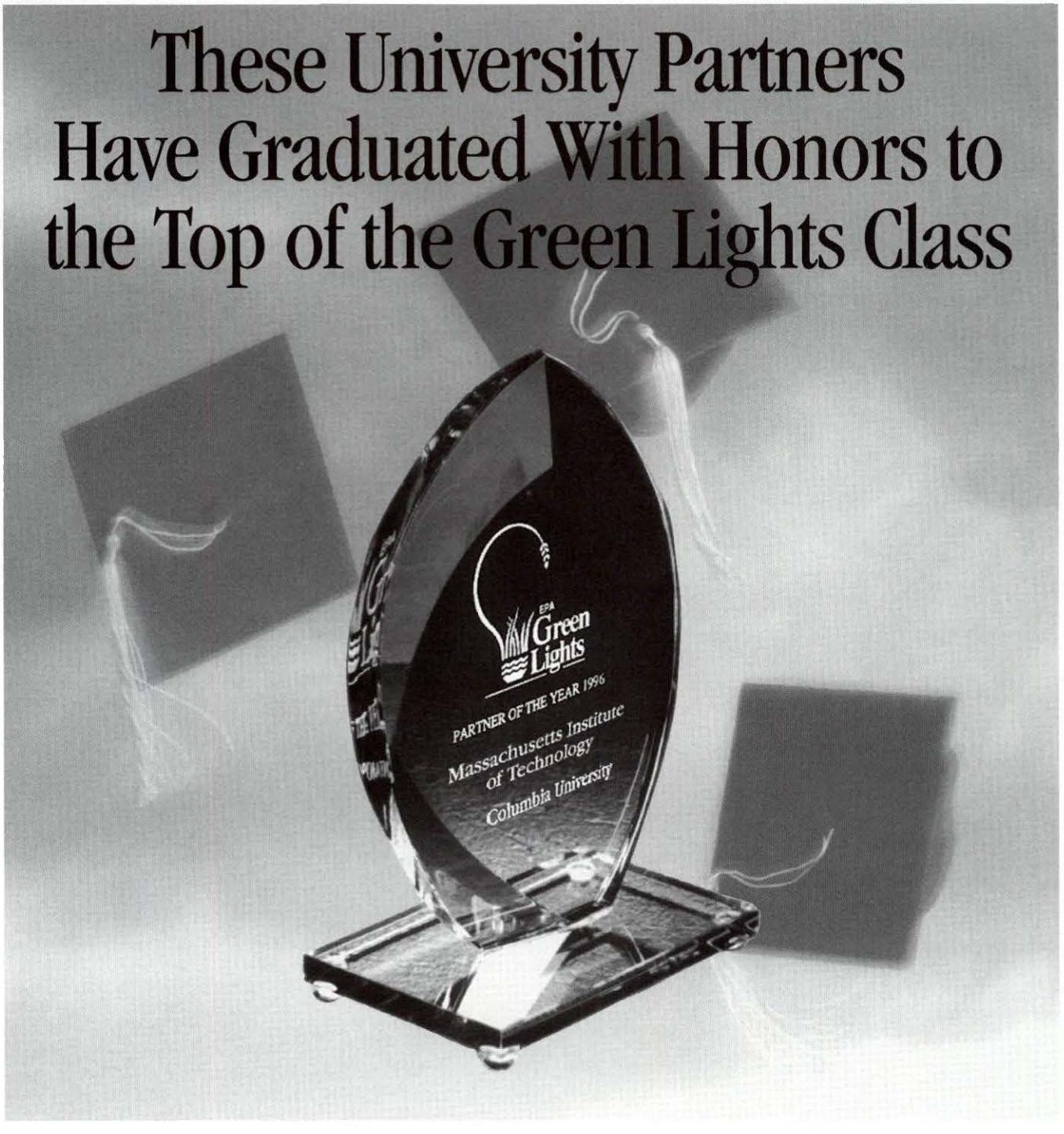
Putting It All Together

Developing mission, vision, and values statements for the department will set the tone for all to work toward. The trades people need to take ownership in these, and the only way for that to occur is to make sure they have been part of the MVV development. For total buy-in there must be involvement from all levels, and it must be an ongoing process. Employee recognition can come in many ways but must not be overlooked. Establish shop accounts that can be used toward recognizing outstanding accomplishments. Some of these should be available for immediate use, things like gift certificates for restaurants, sports events, or even a car wash. These can be handed out on the spot to say "thanks" for a job well done. Other forms of recognition should be more substantial and include bonuses when appropriate.

Just as large construction and maintenance contractors have their strengths and weaknesses, in-house shops do as well. Each shop becomes its own business, and success depends on the ability of all shops working together as a team. The leaders will take charge and in the right environment the shops can become a highly respected and relied upon department at the institution.

You must keep an eye on the competition. If they offer free estimates, so should you. If they extend other services beyond the norm, look for ways to offer better. Never give your campus customers a reason to look elsewhere. Look to always be the "contractor of choice" for your institution. ■

These University Partners Have Graduated With Honors to the Top of the Green Lights Class



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EPA Green Lights
an ENERGY STAR program

The Physical Plant Crafts Association of Colleges and Universities

by Paul F. Tabolt

In 1987 Scott Goodwin, the crafts manager at Utah State University, decided to become a pioneer. For twenty-two years, Goodwin had been a conscientious contributor to the physical plant organization. Scott enjoyed his position, was proud of his skills, and was always a quick study. Yet, Goodwin knew something was missing from his professional life. There was a void that he wanted to fill. He was not exactly certain of the journey that it might take to fill his void. After contemplating his path, he took his first step by presenting a new and innovative concept to Utah State's then director of physical plant, Paul Sampson. Sampson listened carefully as Goodwin presented his desire to reach out to other crafts people at other institutions of higher education.

Goodwin's vision was to share knowledge and information among the crafts at various institutions so that they could maintain quality service and productivity.

Sampson could have lightly dismissed Goodwin's plan to launch a new organization composed of trades people from various colleges. He could have created reasons why Goodwin's idea might never work. He might have identified the economic realities of travel expenses that would prevent trades people from traveling to other institutions. Instead, Sampson nodded his head at the conclusion of their meeting and encouraged Goodwin with the words, "Go for it!"

Responding to Sampson's encouragement, Goodwin launched the Physical Plant Crafts Association of Colleges and Universities. Goodwin's vision was to share knowledge and information among the crafts at various institutions so that they could maintain quality service and productivity. His vision was later adopted by the organization he created.

Goodwin borrowed an APPA membership directory from Sampson that he would eventually use as a resource for his first mailing list. Goodwin thought long and hard about how he might nurture his idea. He wanted to create an organization that would be known for sharing information. His first meeting was extremely important and had to focus not only on the birthing of an organization, but also on issues that would demonstrate the importance of coming back for another meeting. The meeting had to be worthwhile! An agenda had to be established that would set the stage for future meetings. Goodwin chose to address several topics. He wanted the first meeting to broaden the perspectives of the participants, stimulate information sharing, and enhance skills.

Setting the Agenda

Goodwin chose to emphasize the importance of quality maintenance at the lowest possible cost from the very first time the Crafts Association came together. He desired to create a program to stimulate shared experiences that could lead to problem solving. The first meeting also included a training component. Finally, Goodwin recognized that the entire aura of the meeting would increase if he were to find a university dignitary who could welcome the organization. The welcoming remarks could serve to set the stage for the sharing of information that he wanted to accomplish. A university vice chancellor would do.

After filling his agenda, Goodwin launched the first meeting of the Physical Plant Crafts Association. Twenty trades persons from colleges and universities from Utah and Idaho

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Paul Tabolt is director of facilities management at the University of Colorado at Boulder, where he has just completed his Executive MBA degree.

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came together in May 1988. The success of the first meeting has grown clearer with time. Today, the names of 300 members are available in a directory that includes representatives from more than ten states. Elected officers carry on the meeting tradition originally established by Goodwin. The Crafts Association bylaws, policies, and procedures are strong enough to allow for continuity and steady growth. Sixty-seven percent of its members are physical plant trades employees, and 33 percent are trades supervisors. The organization derives its strength from its grassroots origination and staying power.

Goodwin maintains strong involvement with the Crafts Association to this day and is a champion of the philosophy that underlies his creation. The current slate of officers of officers recognizes Goodwin's contributions and stands ready to welcome new members or help others formulate their own chapter. Current officers include:

President	Howard Bee	Utah State University
Vice President	Roger Harrison	University of Nevada/ Las Vegas
Secretary	Alan Odenborg	University of Idaho
Treasurer	Doug Thymian	University of Wyoming

Sharing Experiences

Howard Bee, the group's current president, notes that the Crafts Association does not have a strong financial base. "Our organizational strength comes from the commitment of our members. We don't charge dues, and we rely upon the support of our institutions to cover the cost of hosting a meeting. Institutions that have supported our meetings find our commitment infectious. Trades employees from host institutions feel a sense of pride when they put new skills to work as they develop a meeting agenda and then see their plan become reality. It's a great opportunity to convey the importance one's work to others in the similar circumstances. It's amazing how many common experiences and problems we can share."

Wayne White, Utah State's assistant director of physical plant, echoes Bee's comments. White has witnessed growing pride among members of his staff who have participated in the program. White observed, "Participation in the Crafts Association has caused a new set of talents and skills to surface. Many individuals who participate in the Crafts Association return to our campus with stories about how others are doing. They hear about budgetary woes and realize that we aren't the only ones who have been suffering. Several employees have told me they didn't realize how good they have it at home. Exposure to other trades employees from other institutions is giving our employees benchmarking opportunities and new experiences."

Impressions from APPA Members

Long-time APPA member and past APPA President Jack Hug was invited to speak to the Crafts Association. Hug summarized his first impressions of the Crafts Association with these words, "The experience was thoroughly delightful. The level of the subject material presented at the meeting was impressive. The members were genuinely interested in the future of the trades in the facilities management profession. Their pride and concern for quality were readily visible."

Hug carefully selected the materials for his speech to the Crafts Association so that he would adequately present trends in higher education to an audience that might never have heard from someone from another institution. Hug explained that the financial problems facing higher education were not unique to a single institution but were felt nationally. He stressed the importance of competitiveness and personal accountability. Hug challenged the audience to help transform higher education to ensure higher educations' competitive advantage.

President Bee reports that Hug's message helped clarify to members the role they must fulfill if they are to achieve competitiveness in times of constrained resources. "Jack helped our members to understand the importance of their personal contributions," said Bee.

Hug could not help sharing some insights he had about the future of the growing Crafts Association. "The changes in our business environments are forcing greater vision, broader perspectives, and outreach from more of our employees," he said. "I like this group and encourage others to participate in their program." Hug expresses concern about the absence of a strong financial base for the Crafts Association. He worries that the evolution of the Crafts Association may be slower than the collective need for the benefits of such an organization. Hug proclaimed, "Top facilities leaders will recognize the importance of the contributions an organization like the Crafts Association can make. Perhaps the future of the Crafts Association will be formulated by employees like Scott Goodwin and Howard Bee who discover their methodology and establish their own regional chapter of the Crafts Association. It's possible to envision a series of regional Crafts Associations that merge into a larger national or international association."

The potential for chapter or regional growth intrigues President Bee. "I'm willing to take the time to help others establish a local crafts organization," he said. "I would like to think that others would develop an affiliation with us. We are in the process of establishing our own Web site on the Internet and will soon have a tool for global communications."

Current APPA President Doug Christensen, who has also spent time with the Crafts Association, has his own observations of the Crafts Association. "This is a growing organization that offers partnership opportunities for APPA," said Christensen. "We ought to monitor and nurture their development. This grassroots organization is chomping at the bit for training and development. They are great at finding inexpensive ways to take advantage of training opportunities."

Christensen speaks highly of the developing leadership he observed. "I watched this group define their vision, set their own direction, assess risks and paybacks, and motivate each other to achieve a higher level of performance. The Crafts Association seems to understand the importance of cultivating members and supporting constituencies."

Topics of Interest and a Few Outcomes

Founder Scott Goodwin credits the growing interest in the Crafts Association to the importance that is placed on setting an agenda. The Crafts Association sets aside some time at each meeting to talk about topics of concern for future meetings. Topics of interest have included:

- Emergency plumbing repairs
- Hazardous material disposal

- Graffiti removal
- Variable frequency drive power filtering
- Fire door certifications
- Wall covering adhesives
- Computer and telecommunications wiring
- Customer service and satisfaction
- Hands-on roofing repair
- Confined space procedures
- Back injury prevention
- Asbestos awareness

When President Bee reflects on the benefits of the Crafts Association, he cites topics from meetings that he and others at his institution have been able to bring back to their home institution. "We talked about the importance of students as our customers at one of our meetings. We then engaged in debate about when we could best deliver some of our projects. The outcome of that experience was the creation of a night crew on our campus that handles most of our major projects without having to disturb any classes.

"We are more interested in how our customers feel about our performance as a result of our interaction with our peers," said Bee. "We came back from one of our meetings and developed an automated customer service evaluation form that allows us to receive almost instantaneous feedback about our performance."

Perhaps the Physical Plant Crafts Association can help the higher education facilities officer align an operating model, i.e., organizational culture, business processes, management systems, and computer platforms, to help achieve operational excellence and customer intimacy. Those who desire to take advantage of the opportunity to broaden the experiences, skills, knowledge, and overall exposure of those engaged in the crafts may find the Crafts Association, or another similar grassroots activity, to be an effective catalyst for improvement. The experiences of Goodwin, Bee, and the other 300 members of the Crafts Association speak well for themselves. Their outreach and developmental effort can serve as a model for others. This is an enthusiastic group that is willing to help others interested in their approach. Goodwin, Bee, and their members are to be applauded for their contribution to a healthier future.

For more information, contact Howard Bee, Utah State University Physical Plant Umc 6600 Logan, Utah 84322-6600; phone: 801-797-3535; fax: 801-797-4000; e-mail: tronics@ppsf1.usu.edu. ■

Next Meeting of the Crafts Association

Date:	August 2, 1996
Location:	Laramie, Wyoming
Host Institution:	University of Wyoming
Contact:	Duane Timmerman or Mike Millen
Phone:	307-766-2266
E-mail:	duane@uwyo.edu

Leadership and Organizational Behavior

by Wayne Bounds

illustration by Sarah Sloane

Wayne Bounds recently retired as director of physical plant at the University of Dallas in Texas.

