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

Facilities Manager

Volume 11 Number 3 SUMMER 1995

Planning, Design, and Construction

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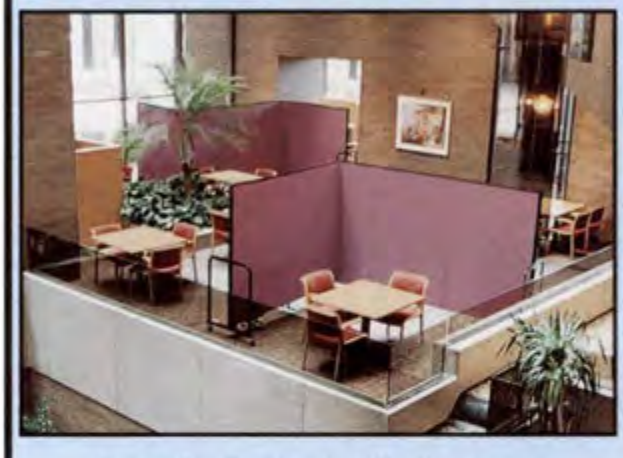

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FEATURES

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From The Editor

Steve Glazner

Devoting a theme issue to planning, design, and construction is much like devoting one to maintenance and operations—the topic is broad, and virtually any subject can be included. The outstanding group of feature articles in this issue was collected and edited by field editor Donald Guckert of the University of Missouri-Columbia. He deserves our many thanks for identifying key concerns and selecting the right authors to discuss them.

Don brings a fresh and knowledgeable expertise to the proceedings—he is director of planning, design, and construction for the dynamic UM campus; he is writing the chapter on construction contract administration for the third edition of the Facilities Management manual; and he is the coordinator of the Capital Project Planning special program for APPA's Institute for Facilities Management.

The January 1995 special program was one of the most well attended and highly rated in Institute history—so much so that the program will be offered again at the January 1996 Institute in Los Angeles, California. We urge you to attend the Institute and register for the special program early.

Also on the PDC route, APPA is proud to announce the publication of *Planning for Master Planning*, a new monograph based on the popular APPA seminars conducted by The Christner Partnership. The authors, John Reeve and Marion Smith, discuss the processes and players needed to begin a successful master planning activity. Costs, schedules, and step-by-step guidelines are designed to help facilities professionals at small and large schools alike to participate, fully informed, in developing a master plan for their institution. More information can be found in the article on page 12.

Additional publications are in the works related to planning, design, and construction. We are planning to publish a monograph on building commissioning, again based on a popular APPA seminar, and we also plan to update our Critical Issues book on planning, design, and construction. If you think you have a case study that would be appropriate for the new Critical Issues book, send me an outline or abstract for consideration.

Wayne Leroy, APPA's executive vice president, discusses planning of a different sort in his Executive Summary column. Incredible changes have been occurring in how institutional accreditation is accomplished, and Wayne urges all facilities professionals to be aware of this important evolution of institutional assessment. It *will* affect facilities.

Finally, read more about APPANet, APPA's new presence on the Internet, in Diana Tringali's Information Access column. We will be demonstrating our initial offerings in the exhibit hall at the Philadelphia annual meeting, July 16-18. Come join us for an exciting meeting, and the start of an exciting adventure on the Net. ■

APPA News

Griffith University and Michigan Housing Receive Award for Excellence

Griffith University, in Queensland, Australia, and the University of Michigan Housing Division have been selected to receive the Award for Excellence in Facilities Management for the quality of their facilities operations. Griffith is the first institution outside of North America to be recognized with the award.

"This award has been earned through the collective effort of all the staff in the office of facilities management. Everyone is very proud of this achievement," said Sam Ragusa, director of physical plant at Griffith.

Griffith University is a comprehensive research, doctoral-granting university with 18,000 students on campuses located in Brisbane and the Gold Coast cities in the southeast region of Queensland, Australia. The university has fourteen faculties occupying more than eighty major buildings on five campuses, which total more than 600 acres. The campuses are distinctive for maintaining the natural Australian bushland environment.

The office of facilities management, with a staff of 150, is responsible for planning, design, construction, maintenance, and operation of the university's physical facilities as well as providing such services as printing, security and parking, space planning and allocation, and room scheduling. The office has used an integrated approach to facilities management to yield organizational and operational efficiency and effectiveness.

The department used the criteria established for the Awards for

Continued on page 7

Walter Simpson Wins 1995 Rex Dillow Award

Walter Simpson, energy officer for the State University of New York at Buffalo, has been selected to receive the ninth annual Rex Dillow Award for Outstanding Article in Facilities Manager. The award is to be presented at APPA's 1995 Educational Conference and 82nd Annual Meeting in Philadelphia, Pennsylvania.

Simpson wrote "Recharging Campus Energy Conservation: ESCOs and Demand Side Management at SUNY Buffalo," which appeared in Winter 1994 in the Energy and Utilities Management theme issue of Facilities Manager. The article was selected by APPA's Information Services Committee from among eighteen eligible articles. Only articles written by full-time staff members at APPA member institutions are eligible for the award.

The Rex Dillow Award was named for member emeritus Rex O. Dillow, a long-time supporter of and contributor to both APPA and the Central region. ■

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Continued from page 4

Excellence as performance standards when it began to formulate a strategic plan in 1991. These criteria were well accepted by the staff and were encapsulated in the strategic plan.

The University of Michigan Housing Division in Ann Arbor received an Award for Excellence for its entire facilities organization. In 1993, UM's Housing Division had received Award for Excellence recognition in the catagories of Campus Condition and Appearance and Energy Conservation Programs.

The Award for Excellence is APPA's highest institutional honor and recognizes institutional excellence as set forth in the program criteria. An institution may seek recognition of its entire facilities operation or of specific components, such as housing, grounds, or various services. Awards are given on an ongoing basis, and an application may be submitted to the APPA Professional Affairs Committee at any time. For further information on the program, contact Wayne Leroy or Lander Medlin at the APPA office, 703-684-1446. ■

NACUBO Names New President

The National Association of College and University Business Officers (NACUBO) board of directors has selected James E. Morley Jr. as their new president. Morley will replace Caspa L. Harris Jr. on September 1, 1995.

Morley comes to NACUBO from Cornell University, where he has been senior vice president since 1987. He began working at Cornell in 1985, serving as vice president and treasurer, before assuming his present position, and he has served in various positions with other schools. Morley also served as president of the Eastern Association of College and University Business Officers in 1984-85, as a member of the NACUBO board from 1986 to 1989, and he received the NACUBO Distinguished Business Officer Award in 1993.

Morley stated that his twenty-three years of experience in higher education have equipped him with the knowledge and skills to lead NACUBO. "This appointment gives me the opportunity to bring my experience in higher education into the full spectrum of NACUBO operations," he said. ■

APPA President Charlie Jenkins traveled to England in April, where he attended the Annual Conference of the Association of University Directors of Estates, APPA's counterpart in the U.K. Jenkins (right) is pictured here with host John E. Burton, Estates and Buildings Officer at University of Kent at Canterbury, and host of the conference.

Virtual University Created

Jones International Ltd., which operates several cable-TV companies and the Mind Extension University, announced the creation of International University College, a degree-granting institution that will use telephone, electronic mail, and videotaped course sessions to communicate with students. The college has applied for accreditation through the North Central Association of Colleges and Schools and is contracting with faculty members from major universities to produce courses on videotape. The school presently offers a master's in business administration, and hopes to offer at least one bachelor's degree program in the fall. ■

UNC Recognized for Recycling

University of North Carolina at Charlotte received the North Carolina Recycling Associations Merit Award for outstanding commitment to recycling. The award recognizes the university's overall recycling program.

The UNC recycling program was begun three years ago, and the school now recycles approximately 24 percent of its waste. Waste management practices also include the use of a nearby waste-to-energy facility to dispose of 51.5 percent of the university's nonrecycled waste. Recycling efforts are underway throughout the campus, including the student residence halls. ■

Telecommuting on the Rise

By the end of 1995, the number of people who commute to work via modem is expected to reach 9.24 million workers, an increase of 10 percent over 1994, according to Link Resources Corp. The group further predicts that telecommuters will be the fastest growing segment of the burgeoning home-office market.

According to an article in the April issue of *Facilities Design & Management*, factors driving the adoption of telecommuting include:

- The demand for families to have more flexibility in their lifestyles.
- Government efforts to improve the environment (specifically the federal Clean Air Act) are pressuring large corporations to look for methods to comply without disrupting work.
- Increased availability and lower cost of personal computers and communications services and equipment.
- Recent efforts by corporations to streamline, rightsize, and flatten their organizational structures.
- The need to reduce real estate assets. ■

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American School & University
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Applied Management Engineering
Aqualine Resources, Inc.
ARMM Associates, Inc.
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Ashland Chemical Co/Drew Water
Automated Logic Corporation
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B

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Black & Veatch
Blockhouse Company, Inc.
Blue Ridge Carpet Mills
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Brinjac, Kambic & Associates
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C

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Catalina Industries, Inc.
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Controlotron
Copper Development Association
Corbett Inc.
Country Roads
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D

Daniel F. Tully Associates
Dataquire
Design Alliance
Diversey Water Technologies
DriTherm Inc.

E

E & A
E & I Cooperative
Edwards Engineering Corp.
Elevator Controls
Engineered Systems Magazine
Engineering Associates, Inc.
Entech Engineering, Inc.
EPA Green Lights
EPA Stratospheric Ozone
Equipment Marketers
Essex Industries, Inc.
Ewert Wholesale Hardware Inc.
Exeter Architectural Products

F

Facility Engineering Associate
Fly Away
Forbo Industries, Inc.
Foreman Bashford Arch/Engrs.
Foreman Program & Const. Mgrs.
FulCircle Ballast Recyclers

G

Garaventa (Canada) Ltd.
George B. Wright Co., Inc.

H

H Window Company
Hanscomb Associates
Harrington Corporation
HESCO Division of MRL, Inc.
Hillyard, Inc.
HNTB
Hoffman Architects
HOK Sports Facilities Group
Holophane Company, Inc.
Host/Racine Industries, Inc.
Hubbell Wiring Device-Kellems
Huntington Laboratories, Inc.

I

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Int'l District Energy Assn.
ISES Corporation
Islandaire Inc.

J

Jenbacher Energy
Johnson Controls, Inc.

K

Kaba High Security Locks
KCM
Kenall Lighting
Kieran, Timberlake & Harris
Kullman Industries, Inc.