As the twentieth century quickly draws to a close we will soon begin a new era. While thoughts of a new century may be ominous to some, it will be an exciting and challenging time for those who are just entering the workplace. We have made the future changes in technology and automation seem more frightening than they need to be.

As I look back on a working life of fifty years I can see many changes. The changes we can expect in the near future look to be more drastic and exciting than anything we have seen so far. But that does not necessarily mean the changes have to be frightening. I well remember, as a boy of twelve working in a machine shop, learning progressively the use of a scale and caliper, micrometer, and dial indicator as I did fledgling work on a lathe. Each of these tools was more accurate and precise than the other and yet I looked forward with eagerness and anticipation to going on to the next level of the existing technology. It was a way I could demonstrate my proficiency and developing worth to the company. In later years (much later) I learned to use the computer in much the same way. But since it was not "mechanical" in the old sense I did not understand it. So it was thrust upon me by necessity. But once I had a taste of what it would do for me in terms of my productivity and the ease it brought to my job, I lost the fear of computers.

I see the present and future generations of crafts workers and technicians as being in the same boat that I was as a boy in some sense. But instead of advancing to the next level of hand instrumentation, they will be advancing from one generation of computer or robot to another, each perhaps exponentially superior to the one before in terms of their capabilities. There is one major difference between the young trades person today and those of my generation that gives them a tremendous advantage. They have grown up in an electronic age

with TVs, VCRs, video games, and computers and thus are not as frightened by it as I was when I began. Their learning curve should be much shorter and easier for them to navigate.

However, having said all of this, there remains a constant that is well worth noting. The workforce of today and those of the future are still human beings who are motivated by the same basic needs and similar desires. They have physical and emotional needs and limitations. It is the job of leadership to discover these factors and to address them in such as way as to produce a productive workforce. This is a task for the whole organization.

The Prevailing View of Leadership

One of the key elements to any successful organization are the people in positions of leadership. A survey among Fortune 500 companies revealed some interesting things about people who had been placed in leadership positions. It was discovered that all of the surveyed managers initially possessed the same basic abilities. What was revealing was that those who did not make it to the top rung of the ladder were considered insensitive, aloof, and arrogant by others. It is strange in light of this fact that most companies today still consider front-line workers as mindless drones, a disposable resource, and it is not uncommon for the turnover rate to be 100 percent or higher in many stores, hotels, and restaurants. Such turnover rates makes team building almost impossible to achieve.

A New Trend of Enlightenment in Management

Successful leadership is now beginning to recognize that the employee is the most valuable asset they have. Without motivated employees the product or service they have to offer is not going to be very successful in the marketplace. Recent surveys reveal that pay is not the most important thing in "job satisfaction." Personal satisfaction, feeling appreciated, and a feeling of doing something worthwhile all out rank pay as the reason employees stay in their present job.

An example of the new outlook of a company toward its troops would be that of Canada's Cadet Uniform Service. Cadet's executives have successfully addressed the problems of employee turnover. Cadet's annual growth for the last twenty years has averaged 22 percent per year. The customer defection rate is less than 1 percent. The employee turnover rate is now at 7 percent. A spokesman for Cadet said, "The jobs we do aren't so special. The pay is good, but it's not great. The main thing we have to sell to employees is the culture of the organization."

Hal Rosenbluth, coauthor of *The Customer Comes Second and Other Secrets of Exceptional Service*, argues that anyone in a leadership position must constantly strive to find and solve morale problems among employees. He believes that if the company leadership puts the employee first it will not have to worry about the customer. Employees should have the feeling that the company is doing something for them. The company, in order to build loyalty, must make the employee know that they are cared for, are being trained, educated, and that their skills will be better after they leave the company. They are less likely to leave than if they feel that they are being held back.

A Clear Message: Why Our Employees Leave

It is impossible to speak for all of our employees who leave but here are a few things to consider.

1. The employee feels that they were not properly trained for the task they were being ask to perform.
2. The employee feels that the leadership or planning is not

A SUGGESTED READING LIST FOR LEADERSHIP

The responsibility of any manager is to run the operation with which he or she is charged to the best of their ability. However, we must never forget that the operation consist of people as well as machinery and equipment. It is the people, as people, with which we should be concerned.

Knowing "systems" alone will not get the job done, at least not very effectively. To this end the manager should read a little more widely than the technical skills requirements for the job. Beyond the level of first-line supervisor, the job has to do more with people skills than with the technical skills. In dealing with people we should know what motivates them, their fears, needs, and wants. It is at this level that one needs to turn to philosophy, ethics, and motivational/inspirational reading.

Everyone's taste in reading may be different, but I have found that books which deal with justice, truth, honor, and courage have been the most helpful in shaping my philosophy of management. The books referred to in this article are more than technical "how-to" books. They suggest an underlying philosophy of management that looks at employees as more than just the mechanic, electrician, or carpenter, and how to get them to do their job. They look at "Joe, Frank, or Sarah," who also just happens to be the mechanic, electrician, or carpenter.

The following books and articles will help managers in looking at the "human factors" of their job—and in dealing with the joy and stress that go along with it. Those marked with an asterisk are quoted in the article. Most of these books should be available in your library or bookstore.

—W.B.

Adler, Mortimer. *Six Great Ideas.* And also *How to Speak, How to Listen.*

Aristotle. *The Nicomachean Ethics.*

*Blanchard, Kenneth, Johnson, Spencer. *The One Minute Manager.*

*Blanchard, Kenneth, Zigarmi, Patricia, and Zigarmi, Drea. *Leadership and the One Minute Manager.*

*Blanchard, Kenneth, and Lorber, Robert. *Putting the One Minute Manager to Work.*

Abraham Lincoln: *Selected Speeches.*
— *Young Men's Lyceum Speech, Springfield, 1838.*
— *A House Divided. Springfield, 1858.*
— *Gettysburg Address. 1863.*
— *Second Inaugural. 1865.*

Martin Luther King. *Letter From A Birmingham Jail.*

Sophocles. *Antigone.*

*Eisenhower, Dwight D. *At Ease: Stories I Tell To Friends.*

Lord Moran. *The Anatomy of Courage.*

Guaspari, John. *I Know It When I See It.*

Hanson, Peter G., M.D. *The Joy of Stress.*

adequate for the task we are asking them to preform.

3. The employee feels betrayed by his superiors because of favoritism. They do the same work, duty, or activity as others and they see others rewarded.
4. The employee feels that the policies are applied unfairly or unevenly.

Those who leave usually leave because of a feeling of dissatisfaction or discouragement. They leave because they feel that the organization did not fulfill their basic need, desires, or the expectations sought when they joined. We need to find a way to keep the original fire they have lighted. Perhaps there are reasons in our actions that drive some off. It is safe to assume that all employees of an organization want and expect:

1. Training that is appropriate to the responsibilities and duties they hold.
2. Discipline that is fair, even-handed, and "by the book."
3. To both give and receive loyalty up and down the organizational chain of command.
4. Recognition and rewards when they are deserved.

What Kind of Leaders Do Loyal Employees Deserve to Have?

Our employees are loyal to an organization that has an honorable and valid mission, and they usually go to work here for valid, noble, and legitimate reasons! What should they be able to expect from the leaders of an organization to which they give their time and, in many cases, a considerable amount of money?

Words and Behavior

Supervisors should always:

- *Praise subordinates for hard work and faithfulness.* As the supervisor you have the opportunity, authority, and duty to praise those who serve under your supervision when they act in a praiseworthy manner. The key to success in leadership is giving praise and guidance to others.
- *Commend and reward praiseworthy action in subordinates.* It is a compliment to you as well when someone under your supervision is worthy of reward. You should rejoice when your subordinates are recognized by others. Petty jealousy or resentment at the good fortune of others is unbecoming in a supervisor. It may be tough to reward people for hard work and faithfulness if you do not particularly like them—but you must treat them fairly. If they are good at their jobs, do their duty, and are a credit to the organization—reward them. Reward their action, not their personality. Remember, the demonstration of power and authority is in giving rewards, not in withholding them.
- *Avoid vulgarity and profanity.* The use of such language in the presence of seniors or subordinates leads to a loss of respect. Foul language and lewd jokes are not a sign of good management or good manners. You should set the tone of moral, as well as professional, leadership.

The three basic things that have the most "social" impact, and which should serve as starting points, for building trust among subordinates, are: following the chain of command, avoiding gossip, and developing true comradeship.

Chain of Command

In giving orders, or requesting permission, the jumping of an echelon of command is to be avoided at all times. This holds true whether the information or request is being passed up or down the chain of command. This is a sign of disrespect for the person being skipped. You cannot expect subordinates to follow the chain of command if they observe you going outside of the chain of command yourself.

Gossip

Avoid being known as a gossip. Do not strive to be an information merchant. You should be frank and honest in, and about, your communication. It is appropriate to use "I am not at liberty to say" or "I don't know" to requests for information which should actually be passed along by senior administrators. Don't tear the organization down with gossip or rumors!

Comradeship

One should take every opportunity to "socialize" with other members of the organization in both formal and informal settings such as at parties, meetings, or at department training sessions. These qualities and traits should be part of any good supervisor.

Since we are an organization dedicated to excellence, we must teach and lead by the use of the best methods available to business and industry. We must learn to use the interest and motivation of the individual employee to teach them the things necessary to accomplish the mission of the university. There are two books that I think are essential to anyone wishing to teach, lead, or manage others. They are *The One Minute Manager* and *Leadership and the One Minute Manager*. The principles in these books apply to any situation whether it is business, industry, or education.

Leadership and the One Minute Manager outlines four leadership styles that can be used effectively to reach people with different levels of knowledge and motivation. These styles and their appeal are as follows:

Style 1: DIRECTING

The leader provides specific instruction and closely supervises task accomplishment.

Style 2: COACHING

The leader continues to direct and closely supervise task accomplishment, but also explains decisions, solicits suggestions, and supports progress.

Style 3: SUPPORTING

The leader facilitates and supports subordinates' efforts toward task accomplishment and shares responsibility for decision-making with them.

Style 4: DELEGATING

The leader turns over responsibility for

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The Building Commissioning Handbook

By John Heinz, P.E., with Rick Casualt, P.E., and a case study by Phoebe Caner, P.E.

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The Building Commissioning Handbook

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decision-making and problem-solving to subordinates.

These leadership styles are very different, yet each can be effective with the right target audience. In fact, what will work with one group might not work with another. *Leadership and the One Minute Manager* also points out that "there is nothing so unequal as the equal treatment of unequals." We must get across the idea that the performance of our employees does make a difference. People lose their interest and commitment only after they realize that their performance doesn't make a difference.

Discipline

In an effort to ensure that people can know that their performance does make a difference leadership should work to ensure discipline and morale. Lt. Col. Lawrence P. Crocker, USA (Ret.), lists two things that are essential for discipline in an organization. First, the leader must be careful that instructions are correct and capable of execution by subordinates. Second, the leader must ensure by observation that the instructions are meticulously complied with by each individual.

One of the most difficult things for a supervisor to do is to exercise discipline. There are certain things that a military officer can and must do if he or she is to maintain order and unit cohesion. It is the duty and responsibility of the trades supervisor to ensure that discipline is maintained within the unit. That is a part of leadership. Some people may still think of discipline as the old-fashioned meeting where the boss rants and raves for about an hour. I am happy to announce that this concept is now dead and gone in most places. It was ineffective in the past and is now a dangerous practice for many reasons.

This is an over simplification of a valid management theory, but "it only takes a minute" to give someone praise or a reprimand. If it takes longer than that there is probably something wrong with The Boss. A careful reading of *Putting the One Minute Manager to Work* should help solve this problem. The argument of that book is that it should take only a minute to get your point across.

The following is a summary of the section dealing with discipline in Army Field Manual 22-100 (pp. 151-156). As is pointed out in FM 22-100, discipline exists in a unit when the unit is functioning in an orderly, controlled, and dependable way. The forces that drive a disciplined unit come from within that unit. Discipline is based on the character of the leaders and the individual troops. Such a unit deeply values self-discipline. The surest way to develop such a unit is by *training*. A leader should be guided by the following principles in order to ensure discipline:

1. Ensure that norms which contribute to discipline are established and strengthened. Stress the fact that you must operate on truthfulness and candor. Inform subordinates of the fact that evaluations will be lowered if there is a failure to inform you candidly of a problem that affects unit discipline and cohesion.
2. Set high, yet realistic, standards in all things that relate to the success of your units training. Make sure that these standards are communicated clearly to each individual member.

Morale

High morale is the surest way to guarantee that employees will carry on their duties even when "leadership" breaks down. Employees with high morale know that they are trusted to do their jobs and will be supported for doing so—even if mistakes are made while doing so without supervision. Every employee needs to know that he is allowed a margin of error in fulfilling his duties as long as the infractions made are minor ones. Morale consist of:

1. A sustained training program in which every member of the unit knows his or her job and place within the organization—and its importance.
2. The employee must know that the unit as a whole, and each individual within it, will be treated with fairness and objectivity regardless of their role or rank.

Supervisors who have reached the senior levels of leadership have a greater role as a "moral arbiter" and as a mentor to younger, or subordinate supervisors, and their employees than they do as technical experts. Their primary function is to provide overall guidance to the subordinate units below them. Schools and other educational programs should set the foundations for all leaders, but the real skills come from experience. It is the fundamental job of the senior level management to mold those skills of habit in junior level supervisors by monitoring them in those job skills

necessary to achieve higher levels of performance.

The senior level management must know something about human personality, philosophy, and educational methods if he hopes to properly mold "character" in their employees. For example, new supervisors must be taught that when one takes a position of leadership that duty carries a moral obligation, and the nonperformance of that duty is a reflection of a character flaw. Dedication to doing a good job is part of that obligation just as telling the truth on reports is a part of that duty.

Meetings

A note about the unavoidable activity called "meetings." As a supervisor you may spend a considerable amount of time in meetings. A good leader must learn how to conduct an effective meeting. Meetings can serve a very important purpose and can be used effectively. Lt. General Edward M. Flanagan Jr., USA (Ret.), expanded on that theme with a checklist of principles a leader should adhere to in order to ensure having an effective meeting.

1. Write an agenda, with staff input, and stick to it.
2. Have a recorder to write up the minutes for distribution to the participants.
3. Limit comments by a clear requirement to stick to the subject.
4. Forbid smoking.
5. Start and end the meetings at the announced time. All participants must be on time. That requirement derives from courtesy, but it also saves valuable time.