L

LampLight Industries, Inc.
Landis & Gyr Powers
Law Engineering & Environmenta
LCN Closers
Lerch Bates North America, Inc.
Leslie Controls
Lever Industrial Company

M

Maintenance Automation Corp.
Martin Surfacing Inc.
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McQuay International
Mechanical Ingenuity Corp.
MILCO
Milliken & Company
Mity-Lite Tables, Inc.
Motion Control Engineering
Musco Sports Lighting, Inc.

N

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Natgun Corporation
National Energy Control Corp.
New Hermes, Inc.
Nord Bitumi U.S. Inc.
NuTemp

O

O & R Energy, Inc.
O'Brien-Kreitzberg
Ogden Facilities Services

P

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Pemko
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Perini Building Company, Inc.
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R

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RBI/GraviTURF
Refron, Inc.
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S

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T

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This End Up Furniture Company
TMA Systems, Inc.
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U

United States Pumice Company
United States Roofing Corp.
United Technologies Carri
University Loft Company
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V

Victaulic Company of America
Victor Stanley, Inc.
Virco Mfg. Corporation
Viron Energy Services

W

Wallace Roberts & Todd
WASA/Technical Systems Group
Weil-McLain
Wiley & Wilson
Window Repair Systems, Inc.
Wohlsen Construction Company
World Dryer Corporation
WP Hickman

CHEMA Examines the Electronic Campus

The Council of Higher Education Management Associations, and its member the National Association of College and University Food Services, will present an educational program on The Electronic Campus: Technological Trends in Auxiliary Services. Eight speakers will discuss the single most important technological innovation in his or her auxiliary service area. The program will be presented on July 23, 1995 at NACUBO's annual meeting in Orlando, Florida. ■

Indoor Air Quality Guideposts

Indoor air quality has become a common concern among both facilities managers and building occupants. The following are some common factors affecting indoor air quality, as recently listed in *Engineered Systems* (April 1995).

1. *Carbon dioxide*—Buildings with high CO2 levels have a higher rate of complaints about indoor air quality. An elevated CO2 level may indicate that the building mechanical systems are not circulating a sufficient amount of outside air.
2. *Temperature*—Complaints of fluctuating air temperatures may indicate poor air circulation and improper air balancing.
3. *Humidity*—Humidity levels are difficult to control; high humidity (greater than 50 percent) increases microbial growth, while low humidity can cause eye and skin dryness.
4. *Microbial contaminants*—An estimated 10 percent of indoor air quality problems are due to microbial contaminants. Often, these microbes are released during repair and maintenance of contaminated mechanical systems.
5. *Building materials*—Building materials can give off pollutants at very low levels, making them difficult to isolate.
6. *New assessment methods*—New methods to test indoor air quality are in development that may provide clearer ways of evaluating inside air.
7. *HVAC maintenance*—Poor HVAC maintenance has been associated with increased air quality complaints. Often these complaints subside once the system is properly maintained.
8. *Medical recognition*—The medical and legal professions are increasingly recognizing the effect poor indoor air quality can have on health. It is estimated that hundreds of millions of dollars in medical care and lost time can be attributed to health problems resulting from poor air quality. ■

Call for Entries

The Professional Grounds Management Society (PGMS) and *Grounds Maintenance* magazine are searching for the country's best maintained landscapes for their 23rd annual Professional Grounds Maintenance Awards. Awards are offered in thirteen categories covering all types of private, public, commercial, and industrial landscapes. To qualify, a landscape must be at least four years old and under your continuous maintenance for at least two years. Awards will be presented during the PGMS annual meeting November 12-16 in Fort Worth, Texas. Deadline for entries is August 4, 1995. Contact PGMS, 120 Cockeysville Rod, Suite 104, Hunt Valley, MD 21031; 410-584-9754. ■

Resources Currently Available

The Complete TSCA Chemical Inventory of over 61,000 individual chemicals is now available at cost on CD-ROM. IBM BookManager search and retrieve software is included for DOS, Windows, and OS/2. The inventory lists 61,000 chemicals indexed by CAS number, common name, molecular formula, etc. To receive a copy, send an e-mail request to wemhoff@gate.net, or call Mark Wemhoff at 407-321-7912.

The fourth edition of the *Disaster Recovery Yellow Pages* is available from the Systems Audit Group, Inc. The book is a 280-page comprehensive listing of hard-to-find recovery services throughout the United States and Canada containing over 2,300 vendors. Cost of the publication is $98, plus $3 shipping and handling. To order contact The Systems Audit Group, Inc., 25 Ellison Road, Newton, MA 02159; 617-332-3496; fax 617-332-4358.

Contract Services for Higher Education, a new publication from Peterson's Guides, lists over 2,000 companies offering a host of services to higher education. Profiles of the companies are divided into sixteen major categories, such as financial, legal, academic, administrative, plant, and public relations services. Also included is information on each company's size, location, college and university clients, geographic areas served, and annual sales. To purchase a copy call Peterson's customer service at 800-338-3282. Cost of the guide is $89.95.

Peterson's Guides has also established "The Education Center" on the Internet's World Wide Web. The center presently carries searchable data and narrative on educational institutions at all levels and will provide communication and transaction services such as e-mail and college applications. Future development of the center will include providing a site for all institutions that Peterson's traditionally works with. The address of the center is **http://www.petersons.com.**

How to Mitigate Slip and Fall Liability...A Plaintiff's Attorney Speaks Out is available free of charge from Altro Floors. This brief guide provides case histories, suggestions of how preventive action can reduce the incidence of slips and falls in the workplace, and what action is necessary should a slip and fall occur. To request a copy, call Robert Ross, Altro National Marketing Manager, 800-941-1696; fax 415-941-2961.

The 1994 Indoor Air Quality Directory is now available from IAQ Publications. The directory lists thousands of service firms, product manufacturers, training resources, workshops and courses, federal and state government agencies, and publications and glossaries relevant to indoor air quality. The cost of the directory is $75. To order, or to receive more information, contact IAQ Publications Inc., 2 Wisconsin Circle, Suite 430, Chevy Chase, MD 20815; 800-394-0115; fax 301-913-0119.

When Crisis Strikes on Campus, a handbook and companion videotape on handling campus crises is available from CASE, the Council for Advancement and Support of Education. The publication gives a

behind-the-scenes look at how the University of Florida handled the murder of five students in 1990. Other sections of the book present case studies in crisis communications and issue papers on communicating about sensitive campus concerns. The 254-page book and 24-minute VHS videotape are available for $79.95 from CASE. To order call CASE Publications Order Department at 202-328-5900 or mail to P.O. Box 90386, Washington, DC 20090-0386. Specify item number 24902s.

CAUSE, the association for managing and using information resources in higher education, has published the *CAUSE Institution Database 1994 Profile*, a 170-page summary of its annual survey of colleges and universities on information technology-related issues. Copies of the report are available for $35 to CAUSE members; $70 others. For information contact CAUSE at 303-939-0310.

Parke Industries, Inc. is offering free copies of its video, *Inside a Successful Lighting Retrofit Program*, a 12-minute production documenting Parke's work in developing the Green Lights award-winning Southern California Gas Company lighting retrofit project. The video is intended to be a tool for training and information by organizations considering a lighting retrofit. For a copy of the videotape, contact Parke's marketing department at 800-367-2753.

The Directory of Operating Grants lists 670 foundations that support the ongoing operating expenses, such as salaries, rent, mortgage payments, and utilities, that sustain an organization's usual activities. The index contains more than 3,000 entries and includes the following categories: Community Development, Cultural Organizations, Disabled, Education, Health Organizations, Higher Education, Hospitals, and more. The cost of the directory is $58.50, plus $6 shipping and handling. Contact Research Grant Guides, Inc., Dept. 3A, P.O. Box 1214, Loxahatchee, FL 33470; 407-795-6129. ■

APPA Publishes Master Planning Book

Planning for Master Planning, a new monograph published by APPA, provides facilities managers and other campus administrators with the tools and processes needed to begin and conduct a master planning effort. The authors, architects John Reeve and Marion Smith of The Christner Partnership, conducted APPA's popular seminars on planning for master planning.

Section I, What is Master Planning?, defines the term and provides a step-by-step process for beginning a successful master plan. Section II, Preparing for the Process, provides information on determining objectives, where to begin, and master plan administration. Section III, Selecting Consultants, discusses the selection process, searching for professionals, evaluating RFQ responses, negotiating contracts, and more.

The 112-page softcover book includes many worksheets and checklists that can be adapted to any institution. A comprehensive resource listing is included for further reading.

Planning for Master Planning is available from APPA at a cost of $29 for APPA member institutions, $40 for all others. Please add $8 for shipping and handling. Prepayment is required; please send your check or credit card information to APPA Publications, P.O. Box 1201, Alexandria, VA 22313-1201. ■

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Executive Summary

Wayne E. Leroy, CAE

Changes in Institutional Accreditation Will Affect Facilities Operations

It is appropriate in this issue of *Facilities Manager*, which focuses on the planning, design, and construction of higher education facilities, to also bring to your attention a related debate that is raging throughout higher education. This one, however, is not in the area of facilities, but it goes to the very fabric of the institution itself—institutional accreditation!

Perhaps a brief history of institutional accreditation will help focus the issues as they are currently being debated throughout higher education. Voluntary self-regulation through accreditation has a century-long history of distinguishing secondary school programs from undergraduate programs, separating legitimate from illegitimate institutions, and assisting colleges and universities to improve themselves through periodic self-assessment of their strengths and weaknesses. In doing all these things, accreditation has helped assure the public, faculty and staff, and institutional leaders that accredited institutions genuinely do offer high-quality educational programs.

During the last century of accreditation history in America, the responsibilities of accreditation have resided in six regional associations (including nine commissions organized by type or level of institution), seven national associations for entire institutions, and sixty specialized agencies. It is not uncommon for many institutions to deal with a dozen or more accrediting bodies during the course of a few years. Each and every year virtually all institutions undergo hundreds of hours of self-study in preparation for accreditation team visits. Thousands of hours are spent by "peer professionals" making site visits, and institutions in aggregate expend hundreds of thousands of dollars to gain or retain accreditation.