Meetings, in short, should only be held when there is a clear exchange of ideas or information and from which action can be taken.

Leadership and Change: Finding a Starting Point

Most of those who make up our present leadership are excellent people who have had a great deal of experience. However, everyone assuming a position in a new organization should, to a certain extent, start fresh and be open to the possibility of learning new and better, or more appropriate ways to do things in the new context.

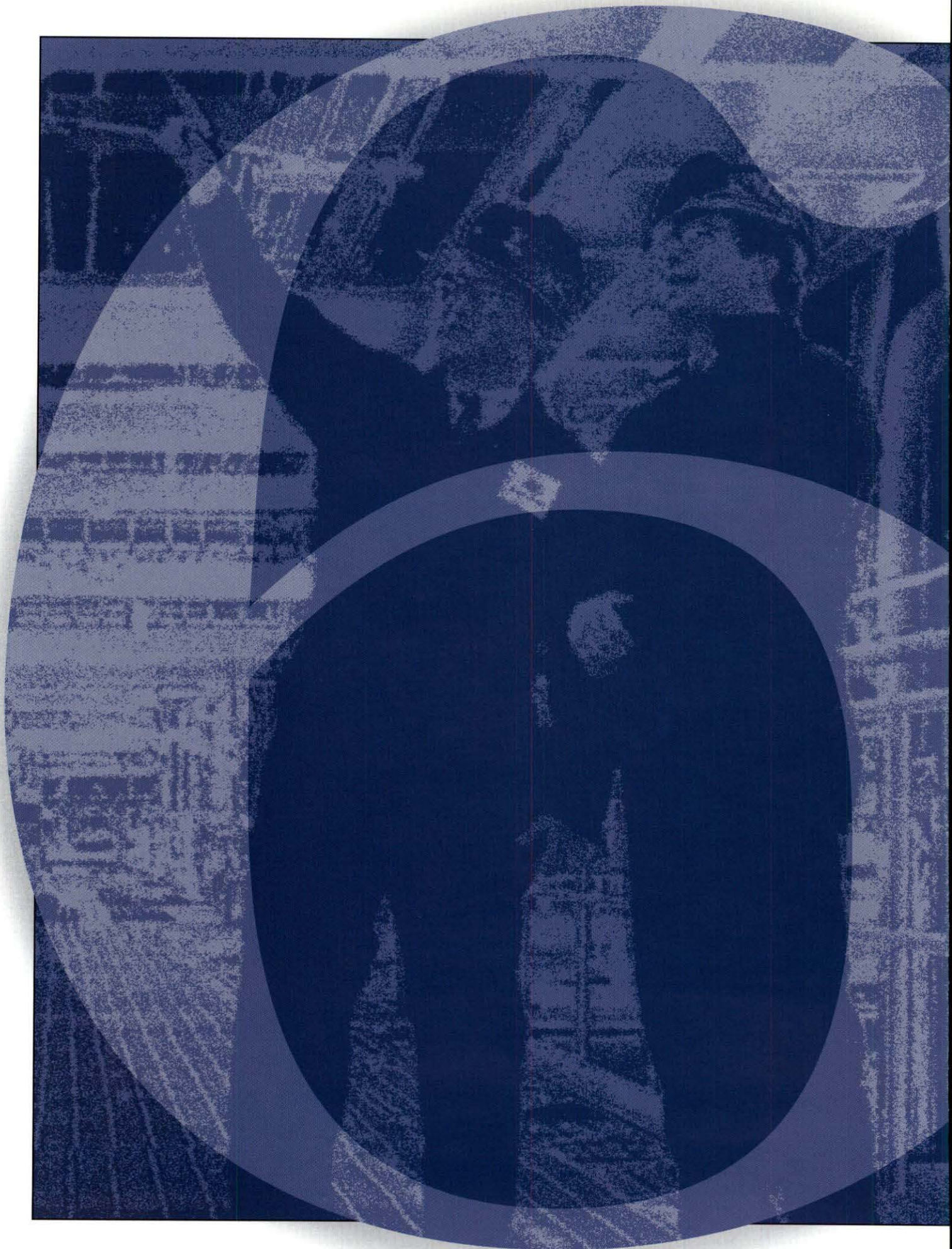
It is essential to successful leadership that one learn the ways of the new organization. The "ways of the organization" include, but are not limited to:

- Learning the governing policies and regulations of the organization.
- Learning the people and personalities that have guided the organization to its present position.
- Learning the reasons for the present policies and regulations and the present position of the organization.
- Learning to be inventive in suggesting ways of improving the organization while living within the policies of the organization.

One would expect that the university will be made up of the typical profile of society. In almost any society there will be about 10 percent who are exceptionally hard working, about 60 percent who will fall into the average category, and about 10 percent who will fall into the poor achiever category. Another 20 percent can be molded into the average or low end of the scale. This will probably be the ratio in which the university receives them. Most people who are willing to work for an organization will also be willing to follow the rules and regulations of that organization. They just need to be taught what, how, when, and where. However, there are a few people who have no intention of being under authority and must be disciplined before they ruin the morale of the unit as a whole. If they cannot be brought "into the fold" and show a willingness to follow the rules they must be discharged for the good of the whole organization.

The End of The Story

The end of the story of leadership for the next generation is, first, for upper management to be convinced that it is necessary to invest the time and effort in training both the trades and first-line management in the latest technology that applies to them and will facilitate the completion of their mission. Second, it is important to communicate to the individual employee that the changes being made is for everybody's benefit—that they will be more valuable as a result of demonstrated proficiency in the new training. And last, but most important of all, besides being convinced that they need it, is to actually give the employees the training and the technology they need to do the job that is expected of them. Regardless of an institution's other assets, the people who make up its permanent workforce are the most important asset the institution has. To treat them as such will pay rich dividends. ■



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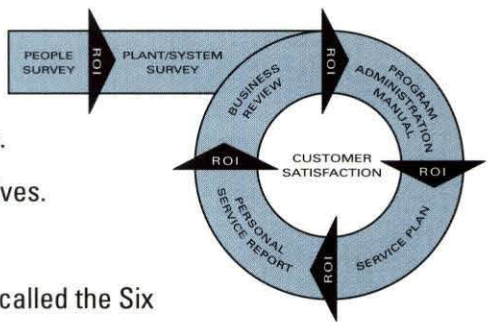

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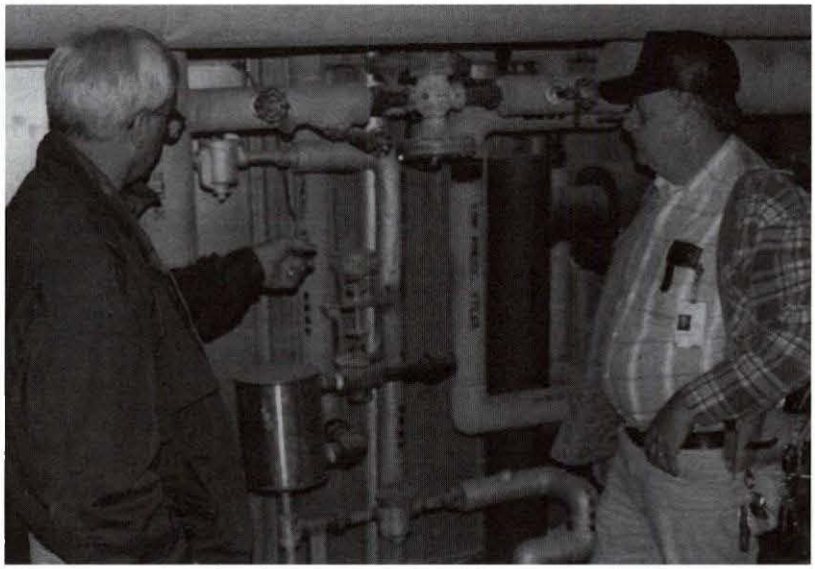
Multi-Skill Training:
Key to a Successful Maintenance Program

by James R. Vespi and Lisa M. Sasser



J.C. Boykin, supervisor, left, and Eugene Foley, trainee, right, engage in multi-skill OTJ training.

North Carolina State University is a large public university located in one of the nation's most technologically advanced regions. The department services 9 million square feet of teaching, research, administrative, and residence buildings, and 1,500 acres of grounds and transportation infrastructure with a staff of 660. The maintenance activity is staffed by 160 people.

Jim Vespi is director of facilities operations, and Lisa Sasser is assistant director for personnel & training, at North Carolina State University, Raleigh, North Carolina.

North Carolina State University's physical plant department, like many in higher education, is playing catch-up. The rapid expansion of higher education facilities during the 1970s and 1980s was financed largely by deferred maintenance and postponed upgrades to building systems and utilities infrastructure. With the focus on constructing new buildings and expanding programs, many organizations failed to invest in training and development of maintenance staffs during this period.

Following the unprecedented growth in new facilities and programs came the inevitable downturn that gave rise to budget cuts, downsizing, and calls to outsource physical plant services. Many senior leaders in higher education, and in some cases state legislatures, failed to recognize or accept that the decisions made in recent decades leveraged the future and disadvantaged higher education's service workers.

We are pleased to say that NC State senior leaders have recognized their responsibility to the physical plant workforce, as well as the benefits that can accrue from a well-led, well-trained, and motivated physical plant staff. Strong support for technical and supervisory training and the pay for skill concept has been given by these leaders. This article outlines the organizational conditions where multi-skill maintenance may be an appropriate strategy for improved performance and charts the development of a multi-skill training program at NC State University.

Technology and the Workforce

Higher education has not escaped the technological explosion that is driving much of the global economy. Significant changes in building HVAC, safety, telecommunications, control systems, and indoor air quality requirements have been introduced into higher education facilities over the last fifteen years. In addition, researchers require exacting space and electric power conditions to carry out ever more sophisticated experiments. Faculty, administrative staff, and students are demanding temperature and humidity controlled teaching, working, and living environments.

The maintenance workers at NC State, like many in higher education, lack the skills and knowledge to meet the growth in the technical service needs of the university's facilities. This deficit in workforce skills and knowledge is compounded by the failure of technical schools or the labor market to provide a supply of well-trained maintenance technicians. In response to this shortage NC State, following the lead of private industries, has established a technical training program that focuses on multi-skill training.

Multi-Skill Maintenance Program Needs

Recognizing the benefits of a multi-skilled workforce and successfully transitioning the concept into the workplace poses many challenges and pitfalls. Examples of failed or less than successful multi-skilled maintenance programs can be found in both the private and public sectors. The reasons that programs fail to meet expectations or needs are varied, and often related to factors specific to an organization or industry. However, there are common program needs that, if met, will help ensure that the multi-skill program goals of an organization are achieved. Successful multi-skill programs are generally characterized by:

- Well-informed and committed facility department leaders
- Senior organization leaders that are patient and supportive
- Appropriate participation in program development by department leaders, maintenance employees, human resources staff, union leaders, and qualified consultants
- Well-defined program goals
- Maintenance supervisors who are technically qualified and effective leaders
- A clear, customized definition of multi-skill maintenance.

Robert M. Williamson, a recognized leader in multi-skill maintenance, offers a general definition that will help any multi-skill program get off to a good start.

"Multi-skill maintenance is a blending of traditional trade or craft skills and new technology skills in a way that improves maintenance efficiency, effectiveness, safety, and job satisfaction. This skill blending can focus on the role of the individual worker or the mix of traditionally skilled people in a natural work group, crew, or team."

Any definition of multi-skill must capture the idea that multi-skilled workers need an inventory of primary, shared, and common skills that are blended with the individual's principal role in the organization. Also, improved performance should be inherent in the definition.

Organizational Change Drivers

Valuing its employees, customers, facilities, and a commitment to improvement all characterize NC State's physical plant department. These core values are rooted in an operational philosophy that calls for creating an environment that promotes individual and group success. This philosophy is one of the principal drivers behind the multi-skill training program and its corollary, pay for skill. Investing in employees and recognizing the value of the increased skills through promotions and pay raises is a great motivator and good business.

Another change driver behind NC State's multi-skill program is the service delivery problems that were plaguing the department. These problems were a classic manifestation of the traditional, centrally deployed trade shops and a training deficit that had grown over the years. It was clear in early 1993 that creating an environment for success would require the development of a highly trained multi-skilled workforce assigned to decentralized maintenance zones.

Changes in the economics of higher education and the public sector, along with the realities of a tight labor market, were also important drivers behind the development of a multi-skill training program at NC State. These drivers required that the NC State physical plant department focus on business processes. It was imperative that improvements in effectiveness and productivity be achieved. Therefore, adding a multi-skill training and promotion program to the formula for improved services at NC State made good sense.

Multi-Skill Training: Charting the Course at NC State

In early 1993 the department's senior leaders identified the keys to successfully delivering physical plant services to the university community.

- Switch from centrally deployed trade shops to maintenance zones staffed by multi-skilled technicians
- Establish formal planning and estimating activities that employ universal maintenance standards
- Establish a management engineering activity
- Establish a financial team to evaluate and make recommendations to improve business processes
- Develop a cadre of competent and confident leaders.

It was clear that to establish and sustain these foundations for success, a comprehensive training program was required. Subsequently, multi-skill training became the linchpin in NC State's technical training strategy.

Conceptualizing the need for a multi-skill maintenance program and successfully establishing a training program that is tied to pay for skill, particularly at a public university, requires a full partnership with the human resources division and a strategy that pushes the policy envelope but does not break it.

A strategy that utilized an existing state classification family and called for incremental pay and promotions for individuals was proposed to the senior leaders of the human resource division in the summer of 1993. The strategy was accepted, and our associate vice chancellor of human resources became a strong advocate and supporter of the initiative.

Partners for Success

In the fall of 1993 a team of human resources and physical plant staff was established. The team included policy interpreters and technical specialists from both groups.

Multi-Skill Project Team

Human Resources	*Physical Plant*
Director, Training	Personnel/Training Officer
Director, Classification & Compensation	Two Trades Supervisors
Facilitator	Staff Training Specialist

It was clear from the start that, to be successful, the policy makers and interpreters needed vision and flexibility; whereas, the implementers needed to understand the nuts and bolts of making the program work. The team was charged with developing the policies, procedures, standards and an implementation schedule for the multi-skill program. The policy makers provided guidance to frame the team's work:

- Develop assessment tools to allow assignment of incumbent trades personnel and new hires to the appropriate level in the maintenance mechanic classification family
- Program participants must demonstrate knowledge and hands-on skills with promotions and pay raises tied to standards and measurable performance
- The program must blend classroom work and on-the-job training that is tied to the performance appraisal process
- Maintenance supervisors must be actively involved and accountable for training and administration of the program.