Since the early 1900s some form of national accrediting body has been in existence to coordinate the activities and functions of the accreditation process. For the last twenty years accreditation coordination was provided by the Council on Postsecondary Accreditation (COPA). For a variety of reasons, but most specifically the ones listed below, COPA was disbanded in 1993:

- Lack of a shared vision of purpose of accreditation and its outcomes.
- Concerns regarding the rigor and consistency of a regional accrediting structure.
- Federal dissatisfaction with the ability to monitor student financial assistance, and the attempt to shift that responsibility to accrediting entities. The 1992 amendments to the Higher Education Act and creation of the Congressionally authorized State Postsecondary Review Entities (SPREs) also have been major components of the accreditation debate.
- Growing concerns among college presidents, as well as other institutional leaders and policy makers regarding the demands of specialized accreditation.

> ***...Accreditation has helped assure the public, faculty and staff, and institutional leaders that accredited institutions genuinely do offer high-quality educational programs.***

Following the dissolution of COPA, a new group has been formulated to establish a new national body capable of demonstrating that higher education itself can monitor and improve education while protecting the public interest. The new national body undertaking this task is the National Policy Board (NPB).

Now, you may be asking yourself, "What has all of this got to do with me and my job as a facilities officer?" There are many correlations that can be made to link institutional accreditation to the daily life of facilities management. For the sake of brevity, let's focus on two.

1. ***Planning, Design, and Construction***—One of the most basic premises of institutional accreditation is a process that allows an institution to assess its various strengths and weaknesses to determine the effectiveness for delivering high-qualty educational programs. High-quality teaching, research, or community service programs cannot be delivered without high-quality facilities. That fact remains true whether the facilities are new, renovated, or merely existing. The efficient and effective planning, maintenance, and utilization of campus facilities is usually the purview of the campus facilities officer. So, as the debate continues regarding the system, structure, and governance of a national accrediting body—regardless of disagreements on specifics, costs, etc.—the final accreditation process *will* have a facilities component. This will remain true because all stakeholders in the process—the policy makers, administrators, faculty, students, and the public at large—realize that facilities are an integral part of higher education's ability to deliver quality educational programs.

Wayne Leroy is APPA's executive vice president.

2. *Self-Assessment and Peer Review*— Throughout accreditation's long history, the two strongest pieces of the process have been self-assessment and peer review. In any future institutional accreditation system, these will remain as foundations to the program. At this time I ask you, have you recently reviewed APPA's Facilities Management Evaluation Program? For if you have, you will immediately see that there are two key componets to the FMEP: a self-evaluation and a site visit by peers. Since the inception of the Facilities Management Evaluation Program about five years ago, nearly three dozen FMEPs have been conducted, and more than 125 APPA members have participated on FMEP evaluation teams. As the institutional accreditation process continues down its new path toward a consensus as to structure and specifics, the higher education community will have as a resource a ready cadre of individuals with facilities expertise *and* experience in the processes of self-assessment and peer reviews.

Institutional accreditation will be an issue that will consume many hours of discussion in boardrooms, faculty/staff meetings, and a multitude of other gatherings attended by higher educational professionals, but the final outcome should be one that will strengthen and enhance the quality of higher education programs. That strength will also be reflected by the facilities component of the higher education enterprise. ■

For additional information about institutional accreditation or facilities management evaluations, contact:

National Policy Board on Higher Education Institutional Accreditation
One Dupont Circle
Suite 800
Washington, DC 20036
Phone: 202-939-9461

Facilities Management Evaluation Program
APPA
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Focus on Management

H. Val Peterson

Personally Inspected by Mary

The other day I made a purchase at a local supermarket, and the clerk placed my items in a brown paper sack. Upon reaching home and while removing the items from the paper bag, I happened to notice a stamped message on the bottom of the sack that read, "Personally Inspected by Mary." There was another stamped message below the first which read, "With Pride From The Best People."

As I read these two messages, I tried to envision Mary standing at her work station and personally inspecting each and every brown paper sack that passed by on the conveyer belt. In reality, it probably doesn't happen that way, but that's what I saw in my mind's eye. To some people, the job of monitoring the quality of paper sacks would seem to be a menial and boring job—a task that would produce little, if any, job satisfaction. But as evidenced by the message, Mary took great pride in her work and wants the recipients of "her" paper bags to know that she does her job well. She is proud enough to give her name rather than sending the innocuous message, "Inspected By No. 21."

As facilities managers it should be comforting to realize that if someone like Mary can feel pride in inspecting brown paper sacks, it should be very easy for a facilities management employee to take much greater pride in what he or she does.

Whether it is cleaning toilets, raking leaves, changing blower filters, data entry, or digging a trench, there is something to be said for doing a job well—whatever the job might be.

The facilities management employees that work within institutions of higher education have many things in which they can take pride. At numerous colleges and universities, the grounds are well kept and the campus has a park-like atmosphere. Many first-time visitors to campus have been known to comment upon the beauty of the surroundings. Some campuses have even been given the designation of arboretum. Usually on these campuses the buildings are also well maintained. The restrooms are clean. The paint looks good and the lights work. Everything functions as intended by the building's design architects and engineers.

But attractive campuses with well-kept and maintained buildings and grounds don't just happen by accident. There are other institutions where the grounds are not well maintained, with litter and plant materials that show signs of neglect and buildings that are dirty, run down, and shoddy.

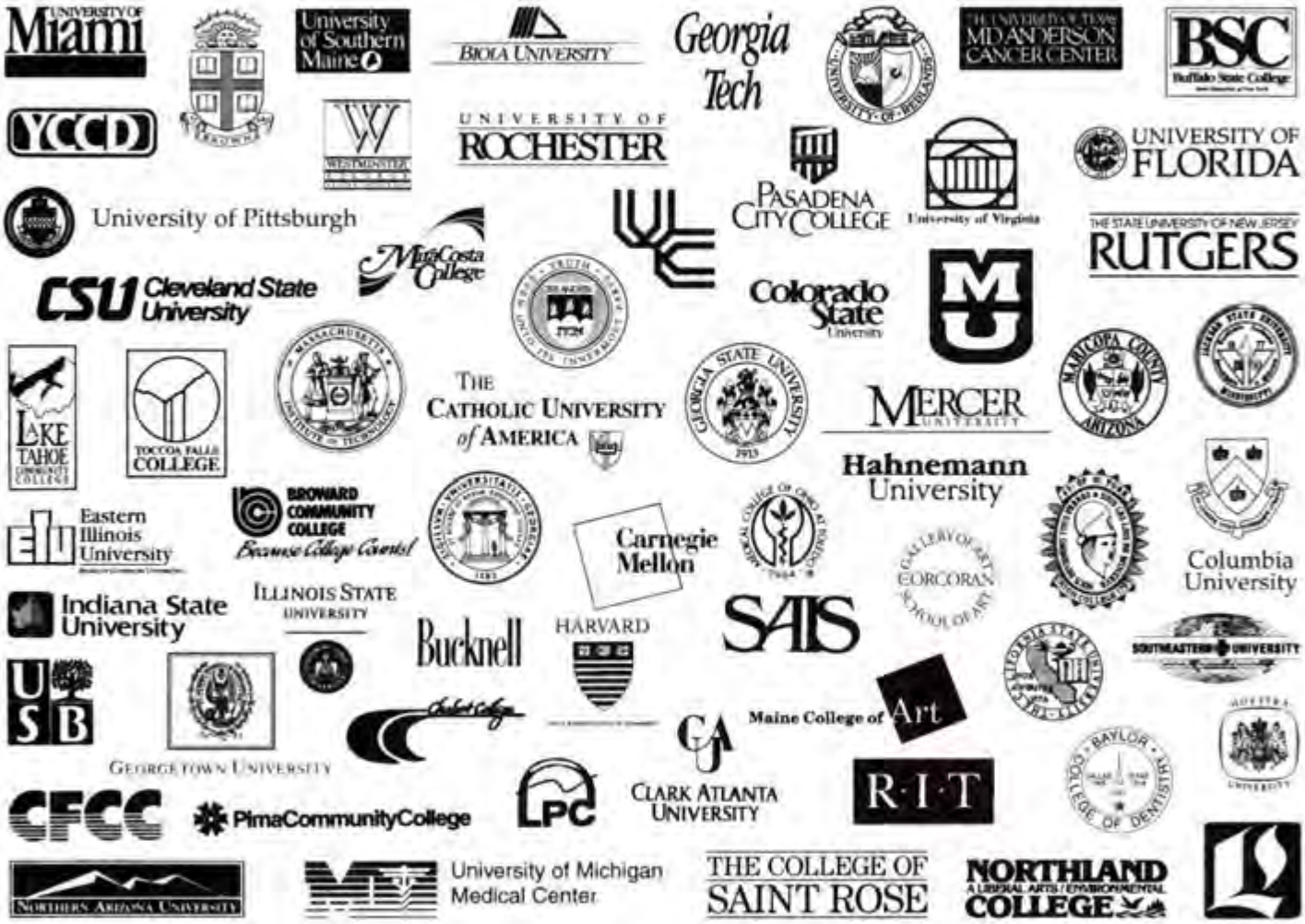
While there may be valid funding reasons for a campus to look shabby, the lack of funding is not always the cause for concern. So why, if allocated nearly the same resources, do some campus facilities look good and others look bad? The difference is in the people who care and take pride in their work. Workers like Mary. For those who do take pride in their work, their job is more than just a job. It's a daily challenge to do their individual best, and the service that they render is done "with pride from the best people."

It seems that the "best people" within facilities management organizations have learned the same secret that many others have learned who work a wide variety of jobs. The secret is as old as life itself. It is a secret only because it is so big and obvious that we often overlook it in search for something more mysterious and complex.

The secret is this: Forget about getting and give! Think about it. It works. ■

Val Peterson is director of facilities management at Arizona State University, Tempe, Arizona, and a former APPA President.

The Environment Breathes A Little Easier Thanks To These Colleges and Universities.



When it comes to preserving the environment, these colleges and universities are doing a world of good. As participants in the Green Lights program, they are using revolutionary, energy-efficient technologies to reduce air pollution and improve lighting quality in their classrooms, laboratories, and administrative buildings.

What's more, they are also significantly cutting maintenance costs and helping to increase student involvement in important environmental initiatives.

EPA Green Lights

Green Lights is an innovative, voluntary pollution prevention program sponsored by the U.S. Environmental Protection Agency, with over 1,500 participants nationwide.

To find out how you can make profitable improvements to your lighting system and take advantage of EPA's free tools and services, call the Green Lights Hotline at (202) 775-6650.

Planning, Designing, and Constructing Today's Campus Facilities

by Donald Guckert

Illustration by Ken Condon

Planning, design, and construction activities represent the highest profile work performed by the facilities manager on a college campus. Unlike other physical plant activities, such as maintenance, grounds, custodial services, and utilities, design and construction activities are outside the daily routine of campus operations. As such, design and construction projects command greater attention and interest from campus administration than any other activities of the facilities organization.

Don Guckert is director of planning, design, and construction at the University of Missouri-Columbia. He is the coordinator of the special program on planning, design, and construction for APPA's twice-yearly Institute for Facilities Management.

As facilities managers, we have a two-fold interest in design and construction projects. First, we are responsible for delivering projects that meet budget, schedule, and quality goals. Second, we must maintain, clean, and provide utilities for newly completed facilities. If we don't design and build projects with low facility operating costs, we will be penalized with higher life-cycle operating costs in the long run. So, whether or not the design and construction responsibilities of your campus fall directly within your organization, you should take an active interest in the design and construction of any facility for which you will have operational responsibilities.

Each campus has a unique organizational approach to its planning, design, and construction workload. Some institutions split the workload according to project size—with a capital projects group managing large projects and the facilities organization managing smaller projects. Some institutions manage large projects from a system office and small projects from the campus facilities organization. Other institutions handle all projects from the same office. Finally, some institutions manage many small projects with in-house design and construction units while contracting larger projects to design consultants and construction contractors.

Regardless of organizational approach, all campuses face common challenges in planning, designing, and constructing facilities projects. All of us struggle with limited budgets, severe time constraints, imperfect designs, high costs, scope creep, construction contract disputes, and unrealistic client expectations.

Sharing a common set of challenges means that we can communicate with one another about how to meet those challenges. Our ability to learn from each other's experiences became evident recently during the special program on Capital Project Planning and Construction offered at last January's Institute for Facilities Management. Program participants spent a full week exchanging experiences and sharing new approaches to old problems.

The APPA membership exhibits a growing interest in planning, design, and construction issues. The number of participants in the Capital Project Planning and Construction program—seventy-five people with several more turned away—set a record for any special program offered at the Institute. With members obviously interested in these areas, and following the success of the last program, APPA has decided to offer the Capital Project Planning and Construction program again at next January's Institute in Los Angeles, California.

I invited Michael Haggans, John Robinson, and Boone Hellmann, who served as faculty at the Institute, to contribute articles to this special issue. I also asked Bill Merck and Ksenia Jaroshevich, Greg Watts and Ron LaPorte, and Duane Fox to provide insights on relevant design and construction topics. Finally, I talked Gene Kershner into updating his previous work on understanding university building costs.

Bill Merck and Ksenia Jaroshevich help get a project off on the right foot with their article on pre-design planning. They discuss their successes at the College of William and Mary with conducting planning work on a project before hiring the architect.

In "Maximizing Value and Function for Campus Facilities," John Robinson describes a formalized approach of using value engineering (VE) to eliminate unnecessary building costs while maintaining function and quality. John provides an outline for the value engineering process, addresses the myths and perceptions associated with value engineering, and discusses value engineering's future. In addition, he presents the results of a VE study at Western Washington University.

Greg Watts and Ron LaPorte share their experiences with successfully running in-house design and construction units that are 100 percent recharge. With campus clients always having the option to utilize outside consultants and contractors, the Design Services and Campus Construction units must compete with these market alternatives. Greg and Ron discuss how this "competitive" model breeds fiscal accountability, a stronger customer service orientation, and progressive management strategies and how in-house services benefit both the client and the facilities operation.

Planning, design, and construction activities represent the highest profile work performed by the facilities manager on a college campus.

Michael Haggans, senior vice president at HOK and a former facilities manager at two major higher education institutions, provides an insightful perspective on the relationship between architects and higher education facilities managers. "Fire the Architect!" is written from the perspective of one who has served on both sides and candidly addresses the issues that often divide them.

Alternative dispute resolution continues to be a hot topic for facilities managers who are trying to avoid the high cost of construction dispute litigation. Duane Fox, an attorney who specializes in construction litigation, offers a more cost-effective approach to dispute resolution in his article on mediation.

While alternative dispute resolution has been the focus of the present and recent past, dispute avoidance is touted as the direction the construction industry is heading. No other tactic for dispute avoidance works better than partnering. Boone Hellmann gives a mid-term report card on how partnering is working at the University of California, San Diego.

Gene Kershner was talked into taking a few hours away from his retirement to update a piece he authored for NACUBO almost a decade ago. Today, as in the mid-1980s, the question of "Why Do University Buildings Cost So Much?" continues to be on the minds of our clients, university administrators, and governing boards. Gene answers this question in a concise and comprehensive manner based on a study conducted at Stanford University.

Finally, I address one of the most scarce resources in design and construction projects—time. We are constantly racing against time as clients demand faster completion of campus projects. Facilities managers can help clients understand the impact that time has on project cost and quality. The article also offers some strategies and techniques to manage time during design and construction so that you can move from fighting time as your adversary to "Getting Time on Your Side." ■

Why Do University Buildings Cost So Much?

by E. Gene Kershner

[Editor's Note: In the mid-1980s, the author conducted a study of building costs for university construction at Stanford University. The study used a methodology that compared the cost of campus institutional buildings with noninstitutional buildings. While inflation and changes in codes and regulations have dated the specific cost data from that study, the principles and concepts on which the comparison was made and conclusions drawn are as valid today as they were a decade ago.]

Why do university buildings cost so much? Since the beginning, college and university administrators have been asked that question by their faculty clients, by their vice presidents, by their trustees.

Nobody can ever believe the bottom line when a budget is assembled for a complex university building, especially the trustees. Often trustees are presidents or chairs of the board of large commercial and industrial corporations. Often they have just finished an expansion of their own plant facilities at half the cost predicted for a new university project, and they do not understand the difference. As inflation pushes the cost of buildings higher and higher, and as sources of funding for university buildings grow scarcer, these concerns widen, and demands for explanations become understandably more frequent. It is imperative that university administrators understand: 1) the high cost of constructing university facilities, 2) the elements of that cost, and 3) the differences between university and nonuniversity facilities. Administrators cannot only explain the reasons for the high cost, but they can also be effective in reducing those costs wherever possible.

The primary methodology used by most people to judge the validity of a building's cost is to compare it with the cost of other buildings. This can be misleading. Accurate comparisons are difficult and must be done with considerable care.

Units of Measure for Comparison Must Be Clear

The confusion normally begins with the units of measure used. As most of us are aware, the unit of measure universally used in comparing building costs is cost per square foot. But which square foot? Architects normally think of cost per *gross* square foot. Many academic program officers, however, think of *net* square feet because it's the space assignable to

Gene Kershner is the retired associate director of facilities project management at Stanford University. He resides in Palo Alto, California. This article has been updated by Donald Guckert of the University of Missouri-Columbia.

their program that's most important to them. They have no interest in corridors, mechanical rooms, and duct shafts. Often, net square feet can be 55 to 70 percent of the gross square feet needed to house a program. So the difference between net and gross can be a major source of confusion.

Confusion also results when one talks of *construction cost* and another talks of *total project cost*. Construction cost for a building is normally identified as the bid cost, including the structure itself, built-in equipment, on-site utilities, and landscape costs. Total project costs include the preceding, but also encompass design fees, in-house management costs, contingencies, financing costs, and often, movable equipment and furnishing. Total project costs can be as high as 1.5 or more times the construction costs, resulting in a 30 to 50 percent cost difference.

Therefore, to ensure that university administrators are not comparing apples to oranges, it is imperative that they know whether stated costs are basic construction costs, total project costs, or something in between.

Another common confusion results from our inflationary economy. Buildings cost more this year than last year simply because of increasing costs due to inflation. The cost of a building constructed five years ago would be substantially less per-square-foot than if it were built today. It is necessary, therefore, that construction costs for buildings being compared be brought to the same index in time by using the *Engineering News Record* index or some other appropriate methodology.

Once the units of measure are straightened out, one may begin to feel confident that comparing building costs on a cost-per-square-foot basis can be done with some ease and accuracy. This is not necessarily so.

Buildings are Unique

Administrators need to know a great deal about the buildings they are comparing in order to do so properly. Buildings are unique. Some are large, others small. The size alone can affect the cost per square foot by a significant amount. Some buildings are complete; others have areas left shelled, to be completed later. Shelled areas may be included in the square foot totals, but they cost a lot less to build than finished lab and office space. The percentage of office space versus lab space—or speaking more generally, simple space versus complex space—can vary greatly from building to building. Some are large one-story, others are multi-story; each could be approximately the same number of square feet, yet the multi-story building would usually be more expensive to build because of the need for such components as stairs, elevators, and heavier structural systems.

So comparing building costs on a cost-per-square-foot basis is a tricky business, and one that must be carefully approached. Still, it's a methodology that is well known, has been used for years, and will continue to be used in the future.

The Culprit is Complexity

There are two fundamental truths obvious to design and construction professionals: 1) a building's cost is directly proportional to the complexity of the building, and 2) university buildings, especially research buildings, are extremely complex.

To make the complexity of institutional buildings and its effect on the cost of construction clear, an analysis at Stanford University in the mid-1980s compared a number of campus institutional buildings with a like number of noninstitutional buildings, including high-tech electronic firms and commercial buildings. Building costs were converted into a series of understandable, architecturally meaningful components such as structure, exterior walls, roofing systems, mechanical, and electrical.

Structure

Starting with structure, the analysis determined that on the average, institutional buildings have a significantly higher gross square foot cost for structure than the average noninstitutional building. These are some of the reasons why:

1. Since institutional buildings are designed for greater land use/density efficiencies, they are generally multi-story structures rather than one-story. This generates greater costs for code compliance (e.g., more stairs, wider corridors, more fireproofing and fire separation requirements), heavier foundations, and greater seismic and wind-bracing requirements than are necessary in one-story buildings.
2. Institutional buildings often have more extensive basements, which require additional excavation, shoring, and waterproofing costs.
3. Greater spans are required for column-free classrooms and for future flexibility to alter the space for other functional uses.
4. Heavier floor loadings—100 pounds per square foot versus 50—are required for program needs (e.g., library stacks, research equipment, future flexibility).
5. The configuration and massing of institutional buildings are normally more complex to accommodate mixed program requirements (as opposed to one-story, single-use noninstitutional buildings). First-floor classrooms require heavy beams overhead to support second-floor functions (e.g., heavy library bookstacks). The need for adjacent labs and offices, rather than grouping like spaces together, requires costly utility runs and more corridor space. The need for many small offices requiring exterior windows results in less-efficient buildings.