The state classification of maintenance mechanic was selected as the program's career family. The classification fit the program needs well. First, the family offered five grade levels—unskilled through multi-journey level skills. Use of the family would provide opportunities for grounds, custodial, and other unskilled employees to move into higher paying maintenance jobs.

Also, this career family accommodated dual-track development in both building and mechanical trade specialties. The

J.C. Boykin, supervisor, left, and Rick Hagen, trainee, right, engage in multi-skill OTJ training.

principal advantage of the dual-track aspects of the classification is that it provides an opportunity for both the individual and the organization to train to existing or forecasted skill deficits. Finally, the use of the maintenance mechanic career family did not require the Office of State Personnel (civil service commission in some states) to change any rules; the program pushed the policy envelope but fit within the rules.

Out of the human resources/physical plant collaboration grew a set of program policies:

- Participation in the program would be voluntary for all existing staff
- A 5 percent pay raise, based on skills and knowledge testing, would be granted at the mid-point between classification grades within the career family
- A minimum time in grade would be required before a promotional test could be taken.
- Vacant positions will revert to the entry level grade to provide an opportunity for unskilled employees to enter the program
- Failure to pass promotional exams would not result in negative personnel actions
- Individuals with active disciplinary actions could not participate in the program.

Position	Time In Grade
Mechanic I	1 year
Mechanic II	2 years
Mechanic III	2 years
Mechanic IV	2 years
Mechanic V	—
Total	**7 years**

To ensure that department personnel and the campus community was well informed about the multi-skill program, these policies, and the program in general, were discussed at every opportunity and newsletters circulated.

Putting It Together

To help team members meld a demanding day-to-day workload with team duties, a multi-skill training consultant and a temporary administrative support person were hired. In addition to easing the workload, the consultant provided technical skills training expertise. The consultant was responsible for developing skills-based technical training, assessment tools, and criteria for pay and promotions. The temporary administrative position prepared job descriptions and served as a technical writer for policy development.

Selecting a qualified consultant was critical to the success of the program. Program credibility and buy-in from maintenance staff would be directly related to the program requirements for pay, promotion, and relevancy of train-

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ing to job requirements. Therefore, considerable effort was expended in developing the request for proposals that clearly set out the university's needs and framed the obligations and responsibilities of both the consultant and NC State.

Program Nuts and Bolts

The pay for skill aspect of the program ties demonstrated skills and knowledge to pay raises and promotions. Therefore, training and testing embraced two key elements: hands-on training and testing to develop and demonstrate skills, and classroom training with written tests to develop and demonstrate knowledge.

To accomplish the training and testing requirements of the program the consultant worked with teams of maintenance personnel having skills and knowledge in specific trades. The consultant guided the teams in the development of curriculum, tests, and standards. The important aspect of this approach is that the curriculum development process involved identification and documentation of the work performed by the people who do the work, not a consultant or management.

The direct involvement of the people who do the work is a critical aspect of the multi-skill program. Having maintenance staff (trades workers and supervisors) identify the duties, tasks, skills, and knowledge necessary to maintain the facilities gave the program value and credibility—two essential characteristics for program success.

This multi-discipline approach to development of curriculum, tests, and standards for pay raises and promotions presented a number of challenges. First, the team had to agree on a common vocabulary. Then we needed to agree upon a shared understanding of what multi-skill was to mean at NC State. In addition to developing a common language, the team had to work through some of the classic barriers that confront labor and management whenever pay, promotions, and training are involved.

There were many factors that contributed to NC State's ability to successfully meet these challenges. The two most important ones were having a competent consultant and a well-qualified training coordinator assigned to the program.

Multi-Skill Program Implementation

In January 1996, the maintenance staff of one of the university's service zones was formally invited to participate in a pilot program. Employees were given the option to participate or to be transferred to another service zone to work in their existing trade. Those who agreed to participate were required to request reclassification to the maintenance mechanic career family. Everyone invited chose to participate.

The participants were then tested in their trade specialty. The test results were used to determine the participant's new classification and pay grade. If a participant failed to meet the minimum skill and knowledge standards of the equivalent pay grade in the mechanical maintenance family, a training program was developed and the individual was given two years to

meet standards before a pay grade adjustment would be made. The test results along with self assessment and supervisory input were also used to develop individualized training plans for advancement to the next pay grade.

As part of the training program a series of classroom courses were scheduled. The course material, including tests and instructor guides, was purchased from Skillcraft Inc. The Skillcraft training material provides a structured way to teach the basics in electricity, mechanics, hydraulics, and other technical subjects. The course work is intended to provide uniform training for individuals in the first two pay grades of the mechanical maintenance career family. Upon reaching the maintenance mechanic III level, the training is customized to meet organizational and individual needs.

Enrollment in the basic training courses was open to all physical plant staff. The intent was to provide the opportunity for individuals to prepare themselves for the future. To ensure everyone had a chance to participate without hurting productivity, classes were scheduled after normal work hours. Off-hour classes also helped to ensure that only those who were serious about improving their skills and preparing for the future participated.

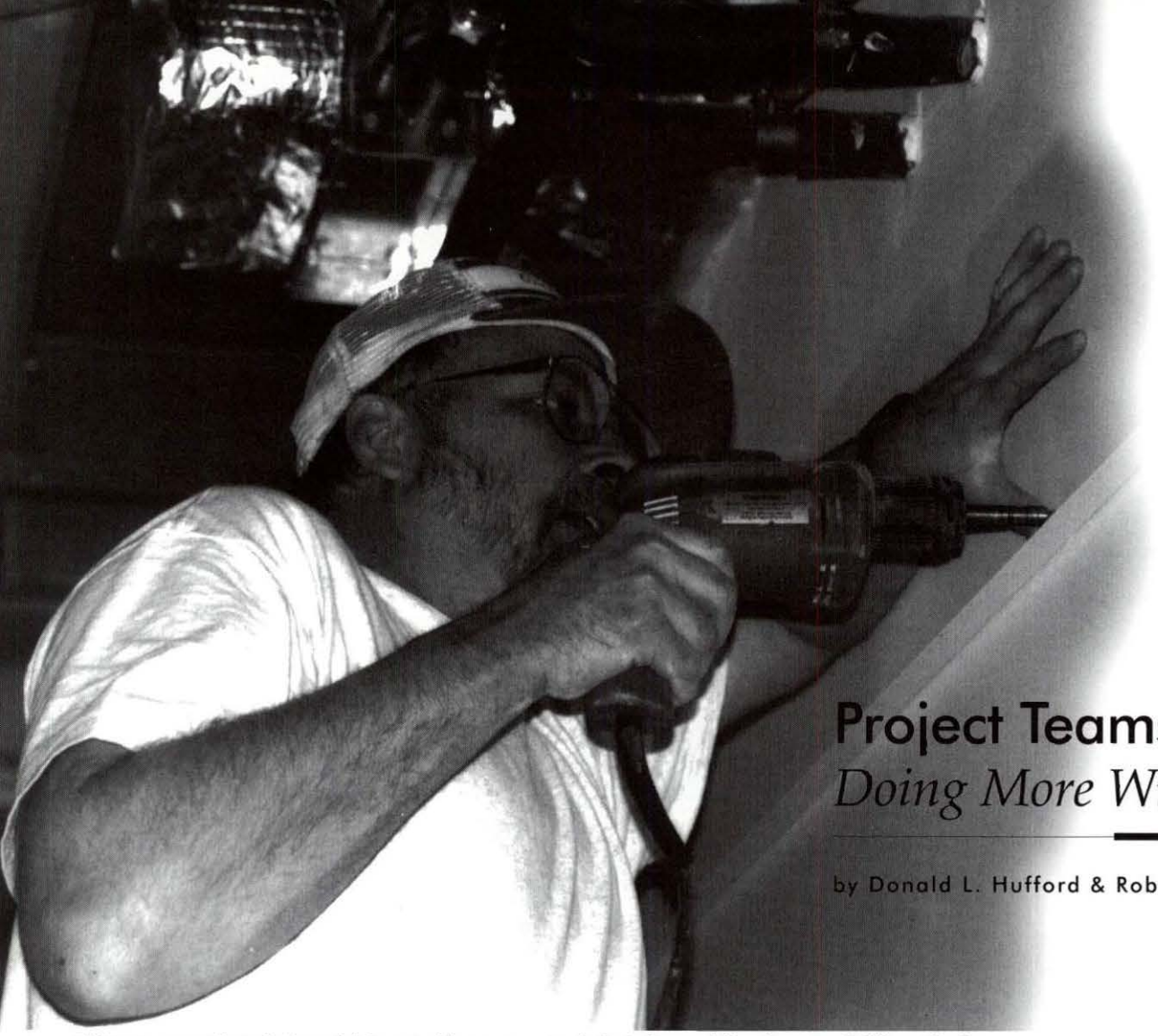
Eight supervisors and senior technicians who volunteered, received training in how to plan and conduct on-the-job training. In March 1996 the director of physical plant, in a certificate ceremony, officially placed the future of the multi-skill program in the hands of these individuals. The director made it clear that the program integrity, effectiveness, and ultimately its success would be determined by the these individuals and the others who may follow.

The implementation of the multi-skill maintenance program will be spread over the next several years. The pilot program is scheduled for review in the fall of 1996. Based on the results of the review, adjustments to the program will be made. The first expansion of the program to other service zones is scheduled for January 1997.

New Directions and Opportunities

The multi-skill program experience has given NC State's physical plant leaders the confidence to be progressive and to seek new opportunities to improve effectiveness. Presently, plans are being developed to introduce a concept that has been dubbed Total Productive Operations into the university's central steam plants. The initiative blends the multi-skill and total productive maintenance concepts into a program that will improve the performance of the university's steam plant operations.

Demonstrating the value of physical plant maintenance and operations services to the university community should be a critical goal of every physical plant department. Achieving that goal will require multiple strategies, a willingness to take risks, and the ability to adapt to the changes in the higher education industry. NC State physical plant leaders believe that the strategic use of the multi-skill concept and its corollary pay for skill should become an important part of any physical plant department's formula for success. ■



Project Teams: *Doing More With Less*

by Donald L. Hufford & Robert K. Beck III

Ed Young, a mason by trade, is seen helping out with some carpentry duties in the remodeling of a campus building at Purdue.

Approximately three years ago Purdue University's Physical Facilities Department implemented a Quality Improvement Initiative that represented some of the largest and most sweeping changes to ever encompass the way in-house construction projects are managed from cradle to grave. What follows is a chronology of the who, what, where, when, and why regarding the implementation of project teams at Purdue University.

In the beginning, after discussions with several of his counterparts throughout the Midwest Association of Physical Plant Administrators, Wayne Kjonaas, vice president for physical facilities, asked Don Hufford, director of buildings and grounds and Tom Schmenk, director of facilities planning and construction, to propose a plan for improving Physical Facilities' customer service through improvements to our project management system. Don and Tom assembled a cross-functional team from Facilities Services, Facilities Planning and Construction, and the Physical Facilities Fiscal Office to study the existing system and recommend changes to create a "new responsiveness" to our mission and customers. The team (similar to Quality Circles) was organized after our own Employee Involvement Group model and began meeting on a weekly basis in August 1993. The group named themselves the Sultans of Solutions and undertook a thorough review of the current system before making any changes.

In order to simplify analysis of the project management process, the group divided itself into subsections consisting of estimating, scheduling, design, field work, and close-out. Then, the entire existing system was diagrammed using the process mapping technique. The map required two complete walls of the group's training room to complete. Not surprisingly, the main conclusion was that the process of project management is very complex and has many interrelationships both internal and external to Physical Facilities. Also, the current system lacked flexibility, which affected our ability to meet our customer's needs.

Early in November 1993, the Sultans of Solutions met with representatives from Illinois State, Iowa State, and Michigan State universites to benchmark project management issues and compare experiences and procedures used at each institution. Several members of the Sultans of Solutions visited Texas A&M to see how they were handling such problems as the backlog of work and the lack of flexibility in scheduling, while trying to meet the customer's time frame for project delivery. Not surprisingly, all the participants were faced

Don Hufford is director of buildings and grounds, and Bob Beck is buildings and grounds training manager, at Purdue University, West Lafayette, Indiana.

with similar issues, i.e., taking care of the customer quickly and efficiently. The groups jointly developed the following statement of goals and factors for improved project management and customer support.

Enhanced Customer Service by Facilities Management Organizations

Plant and facilities are improved by considering the following objectives:

1. Improve communications both within and outside the organization:
   - Voice mail and e-mail
   - Facility coordinator (our building deputies are a good example)
   - On-site visitation with deans, department heads.
2. Streamlining existing processes:
   - Understand customer's needs
   - Follow up on work done
   - Individual time management
   - Meet commitments
   - Empower first-line employees
   - Develop or improve external service providers to gain greater flexibility.
3. Increase customer involvement:
   - Focus sessions
   - Training
   - Surveys
   - Include customers on search committees for hiring new employees
   - Partnering with customer on projects.
4. Create greater organizational flexibility/adaptability:
   - Cross training
   - Think "flexibility"
   - Create environment where change occurs naturally
   - Customer orientation
   - Motivate, rather than control
   - Involvement
   - Risk taking/okay to fail
   - Recognize fear within the organization/reduce or eliminate
   - Listen/hear what is said.

The EIG then performed a "what if" analysis of the estimating portion of the construction process. Ideas were presented, reviewed, argued and, in some cases, rejected. The goal was to make an initial presentation to the vice president and directors within the next six weeks. The team continued to meet and worked on their charge, better customer satisfaction, and project delivery. We also decided to ask for input from both internal and external Physical Facilities customers in order to give us the best perspective for problem solving and process improvement.

How did we do this? It began with a customer survey feedback process where the directors interviewed deans, directors, and department heads throughout the university in order to better identify exactly what the customers' needs and frustrations were. It was truly an exercise in actively listening and responding to what our customers' feelings were with both a positive and negative focus.

As a result of the customer feedback, the EIG recommended the following concepts:

- ***Receipt of all work requests at a single location.***
  The receipt of all work requests at a single location would make it much simpler for our customers and would alleviate the guess work. The implementation of a dedicated estimating team would permit the immediate response to customer requests and would expedite getting the work order to the field for completion. This leads to the extension of the Work Control Center which, up this point in time, was the clearinghouse for maintenance work requests that were being processed by our Zone Maintenance Teams.
- ***Development of a design standards manual.***
  The use of a standards manual would make many repetitive operations more consistent and would eliminate reinventing the wheel. This proposal would also benefit the estimating group and all shops personnel, and would simplify the design of some systems.
- ***Realignment of our shops project area into designated teams.***
  The assignment of shops personnel into project teams could eliminate competition for scarce human resources and improve communication between the foremen, coordinators, planner, and crew chiefs. It could also allow more flexibility as a result of an increased workload from the dedicated estimating team.

TEAM ROLES

The Dedicated Estimating Team:	Works on Project Estimates for Project Teams and Central Shops
Project Teams:	Construction Projects
Zone Teams:	Customer Contact Preventive Maintenance
Central Shop Teams:	Maintain Craft Knowledge Skills Expertise and Provide Diversity of Technical Expertise

Note: The role common to all teams is that of installing and maintaining campus facilities and equipment.

- ***Development of a delivery order contracting type system.***
  Due to the anticipated increase in work, and the rapid turnaround of estimates, the use of a delivery order type contractor could help to ease our current backlog of work and permit flexibility while dealing with the tight scheduling demands of the customers.
- ***Continuing to further develop EWOTS.***
  With emphasis on the electronic transfer of information and project administration, the continued development of the EWOTS system is essential. EWOTS stands for the Electronic Work Order Transfer System where customers, via a PC integrated computer system, can electronically send project work requests immediately to our Work Control Center.

These rather broad concepts, although not developed in detail and requiring additional input from those involved, provided the framework for this continuous quality initiative. This framework is customer sensitive through responsiveness

and meeting their needs and expectations as realistically as possible. The group worked hard during the next few weeks and solicited additional feedback as more details for the above mentioned concepts were required.

The Sultans of Solutions continued to keep everyone informed of its progress and shared its thoughts and ideas through the quarterly plant newsletter and via team meetings with the vice president and directors Hufford and Schmenk. The ultimate strategic proposal made by the Sultans of Solutions was to develop project teams as a means to improve customer service and increase craft participation in projects, thus providing a sense of continuity and "ownership" for the members of the teams.

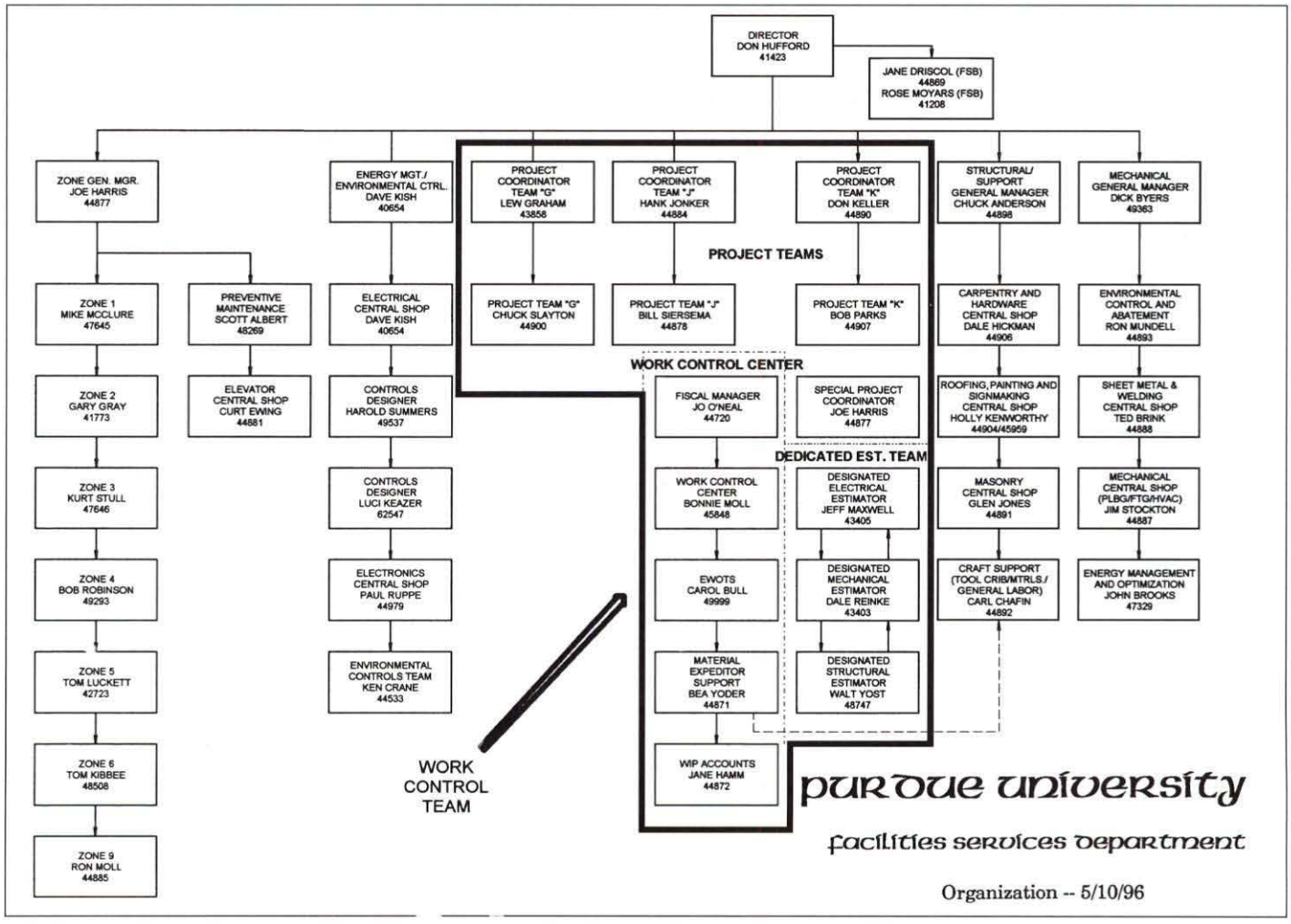
Another proposal was the creation of a dedicated team of planners and estimators. This team is to be responsible for in-house projects and remain responsive to Facilities Services requirements. Taken together with development of construction standards, these two proposals formed the basis for the Dedicated Estimating Team/Project Team model. After approval was gained from the department's leadership, an EIG subgroup was selected to develop this concept. It was dubbed the "Project Teams Sub" or PT-SUB.

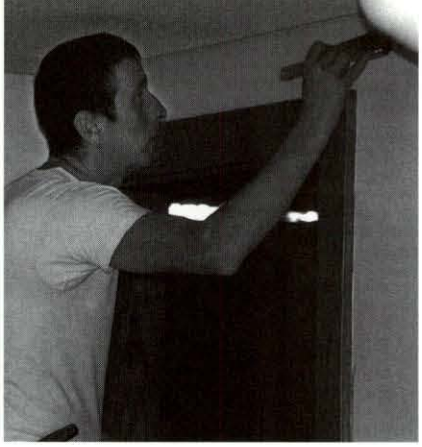
PT-SUB members identified several topics for investigation and assigned them to study groups. These included material procurement, material delivery, tools and equipment, transportation, location of supervisors and estimators, trash removal from project sites, communication needs, and responsibilities of supervisors and estimators. These groups met separately then reported their findings and recommendations to the PT-SUB.

Considering our target date of October 1, 1994 for implementation, the PT-SUB established additional milestones for significant events on the road to project teams. Selection of supervisors was scheduled for July 1 of that year, the program framework was to be completed by August 1, and September 1 was the goal for final selection of all team members. Each milestone was accomplished before its target date.

Three project teams averaging twenty members each were selected from the existing Facilities Services staff. No additional FTEs were required, and all team positions were filled from within. Each team includes a coordinator, a project supervisor, two crew chiefs, and an appropriate mix of crafts persons to accomplish the assigned project work. The teams, designated Team H, Team J, and Team K, were designed with *preponderance of effort* in mind. Team H is heavy in the electrical area, Team J in the Mechanical, while Team K is weighted for structural projects. In this manner, maximum use of available personnel is realized while minimizing shifting of crafts to tailor a team for a particular job.

As the project teams formed, several Central Shops crafts were also reorganized to benefit from craft similarities while reducing and streamlining supervisory requirements. In





Kenny Thomas, a painter from the Central Shops Team, is busy painting trim.

essence, we combined areas and flattened the supervisory structure. HVAC, Plumbing, and Steamfitting were consolidated as the Mechanical craft reporting through one supervisor. Another foreman who supervised the central shops Carpentry team was also assigned the Lock and Hardware craft. The Electrical crafts were added to the ongoing duties of another supervisor. (As a footnote: just this past April 1996, one of the continued progressive streamlining efforts of our shop crafts was realized in combining the Roofing and Paint Shop functions under one supervisor.)

The Dedicated Estimating Team concept recognizes the need for close association between the planners and the builders as well as the requirement for dedicated field support to the project teams. The three staff members representing Mechanical, Electrical, and Structural Planning were physically relocated on-site to the Facilities Services Building to provide this support. Eight individuals from Facilities Services also joined them to distribute, schedule, plan, and execute projects. As a result of the flattening of the Central Shops organization, these eight FTEs were freed up and then reassigned to carry out the leadership responsibilities for the seventy trades persons who now comprise our project teams.

Much of the project team's ability to respond in a more efficient manner is based on the development of a book of acceptable practices or "standards manual." Through a combination of typical photographs, drawings, code standards, and written specifications, a team or central shop craft may be directed to complete a project based on one or more standards. This will avoid the delay associated with detailed investigation of the project area as well as comprehensive drawing preparation. Standards may also be referenced by item within other project documents and drawings.

Another method for simplification of design specifications is "borrowed" from our ongoing classroom renovation process. The use of PICT-O-GRAM photography has greatly reduced drawing time and provided a computerized record of the project. These digital images are computer enhanced by the addition of specifications, bills of materials, explanatory remarks, and details before distribution to the crafts.

A major feature of project teams is the planned assignment of a material expediter to each project, similar to assigning a team or central shop. This process will directly involve the expediter in the development of material lists from the drawings or specifications and simplify the overall material procurement process for a project, i.e., each team has its own dedicated purchasing agent. Crew chiefs and project supervisors will work closely with the expediters to make certain the required materials are on hand before they are needed by the project team.

In order to take full advantage of the reorganization within Facilities Planning and Construction and Facilities Services, all estimators, project team, and central shop craft members participated in a customized team building training program. This module was developed by Bob Beck and Rita Finch from the Buildings and Grounds Training Department. The coordinators and project leaders attended a seminar about building project teams and combined the techniques they learned into the training module.

The Facilities Services staff was excited about the advent of project teams. They shared the expectation of more efficient processing of construction jobs, learning new skills, improved morale and enhanced cooperation for both the project teams and central shops crafts. Perhaps most importantly, the crafts persons were most excited about the prospects of improving their overall professional image in the eyes of the customer. As Purdue's Physical Facilities family has proven many times, people are our most important asset. With goals and determination, we will continue our innovative leadership role in higher education facilities management.

The outcome of having three project teams operating for the last year has generated some fairly impressive results. Project teams is the most successful continuous quality improvement effort we have undertaken since the establishment of zone teams.

STATISTICS AND FEEDBACK

1. Projects Completed - February 1995 - September 1995
193 Projects
21% Over Budget
79% Under Budget
Over Budget Average - $2500

2. Summer 1995
Completed - $1,900,000.00
90 Projects Completed in 68 Working Days
Workforce of 70 People

Compare - Summer 1994
Completed - $2,300,000.00
Workforce of 105 People

3. Dedicated Estimating Team Projects - From Cradle to Grave
Approximately 214 Projects Involved
59 Working Days - versus - Goal of 45 Working Days

The statistics prove this very point: for summer 1995, approximately seventy team members completed $1.9 million dollars worth of in-house construction projects. During the summer of 1994 (prior to implementing project teams) approximately 105 employees completed $2.3 million dollars worth of in-house construction projects. These numbers reflect that more work was accomplished with fewer employees as a direct result of the project team concept. For example, each team member completed $27,142 of project work in 1995 compared to $21,904 of project work in 1994 when there were approximately thirty-five more employees performing the work. Yes, Virginia, project teams are doing more with less!

As a result of this success, customers, team members, project coordinators all have been very complimentary about the project team approach. As Lew Graham, project coordinator for Team G put it, "The greatest impact of project teams has been improved customer service, response time, effective

utilization of labor and materials and coordination of communication and team members."

Customers too have been full of praise about the improved communication and response time from starting a project until it is completed. Two of Purdue's building deputies shared their positive thoughts about project teams in a video that was produced for a presentation about project teams held in October 1995 at the University of Wisconsin's Madison campus. The video was produced in-house by the Buildings and Grounds Training team and features team members, customers, and team coordinators sharing their perspectives about the success of project teams. Anyone interested in seeing the seventeen-minute video can borrow a copy from the Buildings and Grounds Training Department by calling 317-494-1433.

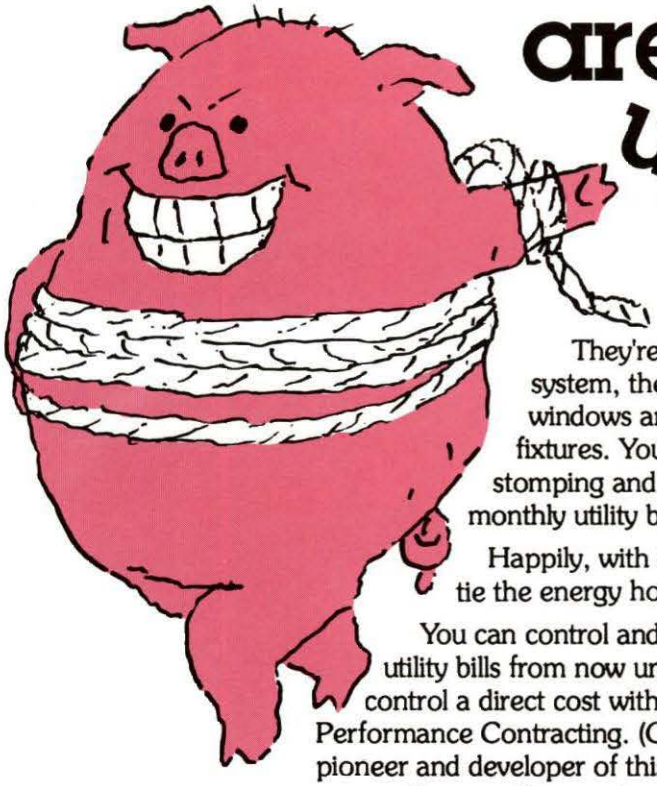
The presentation for the MAPPA Conference (Midwest Association of Higher Education Facilities Officers) featured a panel presentation made up of members from the project teams. The purpose of the program was to share the success of this creative approach which Purdue has enjoyed with other physical facilities managers and directors from throughout the Midwest.