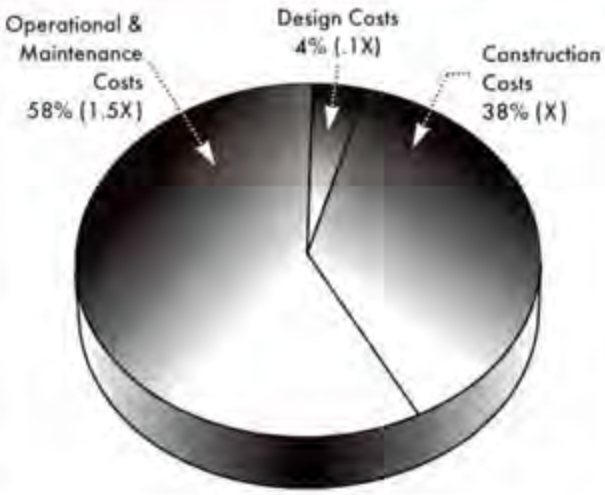
Interior Construction

Another significant cost differential is found in the comparison of components for interior construction. These components consist of interior partitions; floor, wall, and ceiling finishes; function equipment; and vertical transportation. The reasons for the cost differences are:

1. The need for harder, more-durable finishes for high-use areas (for maintenance and, to some extent, aesthetics);
2. Institutional-grade, in lieu of commercial-grade, finish hardware (a heavy-use item subject to damage and high maintenance costs);
3. More extensive function equipment, such as laboratory casework, classroom seating, audio-visual equipment, library shelving, bookshelves, and chalkboards; and
4. Elevators—necessary in multi-story buildings for access by persons with disabilities and the movement of people and material, must be of better quality to reduce maintenance.

It might be useful to point out that a commercial or industrial building is often built with more emphasis on a low first cost rather than life-cycle cost because it is expected to serve a short-term function—perhaps five years or less—and the cost

Total Life Cycle Building Costs

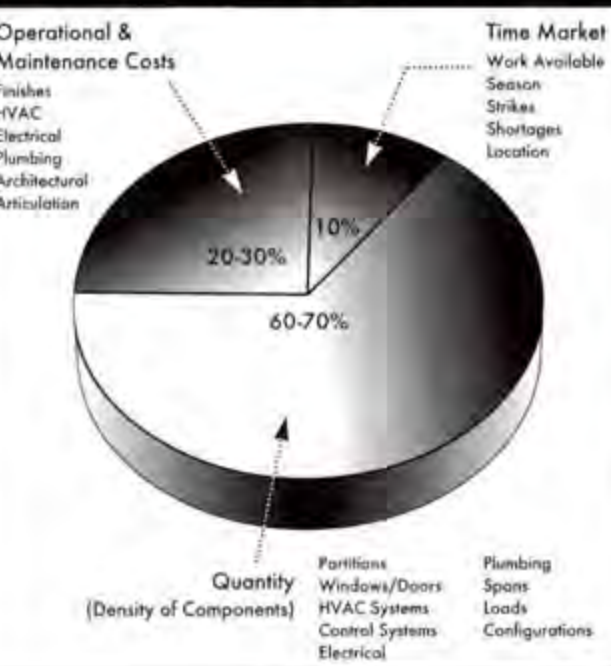


of operating and maintaining the building is not of the paramount importance that it usually must be for educational institutions. This difference in life expectancy is one of the primary reasons for the need for increased quality, and therefore increased costs, for educational buildings for which long-term operating costs are important. This concern becomes especially apparent in interior construction.

Mechanical and Electrical Systems

Operational considerations are also important with electrical, plumbing, and heating, ventilation, and air conditioning (HVAC) systems—areas where program sophistication can have a substantial impact on costs.

Influences on the Cost of Buildings



The various mechanical and electrical systems for a building are significantly affected by the program or functional responsibilities of those systems. In structures that must house intense research and teaching programs, complex, sophisticated air, heat, and light systems are required or the program will suffer—often drastically so. Mechanical systems, more than any other single building component, represent the single largest cost variance. The reasons for the cost differential between institutional buildings and noninstitutional buildings are indicated below:

1. Fully enclosed, institutional-grade air-handling units are used in lieu of roof-top commercial-grade units for longevity (fifteen to twenty years of life versus five to ten), reliability, and less routine maintenance.
2. HVAC control systems are more sophisticated in allowing zoning and metering for energy conservation and localized environmental control. Institutional-grade control systems are also used in lieu of commercial-grade ones for reliability and less routine maintenance.
3. Critical tolerances for heating, cooling, and humidity are required for unique and sophisticated research programs. Control systems requiring an environment with temperature variations of less than +/- 1 degree are considerably more expensive than systems allowing greater temperature variations.
4. Heavy air-change requirements are necessary to accommodate fume hoods for research or animal holding areas.
5. Special conduits for TV, computers, and audio-visual equipment, and more extensive signal and communication systems, are often required.
6. More wall may be exposed to the weather because of configuration and multi-story aspects of institutional buildings, requiring larger HVAC loads.
7. Larger electrical loads are necessary for research requirements.
8. Full sprinkler systems are required by many colleges and universities.

To summarize, specific program requirements necessitated by the complex, sophisticated research and teaching functions to be housed can have a dramatic impact on construction costs. While the shell cost for a building is fairly static, the program costs will vary substantially—as much as five or six fold depending on the complexity of the program. University buildings are at the high end of the range because program requirements for institutional buildings are generally more intense than for noninstitutional buildings.

The cost of a building generally has a direct proportional relationship to the complexity of the systems in the building, and administrators must be aware of and understand these systems if they are to understand the cost of the buildings they build.

Codes and Standards

Two more aspects of building that affect cost are codes and standards. In any analysis of the cost of construction, one must not overlook the substantial impact that the multitude of requirements mandated by government agencies has on the design, and therefore the cost, of present-day buildings.

Codes apply more restrictive requirements, to multi-story building. Since most institutional buildings must be multi-

Continued on page 26

Continued from page 24

story in order to maximize land density, these restrictive requirements almost always apply to institutional buildings, which inevitably adds to their cost.

Examples of such requirements are stairs, fire separations, fire-resistive construction, wider corridors, extensive sprinkler systems, and seismic bracing.

Revisions in existing codes and the adoption of whole new codes have proliferated in recent years. Buildings constructed as recently as seven to ten years ago simply should not be compared to present buildings because governmental regulations have added to the cost over the last decade.

Life-Cycle Cost Considerations

The primary focus of this article so far has been on program costs as they relate to meeting the academic or functional program of a building.

Of lesser impact, but still important, are the program requirements pertaining to the longer life cycle and commensurate maintenance, labor, and utility costs university buildings require.

Operational and maintenance (O&M) costs for a building during a thirty-year period can approach one-and-a-half times the initial cost of construction.

As mentioned earlier, many noninstitutional buildings are built with the idea that O&M costs can be written off as a cost of doing business, or that the building will be sold or otherwise disposed of in a five- or ten-year period. In such cases, high potential O&M costs are of less concern than the initial cost of construction.

Most educational institutions, however, have to fund O&M costs from the operating budget, and those funds are difficult to acquire. Therefore, it becomes extremely important to consider the life-cycle during the design of buildings to ensure that the most cost-effective decisions are made.

How Can University Administrators Reduce Costs?

Once an understanding is reached on what makes university buildings cost so much, one can begin to make some suggestions on how those costs might be reduced.

Obviously, if the program is the chief culprit in higher costs, it seems valid to analyze that area first. Looking at *density* or *quantity* first, can the number of partitions be reduced? If so, perhaps the number of doors or windows can be reduced. Can the requirements for HVAC be simplified? Can less complex controls be used? In the actual design of the building, are the most economical spans consistent with program requirements being achieved? Are floor loadings overdesigned? Is the configuration, shape, and massing of the building responsive to economic considerations? Indeed, is the amount of space being built (the actual size of the structure) correct? Are offices too big or labs too generous? Is the efficiency ratio (net to gross square feet) as high as possible? All these questions relate to quantity or density of the various building components. These areas make up 60 to 70 percent

of the cost of a building, and decisions regarding them have the greatest impact.

Once decisions regarding quantity have been made, it is necessary to look at the quality of those components. What are the finishes to be used? Bare concrete or quarry tile? Vinyl tile or acid-resistant seamless flooring made especially for research lab floors? Can lesser quality mechanical and electrical components be justified? These questions have an impact on operational and maintenance costs, but can account for 20 to 30 percent of the cost—clearly less impact than the question of quantity, but still significant.

Quantity and quality are the two areas constantly in conflict with one another whenever the difficult job of cutting the costs of a building is tackled. If a building costs $150 per gross square foot and one can cut a square foot, presumably $150 can be saved. But if that square foot must be included in the building and the quality of that square foot is reduced, say by 20 percent, only $30 is saved. So clearly, the greatest saving results from reducing the quantity of square feet to be built. Of course, it is painfully evident to all administrators that their academic clients never get enough space and that *any* space is almost preferable to no space at all. So it is always difficult to get agreements to reduce building size.

The other area that influences the cost of a building is an area one can rarely do much about: the time/market/institutional influences. Bid dates are normally set by the need for the building and when funds are available rather than when the most propitious market conditions exist. The work available to local contractors, the current season, and any unusual conditions such as strikes and shortages can have an effect on cost. One obvious factor is location: it simply costs more to build in some areas of the country than in others. Institutional requirements such as bonding and insurance requirements, and public prevailing wage laws may drive up costs. Again, these are all influences that university administrators can do little about, but it is necessary that these influences be understood if building comparisons are to be valid.

Conclusions

Educational institution buildings can cost 15 to 30 percent more than most noninstitutional buildings due to more extensive program needs. These program needs are summarized as follows:

- Complex program requirements, both academic and nonacademic (code, fire, safety, access).
- Longer life than industrial/commercial buildings; greater life-cycle concerns.
- Campus density, aesthetics, logistics, location.