Scott Sprowl, a carpenter, is a member of Project Team "G".

The presentation was of such interest to the attendees that 57 out of 147 persons attending the conference jammed the meeting room where the presentation was being held. Participants were especially interested in how the concept was developed and put into practice. Lew Graham summed up the audience interest, "The audience was very receptive and enthusiastic about how we initiated project teams and the results of the current process to date."

Project teams have been an amazing success story thanks to the dedicated team members and their can-do attitudes about satisfying the customer. Truly the concept of Project Teams has proven to be a WIN-WIN innovation for the customer, the project teams, and the Purdue University community. ■

Energy Hogs are rooting up your Profits



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Happily, with CES/Way you can hog tie the energy hogs.

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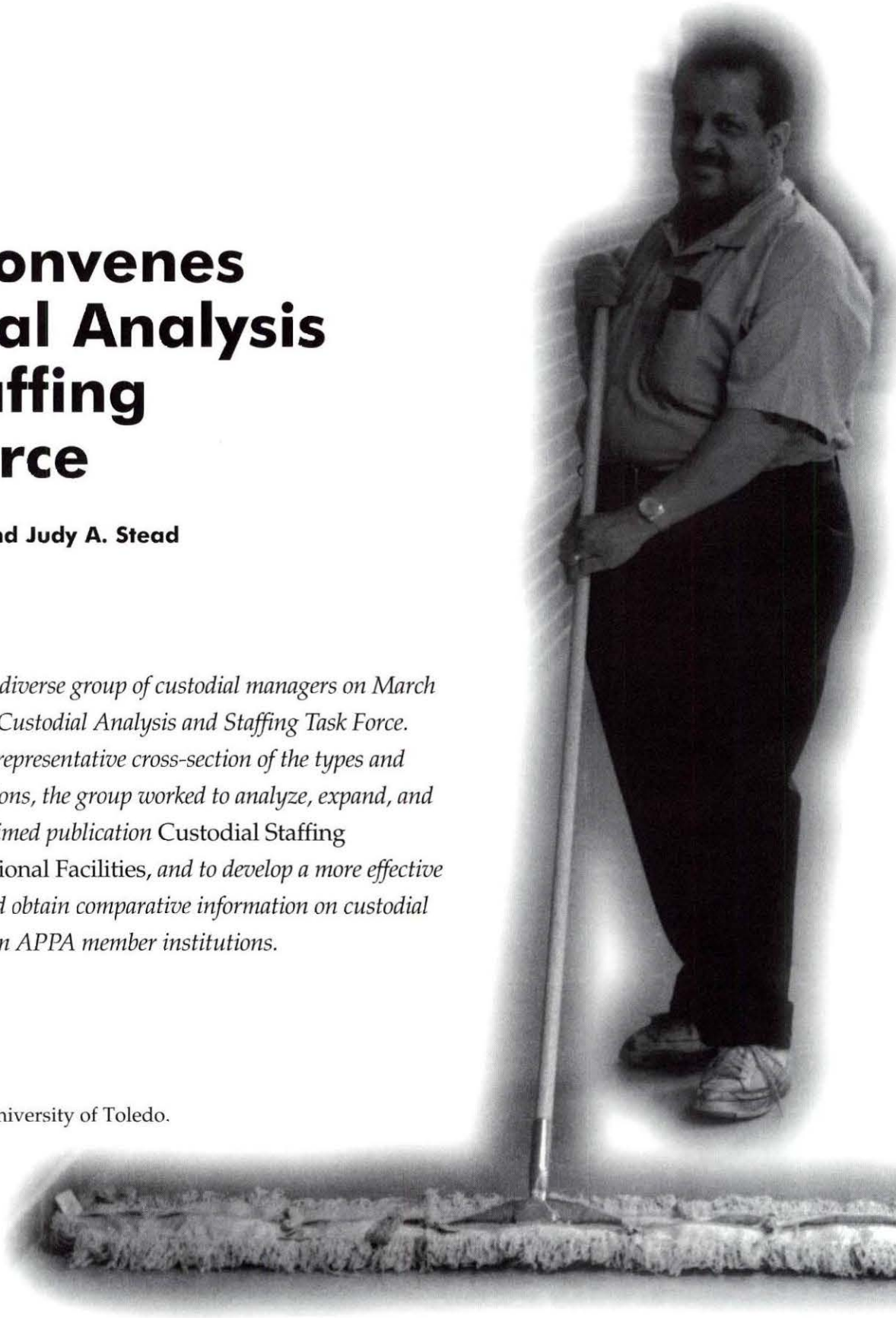
APPA Convenes Custodial Analysis and Staffing Task Force

by Jonathan Ford and Judy A. Stead

APPA pulled together a diverse group of custodial managers on March 11-12, 1996 to form the Custodial Analysis and Staffing Task Force. Providing input from a representative cross-section of the types and sizes of custodial operations, the group worked to analyze, expand, and update the already acclaimed publication Custodial Staffing Guidelines for Educational Facilities, *and to develop a more effective questionnaire that would obtain comparative information on custodial operations and costs from APPA member institutions.*



Photos courtesy of the University of Toledo.

Jon Ford is manager, environmental services, at Montana State University, Bozeman, Montana. Judy Stead is assistant director, plant operations, at the University of Toledo, Toledo, Ohio. Both are members of APPA's new Custodial Analysis and Staffing Task Force.

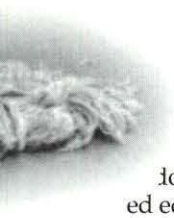
Custodial operations tend to attract administrative attention because they represent such large portions of any facilities services budget. Their large number of employees and their characteristically high rates of employee turnover make them a tantalizing target for administrators looking for a place to cut expenses.

Until a decade ago, there was a lack of available custodial work standard and staffing guidelines relating specifically to educational institutions. More importantly, reasonably priced computers, and software powerful enough to crunch the numbers, did not exist. This made it nearly impossible for an administrator to truly determine if the custodial operation was fat, overly lean, or "right-sized." After relying on the credibility of the custodial management, which was understandably biased toward protecting the status quo, a budget-cutting administrator would often assume that the operation was fat, if only because there was a lack of hard information to prove otherwise.

Many resulting bad administrative decisions were made over the years. As a consequence, custodial operations everywhere had wildly fluctuating staffing and service levels as each department reacted to budget cuts on the one hand, and demands for service on the other.

Unable to convincingly determine the custodial workload and service levels internally, facilities managers looked to comparison with peer institutions for decision-making information. However, this too had pitfalls, since it was never clear whether the institutions responding to comparative data surveys were comparing the same parameters.

APPA has been extremely responsive to this need for accurate information and has produced several excellent resources for facilities managers: the biannual *Comparative Costs and Staffing Report for College and University Facilities* and 1992's *Custodial Staffing Guidelines for Educational Facilities*. Again responding to the needs of its membership, APPA has commissioned the latest finetuning of these tools in the formation of the Custodial Analysis and Staffing Task Force, operating under the auspices of APPA's Information Services Committee. Armed with valid, justifiable recommendations built on the use of these fine resources, managers will be able to more wisely utilize the budgetary dollars that are available, and may more easily defend their operations against indiscriminate budget cutting.



Even with today's advances in custodial measurement, standards, and computer technology, every custodial manager is eventually placed in the position of measuring and quantifying the work of the department. Traditional benchmarks focus on cost per square foot, and as those who have ventured down this road soon learn, not all square feet are created equally. To illustrate, consider the time it would take to clean one thousand square feet of congested office space versus one thousand feet of unobstructed gym floor.

Past participants in the APPA Comparative Costs and Staffing survey expressed the concern that administrators, seeking benchmarks for custodial operations, often eagerly latched on to the data in the annual report without benefit of understanding the hidden variables. In order for the biannual survey and report to be a useful tool, respondents told APPA that the data needed to be expanded, with more clearly defined categories. Institutions could then more accurately compare "apples to apples."

Staffing levels and productivity are affected by many variables. Wide corridors conducive to the use of battery powered equipment, and floors, such as rubber, which require minimal maintenance, contribute to efficient custodial operations.

Therefore, the first objective of the task force was to amend and expand the current survey in a way that identified those variables. Because of the need for quite detailed information, it proved challenging to keep the questionnaire to a reasonable length. As with any survey, it was also difficult to design questions that would extract the exact information required. Otherwise, the answers received might prove to be ambiguous, confusing, or burdensome.

The task force felt that a side benefit of completing the new survey will be the increased confidence and professionalism acquired by any custodial manager who works through the analytical process required to obtain the data. The analysis, along with the biannual APPA survey report, will then become a valuable tool that can be used for budget and benchmark purposes by manager and administrator alike.

There were other challenges to creating a good survey questionnaire. A major complication was the need for determining the way submitting institutions partition their operations. For example, one institution might submit data that represents a combination of its state-funded operations along with its self-supporting or endowed custodial efforts, while another institution might submit only the state-funded side, treating differently-funded budget centers as separate entities. Unless the questionnaire delved into enough of these specifics, institutions still would not be able to compare the same types of custodial operational costs and staffing levels. Therefore, the new survey will include an enhancement to the square footage section, with categories for Medical, Athletic, Research, Residential, and Auxiliary operations. It will also differentiate between in-house staff information and that pertaining to contracted services.

The effective custodial manager must constantly seek to identify ways to shorten the time it takes to perform a given task. State-of-the-art equipment such as the high-speed burnisher is also ergonomically correct, thereby decreasing the potential for injury and costly workers' compensation related absences.

Because a custodial operation analysis utilizes time as a measurement, factors that affect time, such as the number of days and hours of operation, age of the facilities, the presence of elevators, or lack thereof, and the current physical condition of the facilities were all considered to be contributing factors that must be included in the annual survey.

The task force also discerned a need to zero in on personnel comparatives. Members wrestled with the complicated issues of job classification and titles, structure of wages and benefits, and how bargaining units affect costs and affect comparisons with other institutions.

We noted that the availability of workers, the department turnover rate, as well as access to part-time labor must be considered as comparative factors that have an impact on custodial personnel costs. Community size and local unemployment rates affect the size of the applicant pool and determine the ability to recruit and retain a viable workforce. All of the above factors affect the amount of time and expense consumed within a given custodial operation for personnel-related activities.

Information affecting recruitment and retention issues varied widely among the institutions represented on the task force, and it is likely that the survey will reveal useful comparative data surrounding these cost-critical but often overlooked personnel factors.

The task force viewed the differentiation of direct costs from indirect costs

as a means of quickly cutting to the heart of the comparison challenge. The survey will ask respondents to report direct costs, which include annual wages for non-exempt staff, benefits, supplies, equipment, and contracted services. Indirect cost information will also be requested, which consists of other personnel wages and benefits and all other miscellaneous operational costs.

Updating the Book

The second objective of the task force is to expand and update the APPA *Custodial Staffing Guidelines* publication. We unanimously agreed that it would be not advisable to drastically alter the basic organization and layout of an already fine and useful resource. Instead, the task force seized upon an approach that would augment existing chapters with additional information and considerations, as well as add completely new chapters to deal with previously unaddressed issues. Seventeen new cleanable space categories with their corresponding matrices will be added.

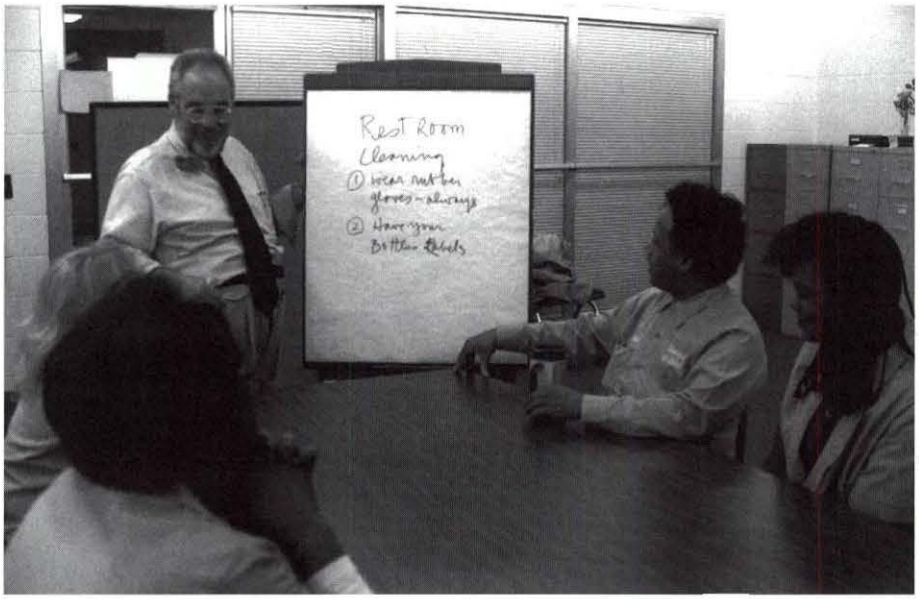
The task force provided input from a wide cross-section of custodial operations across the country. While each representative brought a unique perspective to the group, members quickly agreed that not all square feet data is equal. The first objective: to create a survey that would identify those inequalities and compare "apples to apples."

These proposed adjustments to the original version of the guidelines will allow custodial managers and supervisors to arrive at staffing estimates more sensitive to the idiosyncrasies of their own institutions. There will now be fewer gaps to fill in, as was necessary when confronted with a space that was not one of the ten space types benchmarked in the first edition of *Custodial Staffing Guidelines*.

Because of input from the task force, more of the factors worthy of consideration when making a staffing estimate or analysis will be stated in the text. This information will help remind the custodial manager of important items that must be incorporated into the application of the formulae. Omissions can result in future budget problems or erroneous analysis of staffing requirements and productivity—quite reminiscent of the old way of doing things.

Preliminary plans call for adding chapters relating to design specifications, staff orientation, blueprint interpretation, real-life case histories, training issues and bid forms—to name just a few. The second

Use of a wide area vacuum can affect staffing requirements by reducing the number of FTE needed to clean larger, more open areas. Employees can then be scheduled for more labor intensive work such as occurs in classrooms.



Personnel concerns included availability of labor, turnover rates, wages, and benefits because these items are often overlooked in the traditional square foot cost comparisons. An effective training program affects staff efficiency, and well trained supervision will also boost productivity, help to prevent costly accidents, and sometimes reduce turnover thereby reducing overall costs.

edition is targeted to be available in spring 1997.

As often happens in APPA get-togethers, members of the group found that they shared a lot more similarities in their day-to-day challenges and viewpoints than differences. Many commented on the professionalism and unity of the group as it attacked the assignment at hand.

Both the comparative data survey and the APPA Custodial Staffing Guidelines effort will continue to evolve beyond the product offered by the current task force. Further finetuning will be appropriate after a few years of working with the latest editions, and that is as it should be. Good management is dynamic and full of change and innovation; management tools should reflect the flux. These are two tools that definitely meet the needs of custodial managers and facilities administrators as they strive to be worthy stewards of what is one of the largest budgets within any maintenance operation.

Thanks to the efforts of the many respondents who participate in the APPA Comparative Costs and Staffing survey each year, and because of the contributions of those who serve on the new task force, custodial departments everywhere will have an effective benchmark that will allow their operations to truly compare and plan. ■

Members of APPA's Custodial Staffing and Analysis Task Force

- Greg Fichter, Indiana University, *Chair*
- Linda Carter, Mercer University (GA)
- Paul Courtney, University of California/Riverside
- Jimmy Davis, University of Arkansas/Fayetteville
- Jack Dudley, INFORMED, Inc.
- Jonathan Ford, Montana State University/Bozeman
- Bob Lawrence, University of Maine/Farmington
- John Marker, University of Nebraska
- Bernadine Roybal, University of Wyoming
- Judy Stead, University of Toledo (OH)

Productivity in cleaning hard-to-reach areas can be improved by utilizing equipment such as compact vacuums. Lightweight and quiet, these provide dust-free cleaning while eliminating fatigue and physical strain. The effective manager will take the time to compare costs vs. labor savings to administration.

Regulatory Action

States Awakening to Indoor Air Quality

Patricia E. Dougherty

Air is an ever-present fact in our lives and yet, until recently, little attention has been paid to the quality of the air where we spend 90 percent of our time: indoors. The energy crisis of the 1970s, while teaching the lesson of energy conservation, unfortunately also brought with it airtight building techniques which today have resulted in indoor air quality (IAQ) problems. Additionally, poor operation and maintenance of mechanical systems at the workplace can further contribute to unpleasant or unhealthful working conditions.

The energy crisis of the 1970s, while teaching the lesson of energy conservation, unfortunately also brought with it air-tight building techniques which today have resulted in indoor air quality (IAQ) problems.

The term "indoor air quality" can apply to a broad concept of the overall quality of the indoor working or living environment, or it can address specific problem contaminants such as radon, environmental tobacco smoke (ETS), volatile organic compounds, pesticides, or urea formaldehyde foam insulation (UFFI). States are now beginning to confront IAQ issues by addressing both specific pollutants and broader notions of acceptable indoor air quality.

Pat Dougherty is regulatory counsel, environmental regulatory information services, for Stateside Associates, Arlington, Virginia.

IAQ programs have existed at the federal level for about a decade, but most states have been slower to recognize and address the issue. Certain IAQ contaminants like radon and ETS have received greater attention at the state level, spawning laws and regulations addressing the abatement and prevention of these contaminants. Less developed, however, are state programs addressing the broader issue of good IAQ. Currently, state involvement in the issue generally comprises a patchwork of laws, regulations, and programs distributed among health, environmental, and occupational safety and health agencies. Among the states there is great variety in the approaches taken to IAQ. However, despite the disparity in state IAQ programs, it is clear that the states have begun to recognize the need to address IAQ concerns.

Currently, there is no federal rule or national standard governing IAQ. To date, federal activity on IAQ has been limited to educational programs and voluntary participation in programs promoting good IAQ techniques. However, there are two emerging documents that may spur states on to greater regulation of IAQ. The U.S. Occupational Safety and Health Administration (OSHA) is presently reviewing comments on a final proposed rule governing IAQ. This rulemaking was commenced in 1994 and has been marked by considerable controversy. The rule, which staff do not expect to have finalized until sometime in 1997, will establish IAQ protocols and exposure limits for the non-industrial workplace. However, possible Congressional action affecting OSHA reform, deregulation, and the agency's budget may alter the content of the final rule and delay its release.

Another potentially national standard, the revised American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) 62-1989 standard, is also likely to have an impact on states' approaches to IAQ. The recently released proposed ASHRAE 62R, titled "Ventilation for Acceptable Indoor Air Quality," is a departure from the current standard. It not only addresses design standards, but it also specifies building operation and maintenance procedures to assure adequate ventilation and contaminate-free building systems. Another departure from the current standard is that proposed 62R is written in code language so states and localities can incorporate the standard directly into their building codes; previously, the standard had to be redrafted by the adopting jurisdiction into code language. Drafters of 62R hope this will assist in the quick adoption of the standard.

Even without a clear federal mandate to do so, all states have begun to address the issue of IAQ in some fashion. Every state has at least one state agency contact responsible for IAQ issues. No one state has a comprehensive IAQ program that encompasses problem identification, a uniform set of definitions, certification of contractors abating the problem, consumer protection against contractor abuse, enforcement provisions and dedicated funding for the program. Similarities in state programs end here, however, in part because of the nature of the IAQ problem. The issue touches upon many disciplines and several state agencies can have jurisdiction over areas affecting IAQ. Thus, the states' approaches to IAQ are diverse; these programs may take an educational, pollutant-by-pollutant, ventilation or more comprehensive approach to the problem.

The majority of states have at least some educational efforts underway to increase awareness of IAQ. These programs generally will target high profile buildings such as schools, workplaces, and public buildings. Specifically, state programs have utilized information provided by federal agencies, like the U.S. Environmental Protection Agency's "Build Air Quality" and "Tools for Schools" materials, to reach these target audiences.

To reach the broader public, state departments of health administer in-service training seminars to local public health professionals to help them identify and address potential IAQ problems they may encounter. University-based extension services and small businesses assistance centers are also vehicles used to disseminate IAQ information. Likewise, the consultation service of state occupational safety and health agencies include IAQ concerns in voluntary safety inspections performed at private businesses. Education and outreach-oriented programs are the most common types of programs found in the states and are generally the types of programs a state will undertake when initially confronting the issue of IAQ.

Where states do formally regulate IAQ, it is usually done through rules governing exposure to specific pollutants or through ventilation standards. States vary greatly on the number and extent of specific pollutants regulated. For example, Massachusetts, Minnesota, and New Hampshire presently require that the presence of UFFI be disclosed in real estate transactions. A large number of states, including Montana, Tennessee, and Texas, have integrated pest management rules which mandate notice and exposure protocols when treating buildings with indoor pesticides.

State rules regarding radon are among the most advanced of those rules addressing IAQ pollutants. Many states have, or are considering requiring, disclosure of radon test results during real estate transactions. Additionally, radon testing and mitigation contractors are subject to certification or licensing requirements in numerous states.

Close on the heels of radon in terms of regulatory advancement is ETS. States such as Delaware, Idaho, and Utah already have statewide indoor smoking rules in place; in Michigan, Mississippi, and Pennsylvania legislation was considered during the 1996 legislative season that would have instituted ETS rules. Additionally, states such as California, Maine, and New Jersey have employed the use of the IAQ practices suggested in the current ASHRAE 62-1989 standard to require ventilation standards that provide adequate air exchange to promote acceptable IAQ. Many states have considered legislation during 1996 that would institute IAQ programs based on regulation of specific pollutants or ventilation standards.

A few states—Florida, Illinois, and Oregon, for example—have IAQ programs that generally have been in existence longer and have a more comprehensive approach to the issue. These programs provide public information and educational outreach like many other states. Additionally, the programs have developed guidance defining the criteria for good IAQ and have field investigation services to assess IAQ problems on-site for specific categories of buildings, like schools, state-owned buildings and public facilities. Further, accreditation or certification for IAQ contractors is also available. These programs may provide insight into the future of other states' programs for IAQ.

State IAQ programs are just now beginning to take shape. These programs will go through an evolutionary process as state governments gain experience with the issue of IAQ and as more information becomes available about the issue. As a baseline, all states are likely to develop some type of education or outreach program to increase awareness of IAQ among target audiences and the general public. Similarly, all states will probably formally regulate at least some specific pollutants that contribute to IAQ problems. Whether the states will go on to adopt more formal procedures or rules governing IAQ professionals and the protocols they must follow is more difficult to predict. Whether or not this comes about is somewhat contingent upon what, if anything, the pending U.S. OSHA IAQ rule will mandate and how widely the ASHRAE 62R standard is accepted and adopted by the states. What is clear is that IAQ concerns will continue to be addressed by the states in some manner even without a federal mandate. ■

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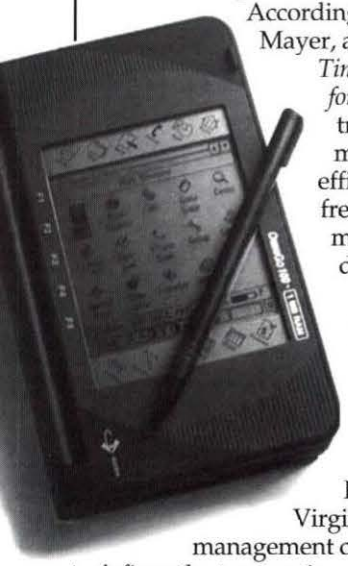
Software & Solutions

Howard Millman

Thwarting Time Hogs

How do you handle critical information? Do you write yourself notes in a desk diary? That's okay until you turn the page—then they disappear. Post-It Notes work well too—until you run out of wall space. So what's the answer? Go electronic!

Replace your day planner and notebooks with an electronic organizer to help make time your slave.



According to Jeffrey Mayer, author of IDG's *Time Management for Dummies*, electronic organizers make you more efficient and can free up one or more hours per day.

Where do you find this gift of time? By thwarting time hogs. C. Austin Pritchard, a Richmond, Virginia-based time management consultant, defines the top ten timewasters as:

1. Shifting priorities/crisis management
2. Telephone interruptions
3. Unclear or missing objectives
4. Attempting too much
5. Drop-in visitors
6. Ineffective delegation
7. Cluttered desk
8. Procrastination
9. Inability to say 'No'
10. Meetings.

While no one strategy can counter all of these time wasters, Hewlett-Packard's electronic organizer can help transform chaos into order by reducing time drains 1, 7, and 10. Small enough to slide into a back pocket or handbag, this digital hired-hand weighs just 12 ounces.

OmniGo's built-in modules include an appointment scheduler, note taker, calculator, a competent handwriting recognition system, and a combination database/contact manager. Based on the GEOS operating system, it uses simple graphical icons to control its features. Just tap on the icon to summon an application.

The unit's screen swivels and rotates giving you your choice of a horizontal or vertical display. You can fold the 240 x 240 pixel LCD screen over the back of the unit and use it like a tablet. Standard configuration includes 1 MBytes of RAM, 3 MBytes of Read Only Memory. It runs on two off-the-shelf AA batteries, which can last about one month.

Hand-held computers, sometimes called paltmtops, electronic organizers, or personal digital assistants (PDAs), offer some of the features found in laptops but cost less, weigh less, and go more places.

Unfortunately, Apple's Newton gave PDA's a bad name. Apple overhyped the units' capabilities, then failed to meet the expectations of users. Sony followed a similar path with its Magic Link.

Electronic organizers and PDAs offer a combination of features that endear themselves to people who spend an appreciable amount of time away from their desks collecting feedback. Think of why you attend meetings (Pritchard's #10 time waster), visit job sites, or meet with the facilities department's customers. Most often is it not to give and gain information?

At least six vendors offer PDAs. H-P's OmniGo 100, a personal favorite of mine, offers low cost, expandability, and features that set it apart from the others. For example, it provides you with two methods to record information. The first, a notepad, records your handwriting. The system watches as you print block letters on the screen, using a plastic stylus, then translates the characters into text. Alternately, you could type in the words using the unit's built-in keyboard. Either way, you end up with text that you can edit, print, or export to a desktop PC.

To help the unit understand your handwriting, you have to follow some easy rules when entering characters. For example, you print the character "U" in the regular way, starting the letter in the upper left hand corner. But to print a "V" you start it in the upper right hand corner. After you gain familiarity with this system, which happens surprisingly fast, you will prefer it instead of the keyboard.

The second method records drawings and notes in "digital ink." In the draw mode, the unit acts like a combination sketch pad and notepad. You just enter your text or drawings and the system takes a snapshot of it. Here you can use script or block letters for text entry. The downside is that the saved images are the equivalent of a photocopy; you can't open them as word processing files.

Subsequently, you can print the files or transfer them to a desktop PC running Microsoft Windows. This operation requires H-P's optional connectivity software, Clip & Go ($70), plus a connector cable that attaches to your desktop's serial port.

The OnmiGo uses the pen-based Geoworks operating system and includes an industry standard expansion slot that guarantees expandability. Some of the expansion devices for this slot include a portable fax modem as well as a two-way messaging and paging communication system from Sky Tel. Likewise, Wynd Communications is readying a two-way wireless e-mail, fax, pager, and voice service.

The unit ships with Intuit's financial application, Pocket Quicken, and six strategy games to play during that extra time you save each day. ■

Hewlett-Packard OmniGo 100, $349
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Howard Millman is a systems integrator who helps universities and hospitals implement facility automation systems. His firm, Data System Services, is based in Croton, New York. Millman can be reached at 914-271-6883 or hmillman@mcimail.com.

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The Bookshelf

Book Review Editor:
Dr. John M. Casey, P.E.

In this issue, three book reviews concentrate on topics that affect facilities managers. The first topic involves downsizing, an issue that has caused more than a few arched eyebrows in nearly every institution of higher education; David Millay of the University of Delaware discusses a publication by the College and University Personnel Association (CUPA) which suggests that downsizing can be a positive sum game. Kevin Swisher of West Virginia University reminds us that energy management is still an important consideration for facilities managers in his review of an extensive collection of papers on that topic. Finally, David Patnaude of Tufts University reviews a handbook containing important reference data for overworked managers in our profession, and indicates that it can be especially helpful in developing service contracts.