If the elements of the building costs are understood by all members of the project team and creative discussions occur throughout the design process, trade-offs can be considered and decisions made to ensure that the most cost-effective use is made of the institution's construction dollar. ■

Pre-Design PLANNING

by William F. Merck II and Ksenia Jaroshevich

For the little things we plan in life we follow commonsense rules to avoid problems. The carpenter tells us to "measure twice, cut once." However, for the larger undertakings in life, we seem much more willing to put the outcome in the hands of fate. Perhaps that is because the larger things come into our life infrequently and we have no simple rules or prior experience to guide us. We forge ahead, uncharacteristically optimistic, thinking that others manage to succeed with big projects, so once we get into ours, we will figure things out. True, but for multi-million dollar building projects, by the time one "figures things out," hundreds of thousands of dollars are wasted, months of staff time misdirected, and serious thought expended on the best way to explain to the boss why this disaster is really not so bad.

There is a time between the boss announcing that you will be in charge of a new, large building project, one that will "transform the institution," the "watershed building that will make the future" (no pressure here), and the point where you bring on board the architectural firm (internationally recognized of course) to prepare the construction design documents.

It is our experience that this period is the absolutely crucial time for setting a course that will lead to success. The following points will help you develop a building program that will get your design consultants off to a correct start in developing a design solution. The discipline will add years to your career!

Bill Merck is vice president for administration and finance, and Ksenia Jaroshevich is director for capital outlay, at the College of William and Mary, Williamsburg, Virginia.

From the Original Idea...

Once the original idea for a project has been passed to you for implementation, the only two questions your boss will have for you from that time on will be "How much will it cost?" and "When will it be complete?" A natural survival instinct immediately suggests hiring an architect to share the risk with you for this newly acquired assignment. Succumbing to this inclination is not good. In a long footrace, a moderate pace in the beginning allows a runner to pick up speed later, shortening the total time to the finish. Similarly, a slower, more deliberate beginning in a building project will lead almost inevitably to increased speed later in the project, less cost, and a better building.

The following points form the outline for the planning that should precede any architectural design drawings on a building project. This planning will give a solid base for all that comes later.

1. Define precisely the problem to be solved by the proposed building project—in writing.
2. Define the goals that will be achieved by solving the problem—in writing.
3. Identify the people most appropriate for this project and specify their role.

4. Have the newly identified team review and refine the assumptions and conclusions reached in #1 and #2.
5. Brainstorm potential strategies for solving the problem.
6. Identify the most promising potential strategies and develop detail.
7. Select the best strategy.
8. Develop a written work plan for the project that, among other things, includes a detailed program to be used by an architect/engineer to prepare design documents.

Define the Problem

Defining the problem would seem to be elementary. It is. What unfortunately happens in many projects, however, is that the project initiator attacks symptoms rather than the problem. The possibilities that can flow from this mistake are frightening. Another potentially damaging blow to effective problem definition is poor communication and misunderstandings between the originator of the idea and the person designated for implementation. These problems can be alleviated by allowing sufficient time for thinking through the root causes of the exhibited problem and reducing the conclusions to a clearly written statement.

A bookstore expansion project undertaken a few years ago provides a good example for illustrating how being deceived by symptoms can allow a project to go seriously awry. The symptoms prompting a perceived need for expansion were too little storage space, not enough retail floor area to display all that was desired, cramped aisles, and not enough room to add extra cash registers to handle book rush. A careful analysis of the symptoms and an honest search for the root causes revealed a much less expensive solution to the problem than adding square footage to the store. Every added square foot would not only be expensive to construct, but would require additional continuing expenses for staff to cover the new sales area, heating, cooling, lighting, and cleaning.

Illustration by Sarah Sloane

Consultants with extensive experience in bookstore operations were brought in for a few days to review the situation and report their observations and recommendations to university management. Surprisingly, after their visit, the consultants concluded that the basic space envelope of the existing store was adequate to comfortably support not only the current volume of sales, but as much as 33 percent more.

One of several observations that led to their conclusion was that the store's display fixtures were not up to current standards for efficiency. Upgrading the fixtures alone could add significantly to the amount of merchandise that could be displayed in the same square footage of retail area. Displaying clothing on hangers, rather than folded on shelves, cut labor costs. By using "slat wall" fixtures on the exposed walls and columns, more merchandise could be displayed in the same area. More effectively designed shelving for office and school supplies was recommended to lower the shelf profile for better visibility, while allowing space for a greater amount of merchandise. These improvements had the added benefit of reducing the need for costly back of the house storage, since more merchandise was actually on the retail floor—where it could be sold!

The consultants further observed that senior employees had, over time, managed to carve out and convert valuable retail floor space into private offices for themselves. Their recommendation was an obvious one. These spaces should be reconverted to retail floor area. Employees must be accessible to customers, not hidden away in offices. Necessary work space to replace the offices would be designed to be open to the sales floor or provided by desks in the (smaller) storeroom. Exceptions to private office elimination would be for supervisory privacy to discuss personnel matters or to provide the necessary security and distraction-free environment for accounting and bank deposit preparation.

An analysis of buying practices revealed the lack of a disciplined system for inventory levels. Much more merchandise was on hand than was needed to cover reorder lead times. The superfluous merchandise took up valuable space. Another discovery was a practice of allowing vendor sales representatives to place "spinner" racks around the store, constricting aisles in an already crowded store. Impulse merchandise was allowed to clutter the cashier's countertop in ever-increasing quantities. Newer counter designs were recommended by the consultants to support the cash registers, allowing impulse merchandise to be displayed above or below the register level. This recommendation allowed for more cash registers in the same linear footage of counter space allocated to the old configuration.

An analysis of sales revealed that some merchandise inventory being displayed was turning at an unacceptably low rate.

This slow moving merchandise was eliminated in favor of products that were more popular, resulting in increased sales and profits within the same square footage of display space.

When the review was completed, and the real problems defined, it became clear to management that a store addition was not an appropriate alternative for further consideration. The more appropriate alternatives were for improvements in operational practices, with construction limited to remodeling and replacing inefficient fixtures.

Define Goals to be Achieved

After the problem is defined and alternatives considered, all too often the solutions sought—goals to be achieved—are left hazy. It is important to quantify what the goals are. In our bookstore example, in what ultimately became a renovation project rather than new construction, one goal was to shorten the customer's wait in the cash register lines during book rush. Good goal, but not yet clear enough. To determine the needed number of registers, a standard must first be set, such as not allowing a customer to wait more than seven minutes in line. Then, through a review of past customer counts at peak times and an analysis of typical transaction times (using new, efficient equipment and properly trained cash register operators), the exact number of cashiering stations was found to meet the goal of no more than seven minutes in line during rush. This exact requirement was then given to the architect for inclusion in the floor plan drawings for renovation.

We forge ahead, uncharacteristically optimistic, thinking that others manage to succeed with big projects, so once we get into ours, we will figure things out.

Identify Planning Participants

When the planning process has sufficiently progressed to the point that it is certain that a construction project is an appropriate solution to the problem and the goals of the project have been at least cursorily determined, it is time to identify a building committee. At this point in the planning process, enough is known to choose people with the requisite knowledge and interest to contribute to the success of the project. Each person identified should be assigned a specific role in the future work of the committee. In a library project, for example, the archivist may be responsible for analyzing volume requirements for the material being presently stored in archives and to supply the committee with projections of future needs. These projections must include sufficient detail to persuade other committee members, with their own priorities for the limited construction budget dollars, that additional archive space should be included in the final plan.

The number of participants should be kept to a manageable size, yet large enough to provide sufficient ideas and information. Five people are usually a minimum, and eight to ten is about right. Groups larger than ten suffer scheduling problems and have difficulty keeping absentees up to speed on what they have missed. The committee chair should be someone experienced in the institution's capital outlay process.

The first priority of the committee is to develop a written planning schedule, identifying milestone events to mark progress. The role each person on the committee is expected to play should be stated by the chair at the first meeting to avoid confusion later.

Check Assumptions

An early order of business should be a session devoted to a critical review of the assumptions and conclusions made before the building committee was formed. For example, a committee member may know about severe environmental problems specific to the proposed building site. Refining assumptions at this early stage is inexpensive. Changes later in the process become ever more costly.

Brainstorming Potential Strategies

A task of the building committee should be to spend some meeting time brainstorming alternative strategies for accomplishing the goals identified. It is entirely possible that the larger group, with collectively more expertise, can come up with an entirely different and better idea as to how the problem should be solved. They may, for example, decide that the activity to be housed in the proposed building could be more appropriately and less expensively handled by renting a building from someone else.

Another example of an alternative strategy can be found in a project proposed to provide additional housing for students. The university administration had a goal of continuously working to "improve the housing services offered students." In pursuit of this goal, lack of adequate housing for a growing student body was identified as a problem. A committee was quickly formed to oversee planning for a new on-campus residence hall. Once the building committee began meeting, however, discussion revealed that a new apartment complex was being planned for construction on the fringe of campus by private developers. When complete, this project would eliminate the current need for additional housing capacity.

The committee decided that there was a better strategy than new construction to improve the housing services offered students. That better strategy would be to use the financial resources that had been earmarked for new dormitory construction to accomplish needed renovation in existing residence halls. As a result, student housing services would be improved, and the university would have the added advan-

tage of having nicely upgraded facilities that would be more effective in keeping currently housed students from electing to move to the new off-campus apartments.

Usually, strategies will have been sufficiently thought through and a sound conclusion reached before appointing a building committee. Radical changes in direction such as those described earlier will rarely occur. However, the point is that in a major building project, millions of dollars are going to be spent. It is worth the time for a building committee to double check the strategy and correct any flaws before going to the next step in the process. The next step is to hire an architect.

The Building Program

Once the architect is hired, the building committee has one last major task to accomplish before the selected architect begins work on the design drawings. The task is to define the building program. This effort should be accomplished in partnership with the architect, who will largely guide the process based on questions generated through experience. The committee's participation in this process will be very important because of each committee member's personal expertise and understanding of the project goals gleaned through participating in the earlier planning. A successful building committee will, however, be open-minded and receptive to the suggestions and recommendations of a design professional who is entering the process as a neutral party, unconstrained by institutional habits and notions.

Following completion of the building program, the architect's design work begins. Because of all the planning that has preceded the architect's development of a design solution, the probability is great that the architect will successfully create just the building design the university wants and needs.