The excellent work and insightful comments of these reviewers is another example of how professionals can help each other by discussing important topics through book reviews. Readers are encouraged to participate in this important effort by volunteering to serve as a reviewer when the next request is sent on APPANet. ■

Downsizing With Care

You *Can* Get There From Here: The Road to Downsizing in Higher Education, by Barbara Butterfield and Susan Wolfe. Washington, D.C.: College and University Personnel Association.

From the moment one begins to read *You* Can *Get There From Here: The Road to Downsizing in Higher Education*, it is clear that the authors are women who know from whence they speak. Authors Butterfield, who is vice president for faculty and staff services at Stanford University, and Wolfe, a professional writer and editor, present a work that could rightly be described as a primer for fiscally responsible administration in today's rapidly changing world. The ultimate product, replete with upside and downside checklists, is equally thorough, objective, and thoughtful. *You* Can *Get There From Here* should be required reading for every university administrator, remaining thereafter within easy reach as critical reference material.

The title of this book may be somewhat misleading, since the term "downsizing" is often construed quite negatively as another way of saying "layoffs." Quite the contrary, Butterfield and Wolfe systematically record a litany of policies and practices that university administrators should consider when faced with budgetary concerns. An array of administrative options are focused on and discussed in detail, ranging from risk management to flexible work schedules. When the topic of layoff of employees does arise, it is treated sensitively and firmly, with ample reference to prevailing university culture, the value of diversity, and concern for potential disruption and deterioration of morale.

The reader will find this book cleanly organized with well-defined topical chapters, and with clearly articulated, no-nonsense discussion within. The authors make profuse use of checklists to enumerate key points, and to iterate the pros and cons of each critical concept. This style lends itself nicely to ease of reading and assimilating a great deal of information in a short time, factors of significant importance to those of us who feel inundated with seemingly endless reading demands. The authors' style is formal, concise, and straightforward, and their understanding of issues and experience in the workplace shows clearly throughout the fabric of the work.

Butterfield and Wolfe liken the road to downsizing to the mapping of a trip. Beginning with the budget targets (choosing the destination), developing a downsizing plan (drawing the road map), then proceeding to make the journey (choosing wisely which fork in the road to travel down) and finally monitoring and reporting the results (checking the landmarks against the map). The overriding theme is to consider as many options as possible within the context of university culture and budgetary condition, and make the best possible choices enlightened with concern for the human element of all downsizing options. The authors make it clear that a smaller, more efficient, well compensated workforce *can* result, and *can* be achieved through humane and considerate means, satisfying at once the requirements to manage costs and retain the culture and diversity of the university environment, while also maintaining or improving morale and commitment of remaining university employees.

Pursuing the downsizing journey is not an easy task. Most of us employed in the college and university community understand from our own experiences how difficult this process can be. Yet we can also acknowledge the underlying need to reduce costs while improving the quality and efficiency of our business processes. *You* Can *Get There From Here: The Road to Downsizing in Higher Education* strikes at the heart of this dilemma, acknowledging the requirement to take firm effective steps to change, while counseling compassion and consideration in the process. Whether one is starting from ground zero, or already immersed, this book is compulsory reading.

—**David L. Millay**
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Keeping Pace with Energy Management

Competitive Energy Management and Environmental Technologies, compiled and edited by Jana Ricketts. Lilburn, Georgia: Association of Energy Engineers and Fairmont Press, 1995. 684 pp. $95, softcover.

Are new high efficiency motors as energy conserving as one thinks? How do preventive maintenance programs affect utility savings? What can a demand side management system do for me? For all of these and countless other questions dealing with energy management, someone, somewhere has written a paper on it. However, searching the wide array of sources would be, to say the least, time consuming. Jana Ricketts has eased this burden by compiling ninety of these papers into one comprehensive book, *Competitive Energy Management and Environmental Technologies*.

More and more often, colleges and universities are trying to operate on fewer funds. Like industry, in the past decade they have turned to downsizing (or rightsizing in some circles) to accomplish this goal. This leaves physical plant departments making every effort to cut costs without cutting personnel. Saving on utilities gives plants an opportunity to justify present funding levels by showing savings someplace other than their operation and maintenance or personnel budgets. Because of this, renewed interest has occurred in the energy management field, and it has gone beyond the "please turn off the lights" phase. Today, programs like the EPA's Green Lights and WSEO's MotorMaster are giving the tools to energy managers to make informed decisions when making equipment selections. *Competitive Energy Management and Environmental Technologies* is another tool that greatly expands the field of view of today's energy manager. Whether an energy program is brand new or well-established, Ricketts has included useful and thought-provoking papers that can be helpful.

Edited and compiled primarily for the Association of Energy Engineers, many sections are helpful and provide specific data, while others are in a more academic style and any pertinent information needs extracting. Ricketts divides the papers into eight sections: Environmental Management, Water Resource Efficiency, Energy Management, Lighting Efficiency and Applications, HVAC Systems, Competitive Power Technologies, Federal Energy Management, and Demand Side Management. Some sections, like the one on lighting, provided information applicable to plant operations and case studies. Others, like Federal Energy Management and Water Resource Efficiency, contained little transferable information. The rest fall somewhere in between these two. Of a total of ninety papers

John Casey is manager of the engineering department in the physical plant division of the University of Georgia, Athens, Georgia.

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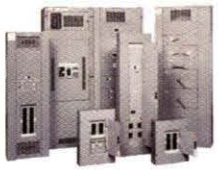

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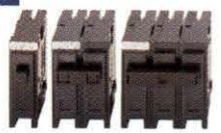

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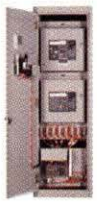

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included, about half readily provide information that can be the basis of an energy saving project at the campus level.

The main thrust of the book is the Energy Management Strategies section. Here Ricketts has complied an array of articles on everything from operation and maintenance and how it affects energy savings, to the future of equipment efficiencies, with motors being the most frequent topic. Several papers go into great detail explaining different types of motors and controllers and how to efficiently configure them. With most of our motors having years, or decades, of life on them, many methods exist to improve their efficiency.

As the age of our campuses increases, the systems originally installed, even if they could be maintained at top efficiency, become more out of date each day. New systems and methods of saving on utilities surface continuously and it is easy to become overwhelmed. Our job is to wade through this information and find those areas that allow us to stretch those dollars as far as they will go. Energy management is one of those areas where money is easily retrievable, and Jana Ricketts has given us a collection of tools to use. For those facilities departments with fledgling energy programs, this compilation of papers is a good example of the number and variety of savings that can be achieved. For those with mature programs, the thoroughness of the papers can provide the necessary justification for funding of those projects that have fallen to the way side due to more popular projects.

—**Kevin D. Swisher**
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Tools for Better Management

Handbook of Facility Management: Tools and Techniques, Formulas and Tables, by James E. Piper. Englewood Cliffs, New Jersey: Prentice Hall Career and Personal Development, 1995. 678 pp.

Webster (via their Internet site) defines a handbook as "1a: a book capable of being conveniently carried as a ready reference, e.g., a manual; 1b: a concise reference book covering a particular subject." At 678 pages, with a definite orientation toward the mechanical end of the house and weighing in at a good three pounds, I don't think the *Handbook of Facility Management* is going to qualify under definition 1a. Fortunately, however, the book does qualify under section 1b of the definition.

The book has large legible print, and the tables and figures are easy to read. It is divided into four parts: Mechanical Maintenance, Electrical Maintenance, Buildings and Grounds Maintenance, and Facility Energy Use. Each part comprises several chapters with each chapter relating to a specific topic.

The chapters in the first part cover the aspects of centralized combustion and cooling systems. Components of these two systems are also covered with attention to air and fluid handling systems along with other miscellaneous mechanical equipment (heat exchangers and air compressors). In the second part, with electrical maintenance being the focus, Piper walks the reader through cabling and wire factors along with the selection, operation, and maintenance of motors and transformers. This section also covers some interesting ground on the use and maintenance of battery and UPS systems, power factor correction, the use of standby generators, and reading your power bill.

Part three has five chapters that go into depth on paint and protective coatings, floor coverings, roofing systems, housekeeping, and grounds maintenance. The fourth part covers weather and climate and their impact on energy use, energy savings estimates, mechanical systems modifications that save energy, and evaluating your energy use program.

As all of us bring different strengths to our positions as facilities managers, we also find that we are in need of broadening our knowledge. As a facilities manager who embraces the generalist's approach, I can appreciate how complex a book with the word Handbook in its title would have to be. I have found that facilities managers come from all walks of life and encompass a broad range of experience. For those of you who are mechanical engineers, this book will be a walk in the park.

Piper shows us that he too must be a mechanical engineer with the matter-of-fact organization of figures, charts, tables, checklists, and worksheets assembled at the end of each chapter. Unfortunately, having all this data at the end of each chapter makes quick review of the information a bit cumbersome. I've always preferred to have all of the graphics and tables imbedded in the text, and even then I want it on the same page that relates to the text. If one were to refer to *Architectural Graphic Standards* or *Time Saver Standards for Architectural Design Data* as good examples of handbooks that incorporate appropriately referenced tables, charts, and graphics into the text, the *Handbook of Facility Management* would be considered inferior. Those of us that need to review the operation of an absorption cooling cycle while reading along might find it inconvenient to have to mark our place in the text and finger our way to the appropriate illustrations at the end of the chapter.

The cover jacket goes out of its way to inform the eager facilities manager that these figures, charts, tables, checklists, and worksheets are reproducible. While reading this book I actually took up the offer, photocopied a page, and had my boiler mechanic check our boiler maintenance program against the one that Piper suggests.

One can use this book as a resource to establish good models of thumbnail estimates for the size of mechanical, electrical, and other systems. There are also many generic explanations of systems that will help you in dealing with the engineering aspects of the business. If you are putting together specifications for service contracts that deal with mechanical, electrical, housekeeping, exterior maintenance, and grounds services, this handbook becomes an excellent guide.

This handbook is not quite complete in its description of facilities management because it doesn't cover cost accounting, personnel issues, staffing, total quality management, customer-focused services, etc. Facilities management is now a multidisciplinary function. All of us who are working for large organizations know that we are manager, mentor, engineer, architect, attorney, project manager, confessor, arbitrator, and much more. While I must say that I found the information this book had to offer rewarding, I think it is titled incorrectly. More aptly this book would have stressed its mechanical and operational orientation and reversed its title to *Tools and Techniques, Formulas and Tables: A Handbook for Facility Management*.

—**David E. Patnaude**
Operations Manager
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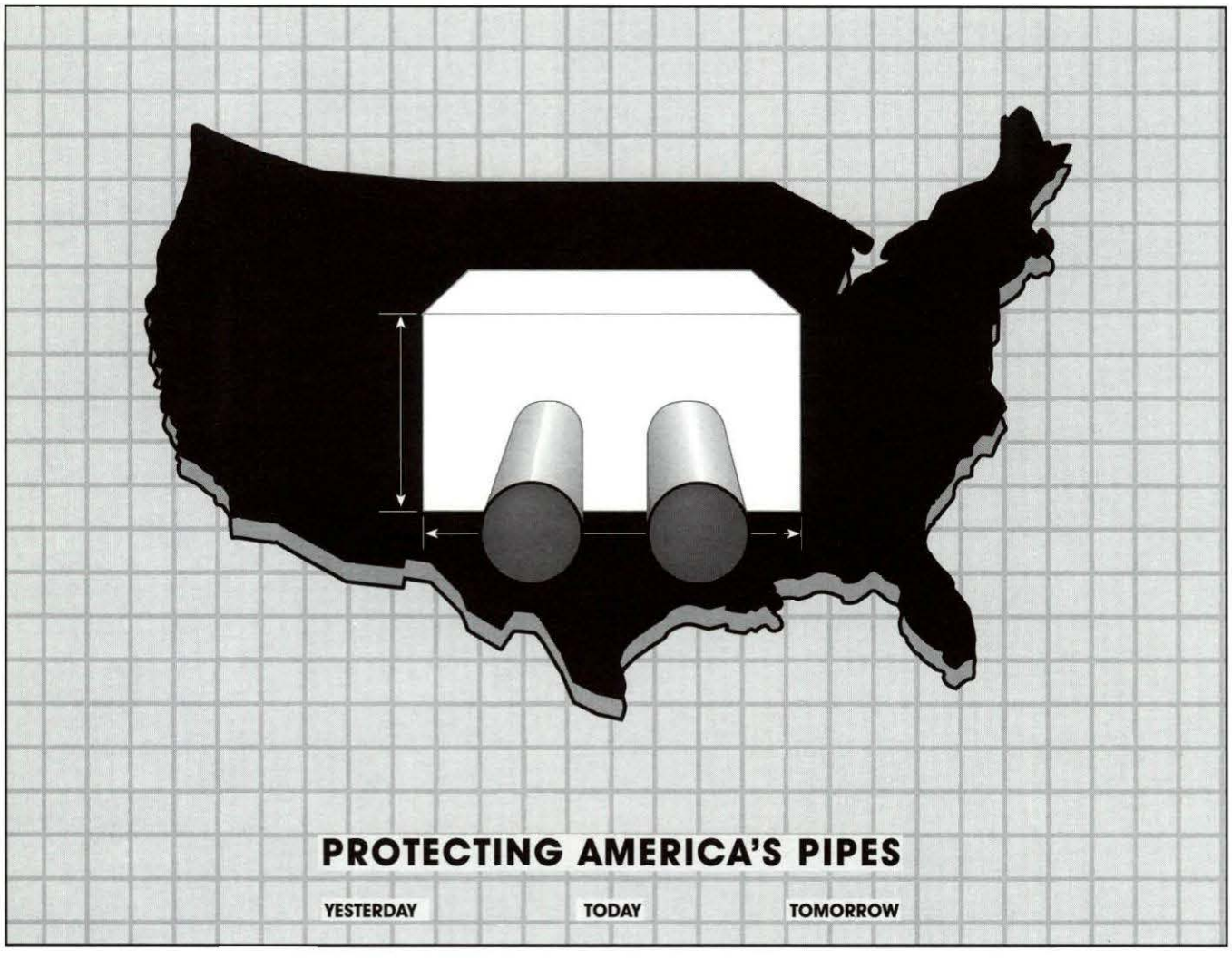

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