Conclusion

Every building project has its own personality. People involved in building projects have different degrees of experience and expectation. The basic elements of effective pre-design planning are problem identification, goal statement, and strategy formulation. Seems simple, but in practice, projects often get into the design phase too quickly, with too little time spent on these basic elements. If adequate time is spent in pre-design planning, the rewards will be great. ■

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Partnering: A Mid-Term Report Card

by M. Boone Hellmann, AIA

Partnering will surely be one of the buzzwords for the balance of the 1990s. We have become familiar with the basic tenets of partnering, but in reality, how well is partnering doing? My institution has implemented approximately 750 million dollars of capital improvements in the last decade and only one project out of the entire program has suffered legal litigation. Oh sure, we've had little spats here and there, but nothing that hasn't been resolved without the use of protracted legal intervention. I feel very strongly that this record of successful implementation is a result of competent project management coupled with an understanding of the construction industry and the utilization of the partnering process.

Partnering has become a standard practice for us. Our biggest challenge at the beginning of all new construction projects is to get a commitment from all the participants to engage in and function through partnering. Partnering has been around long enough now that the majority of our contractors and subcontractors have had some sort of experience, positive and negative, with partnering. Our goal is to create excitement about the project and present partnering as a worthwhile endeavor that can help ensure the success of the project.

Boone Hellmann is assistant vice chancellor for facilities design and construction at the University of California, San Diego. He is a faculty member in the APPA Institute special program on planning, design, and construction, and he wrote on project management in the Summer 1994 issue of Facilities Manager.

Our mid-term experiences and findings are varied and sometimes surprising. The following comprises an evaluation of our experiences with partnering.

Things that are working:

Communication

Partnering definitely opens up the lines of communication. If nothing else, a partnering workshop brings all the participants together in one place. It is an excellent opportunity to place a face with a name that previously had been nothing more than an obscure business title and signature. Personal interactions are fundamental to the success of projects and partnering allows all the participants to meet one another in the flesh. We find that there is less of a tendency to write incriminating, contract-invoking letters when personal contacts have been established. The participants are much more likely to communicate via a friendly phone conversation. Partnering introduces and formalizes the concept of a team and the process of teamwork.

Illustration by Sarah Sloane

Education

Partnering participants learn how they will have to work with one another in order to be successful. Group problem-solving activities during both the initial and follow up partnering workshops allow the individual team members to observe and interact with their fellow teammates, while being

charged with solving real job issues and problems. In one of our recent partnering workshops, it became apparent that the steel subcontractor had a delivery problem that would affect the schedule of the entire project. The participants at this session worked together to develop a schedule that allowed the project to proceed as planned and adjusted several work efforts to facilitate the steel subcontractor's delivery problem. Issues are dealt with in the frame of "it's not my problem, it's not your problem, but it's OUR problem and we'll solve it together." Problem-solving techniques are learned that can be used during the course of the project.

Some partnering workshops engage in personality style assessment. While this may resemble group psychotherapy, the effort is intended to present a plan to help team members understand themselves and others in a specific work environment. Knowing how to sell ideas and solutions to one another is a key ingredient into the success of the communication network.

Productivity

Open lines of communication and efficient problem solving clearly result in a reduction of paperwork. This translates into increased productivity and profit for the contractor and design consultants. Ultimately this benefits the owner/institution because they are not besieged with requests for additional compensation.

Trust and Integrity

Implementation of the partnering process and its associated interaction benefits, leads to a marked increase in trust of fellow team members, a greater willingness to compromise, a reduction in participant stress, and a significant decrease in blaming behavior. The result is a tremendous opportunity for innovation and creativity. Team members aren't focusing their individual efforts on covering their respective behinds; they are focusing on completing the project successfully...on time and on budget.

Things that aren't working:

Communication

Just as communication is noted above as something that is working, there are times where communication is not enhanced. The old adage says it best, "you can lead a horse to water, but you can't make it drink." Partnering is an attitude and a process that must be practiced. It doesn't just happen. Unfortunately, some companies and individuals choose not to become part of the team. They don't subscribe to the principles and goals as outlined by the team. These nonparticipants must be monitored carefully as they can undermine the good of the team process as well as the project itself.

Commitment

Partnering is a commitment. All the participants must be committed to the goals and objectives of partnering. And the commitment must begin at the top of the organization. Partnering doesn't work when leadership doesn't support their representative on the team. The individual runs the risk of making agreements that will not be supported by management. Quickly these team members lose credibility and any trust that they may have earned with their associates.

The commitment to partnering also requires ongoing maintenance. If an organization is not willing to give partnering the required resources along with periodic evaluation and review, then partnering will not be the successful venture that was envisioned. Partnering requires more than simple lip service.

Consultant Involvement

There continues to be reticence, skepticism, and resistance to partnering by some architects, engineers, and design professional support consultants. Losing control of the project is primary on their minds no doubt, but in truth, partnering facilitates their control and involvement on a project. The notion that the owner is creating an additional liaison with the contractor through partnering is a major concern and the consultants fear their importance and authorities will be diminished. On many of our partnered projects, the architects, engineers, and design professional support consultants have indicated how happy they were to have had the opportunity to participate in partnering and the fact that partnering was instrumental in the overall total success of the project.

Subcontractor Involvement

Just as the design consultants are sometimes resistant to partnering, so too are some subcontractors. This is exacerbated by the fact that some general contractors don't really want their subcontractors to participate in partnering for fear of losing control of the project. Subcontractors don't often understand the benefits of partnering and wonder what's in it for them. They see the general contractor establishing a close liaison relationship with the owner and design consultants, and have the same fear that the design professional has of the general contractor and owner liaison.

In reality, probably the greatest benefit stands to be gained by the subcontractor. Partnering can facilitate a subcontractor's need for information. It also facilitates a more direct line of communication with the owner and design professionals, although this is exactly what the general contractor fears most. However, partnering can identify that fear and address a solution that benefits all concerned.

Partnering as a Contract Crutch

Some team members tend to invoke partnering as a way to abrogate the contract. We have seen letters that request certain considerations with a salutation that begins "in the spirit of partnering, we request...." Remember that *partnering is not a contract* in any way, shape, or form. Also, watch out for team members who want to partner only when it is of benefit to themselves. Partnering is an attitude and behavior that is practiced consistently, not only when it is convenient for the moment.

Do's and Don'ts

Do have a prepartnering meeting with the principals of the contractor, architect, and owner to discuss how partnering will be used on the particular project. This is a very good way to ensure that the top level management is committed to partnering.

For smaller projects, do consider shorter, more informal partnering workshops. We have facilitated these partnering workshops using our own in-house facilitator. You can modify the partnering process to reflect the complexity of the project. There is no question that large, complex projects require formally facilitated partnering, but small, simple projects do

well with modified partnering workshops that last one half day or so.

Do have follow-up workshops to continue the partnering process and to evaluate the process to date. The follow-up workshops are actually more important than the initial partnering workshop because the project team has had the chance to work together and interact. Some areas will need attention, and the follow-up workshop is critical for facilitating clarification. Unmet commitments can be challenged and addressed, and appreciation for team members' achievements can be given.

Do carefully consider the timing of the initial and follow-up meetings to optimize their effectiveness. Wait to have the initial workshop until the subcontractors are signed up and contracted to do the work. Schedule the follow-up workshops at milestones noted in the project schedule. This allows new subcontractors and new participants to be brought into the process.

Do have the architect give a presentation about what the project is intended to do and how it will ultimately look. The project team on the contractor's side often knows very little about the intended use of the facility as well as what it will look like in the end. This is an excellent way to generate excitement for the final product.

Do have the general contractor give a presentation on how they intend to implement the construction. This is a terrific opportunity to learn what the contractor's expectations and problems are likely to be. Critical performance objectives can be identified and shared with the partnering team members.

Do consider having a display model or project renderings at the job site. These serve as strong reminders of the ultimate goals.

Don't allow any confusion over the difference between the contract for construction and the partnering charters. Partnering is a process, not a contract. It is a model for communication to facilitate and expedite the contract. But, as mentioned before, it does not diminish the contract in any way.

Don't automatically assume that everyone on a project is familiar with the partnering process. Our experience has shown that one-third to one-half of the team members are novices at the outset of the partnering process. Make sure you include a method for training new participants in the process.

Don't give up! Partnering needs time to work, but you must remain diligent and consistent. Don't hesitate to remind others that you are practicing partnering.

Mid-Term Grade

Partnering is doing very well. It instills mutual confidence and trust in the team members that is ultimately reflected in a successful project. The partnering process affords expanded communication in today's litigious environment. Adversarial relationships are avoided, and true teamwork and cooperation is generated. I am committed to partnering and am convinced that the sharing of values and objectives through the process is instrumental to the ultimate success of our projects. All in all, I would have to give the student a B-plus to an A-minus. Partnering isn't a panacea, but for us, it has been a key ingredient to the success of our construction program. ■

Maximizing Value and Function for Campus Facilities

by John L. Robinson, P.E., CVS

In today's environment of rising construction and operations cost and declining budgets, project planners need every tool they can find to control expenditures. How a project uses money deserves every bit as much consideration in the planning process as structural loading, architectural design, or capacity of the HVAC system.

Courtesy of Zimmer Gunsul Frasca Partnership © J. F. Housel

The 42,000 SF Science Facility Three for Math, Technology and Science Education at Westarn Washington University in Bellingham incorporates a Learning Resource Center, five lecture halls, faculty offices, and teaching laboratories.

Value engineering (VE) is the best tool for ensuring that the money spent on a project is spent wisely. A process for controlling project quality and cost, VE can lead to reduced construction costs and operation and maintenance (O&M) costs for new facilities as well as renovation projects. The earlier VE is incorporated in the planning and design phase, the better its potential results.

Definition and Benefits of VE

Value engineering is the systematic use of analytical, creative, and evaluation techniques by a multidisciplinary team focusing on achieving the required functions, performance, and quality while maximizing value.

VE applies the concept that two heads are better than one. Its strength comes from the dynamics and experience of the team members and its use of functions as the basis for considering design alternatives. The key requirements for a successful VE effort are as follows:

- A team leader well-versed in the VE process and its tools.
- A VE team with experience in each major technical discipline of the project, especially in the primary focus areas.
- A VE team that clearly and quickly identifies and understands the owner's needs on the project.
- A VE team that can clearly explain ideas to the designer in a manner that enables the designer and the VE team to work together productively.

A VE team with members who have not been involved previously in the project's development will bring a fresh perspective to project issues. In general, the greatest benefits are realized by using VE from the earliest planning stages through final design.

Two important benefits are derived from VE studies: improved overall value and validation of key project decisions. Improved overall value is achieved by reducing capital and O&M costs while maintaining or improving functions, performance, and quality. Historically, organizations realize average project capital cost savings of 5 to 10 percent and average O&M savings of 5 to 10 percent as the result of VE.

A VE study challenges various decisions to ensure that the decisions were made for the right reasons. Facilities managers are often unable to fully review every aspect of a project due to time constraints or lack of qualified staff. A VE study provides a way to increase the level of confidence in decisions that have been made and design solutions that have been selected. A project subjected to a VE study in the conceptual stages (and throughout design development) will have fewer problems and delays due to redesign than a project that is not studied. Additional benefits accrue throughout the construction process due to the focused review to which the project has been subjected.

Myths About VE and the Design Process

In planning to use VE for a capital campus project, it is important to recognize some of the myths about VE and the design process. One myth is that any good designer includes VE in the design process. This is simply not the way the design community operates today. Many designers say they include VE in the design process because they look at alternative floor plans or performance a life-cycle cost analysis.

VE is more than just looking at the economics of two or three alternatives. It is a step-by-step process of determining project requirements, applying the expertise of a team of people, and generating scores of alternatives. The biggest difference between VE and the alternatives analysis a designer may perform is the focus on *function*. Through a detailed function analysis, the VE team forms an understanding of what the project must do to be successful.

Another myth is that design firms see it as their job to develop *the* best and most economical project. Designers actually strive to give the owner the best project *they can* within schedule and fee constraints. They develop a project that is workable but less than optimal in design and cost. Designers' fees and schedules are often negotiated so tightly that the

The following are the results of a VE study conducted by KCM on a campus facility. The cost savings indicated are for recommendations actually implemented by the project owner.

Science Facility III
Western Washington University

Project Description:

Science Facility III is the third phase for expanding science education at Western Washington University, Bellingham, Washington. This project addresses the needs of Western Washington's interdisciplinary math, science, and technology education program. It will provide teaching labs, faculty offices, a computer lab, and an interdisciplinary Learning Resource Center. It also provides lecture halls required by all of the science programs involved in this three-phase project (Phase I - Chemistry; Phase II - Biology).

VE Changes:

- Eliminate fill under plaza and Facility III
- Use concrete pan joist structural system
- Delete terrazzo floor finish
- Eliminate redundancy in the northeast stair
- Use constant volume fume hoods
- Revisit diversity factors for building occupancy to reduce HVAC requirements
- Revisit fire pump needs

Other Benefits:

- Simplified construction access
- Validation of academic program requirements
- Preservation of existing art-sculptures
- Cross-pollination of academic goals and facility constraints
- Schedule validation

Cost as Designed: $8,577,000

Total Cost Savings: $779,000

Return on Investment
15.7:1 (Savings divided by VE Study Cost)

John Robinson is office manager/senior VE project manager at KCM, Inc., Blue Springs, Missouri. He is a faculty member in the APPA Institute special program on planning, design, and construction.

hired firms have no choice but to repeat a solution previously developed for a similar, but not identical, project—a solution selected without a full understanding of the current job. Such solutions are almost always less than optimal for the owner who hires them.

How is Value Engineering Applied?

A VE job plan is the systematic set of procedures that constitute a VE study. The key features separating the VE job plan from other techniques are the use of function analysis, the specific combination of activities, and the sequence of the activities. The plan includes three phases: preworkshop, workshop, and postworkshop. This is in accordance with recognized procedures and practices of the Society of American Value Engineers. SAVE is located at 60 Revere Drive, Suite 500, Northbrook, IL 60062; 708-480-1730.

Preworkshop

The preworkshop phase is used to coordinate and prepare for the workshop. During this phase, the following key items must be accomplished:

- The VE team is selected, assembled, and scheduled for their participation.
- Study documents are obtained from the designer and distributed to the team members to review prior to the workshop.
- Cost models are developed for the project.
- If the project is large and complex, it may be appropriate to conduct an organization or orientation meeting to identify project information needed and study constraints prior to the workshop.
- If there is not sufficient time in the workshop schedule for a site visit, one may be conducted during this phase of the study—possibly combined with an orientation meeting.

The Five Workshop Phases

While several VE job plans are described in current literature, I use a five-phase job plan that includes all the essential elements. Although described as distinct, these steps or phases are parts of a continuous process and may overlap. The essential elements are:

1. Information Phase (gathering and analysis of information)
2. Creative Phase (generation of alternatives)
3. Judgment Phase (evaluation of alternatives)
4. Development Phase (development of recommendations)
5. Presentation Phase (presentation of recommendations)

Information Phase

In the information phase the VE team uses owner and designer presentations, analysis of project costs, site visits, and function analysis to obtain a thorough understanding of the system, project, or item under study.

Key questions asked in this phase are:

- What is it?
- What does it do?
- What must it do?
- What does it cost?

Creative Phase

By creative techniques, scores of alternatives for accomplishing the basic functions of the project are discovered. Consideration of alternatives does not formally begin until the problem is thoroughly understood through the function analysis performed during the Information Phase.

The key question asked in this phase is:

- What else will perform the function?

Judgment Phase

The objective of this phase is to evaluate the alternatives generated during the Creative Phase to determine which ones offer the greatest potential for cost savings and project improvements. During the Creative Phase, there is a conscious effort to prohibit any evaluation of the ideas; but in this phase, alternatives must be evaluated.

Key questions asked during this phase are:

- What is the cost benefit to the project?
- How does it impact project quality?
- Will it perform the basic function?
- What is the likelihood of acceptance?
- What is the impact of redesign?

Development Phase

The objective of this phase is to develop final written recommendations for the alternatives selected during the Judgment Phase. The process involves not only detailed, technical, and eco-

nomic evaluation, but also consideration of successful implementation. The alternatives are investigated in sufficient depth to enable the development of specific recommendations for implementation.

Key questions asked during this phase are:

- Does the discussion clearly state the intent of the proposal?
- Would a sketch(es) help explain the idea?
- Would calculations help the reader of the proposal understand how it will work?
- Has a cost been identified for everything impacted by the proposal?
- Is a life-cycle cost analysis appropriate to show long-term owning and operating cost savings?

Presentation Phase

The objective of this final phase of the workshop is to present the results developed by the team to the decision makers. The intent is to convey the ideas of the VE team and provide clarification to the decision makers prior to their review of the study report.

Postworkshop

Implementation of the recommendations is essential to the success of a VE effort and therefore needs a well thought out plan. Too many times, good ideas are not implemented because there are no well defined procedures for ensuring that the persons responsible for incorporating the changes do so.

After the workshop is completed and the recommendations have been presented to the decision makers, a date is set for an implementation meeting. The purpose of this implementation meeting is to get all parties to agree on which recommendations will be incorporated into the project.

Following the implementation meeting, a final report is prepared and distributed. This action concludes the VE study.

Past, Present, and Future of VE

From the mid-1960s through the mid-1980s, value engineering developed a reputation as a technique to use when costs had to be cut. In my opinion, this was a result of many consultants jumping on the VE bandwagon when the federal government started applying it to capital projects. As a result, a lot of poor quality value engineering studies were conducted. While these studies often saved money, they often sacrificed quality and performance. This reputation, to some degree, still haunts the value engineering community today.

During the past ten years, there has been an increasing level of quality in the value engineering work being performed. Many "fly-by-nighters" have since withdrawn, leaving a more select group that recognizes the potential for VE beyond mere cost reduction. Most VE practitioners today recognize that long-term quality and performance is of much greater value than the initial capital savings.

I believe that in the future more major capital projects will require an objective third-party VE study. Owners are becoming wiser about the benefits of VE. As more people try VE, there is no doubt they will see the many benefits and continue applying it to their projects. For those not willing to try it voluntarily, it is just a matter of time before states begin mandating the use of value engineering on all major expenditures of state funds. Some states, such as Washington, Virginia, and Pennsylvania, already have such a requirement. The federal government is currently reviewing legislation that will mandate that VE be applied to 80 percent of its agencies' budgets to include projects, processes, and procedures to reduce government spending without sacrificing needed services.

As a facilities manager responsible for the prudent expenditure of your organization's facility funds, be proactive and try a VE study on one of your upcoming projects. When you do, make sure that whoever does it is qualified and experienced in doing VE studies. There is a certification administered by SAVE, called a Certified Value Specialist (CVS), to recognize individuals who are competent in the VE methodology. If you take precautions to make sure you get a valid VE study, you will maximize the value and function of your facilities. ■

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FIRE THE ARCHITECT!

The Conflicting PERSPECTIVES of Architects & Facilities Managers

by Michael Haggans, AIA

Dissatisfaction with architectural services is a concern to both APPA members and architectural professionals. At their worst, design professionals are characterized as prima donnas and higher education facilities managers as Draconian task masters. This article is based on the notion that unrealistic expectations are at the heart of this developing gulf. Currently a practicing architect and formerly a university facilities manager, I have been on both sides. My comments will probably upset both, but the objective is to promote understanding.

The university president wants the project done yesterday. The department chairperson is grumbling about the incompetence of your department. The cost of the project has gone sky high. The desired program isn't being provided. The efforts to reduce costs have led to a design that resembles a camel—a horse designed by a committee.

What should you do? Fire the architect!

Well, maybe you *can't* fire the architects, but you can blame them. And so it goes....

Almost as surely as the swallows return to Capistrano, facilities managers complain about architects who miss schedules, overrun budgets, and pursue design awards rather than provide quality service. For groups who do so much work together, why is this the case? This situation derives from unreasonable expectations on both sides.

And this is just a start. Any of these differences in expectations can trigger a cascade of additional difficulties, leading to the breakdown of communication and development of an adversarial relationship.

As a facilities manager and a practicing architect, I have been on both sides of the issues. In my experience, the critical items are:

- Authority
- Schedule and decisions
- Construction budgets
- Errors and omissions
- Fees

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The Architect May Expect	What The Architect May Get
clear direction	ambiguity, conflicting direction
instantaneous decisions	extensive collaboration
tightly defined scope	scope "creeps"
comfortable construction budgets	inadequate budgets
fair treatment	unreasonable contract provisions
profitable fees	an opportunity to invest in the project
quality design expectations	limited aspirations
What the Facilities Manager May Expect	**What the Facilities Manager May Get**
instantaneous service	nonchalance
adherence to limited budgets	budget busters
meeting schedule milestones	delays
comprehensive services	requests for additional services
perfect construction documents	errors and omissions
cost effective design	extravagances

Authority

When I am working with the president of a small college, I receive clear direction. My client is the president. When I am working with a large university bureaucracy, I am less sure, because there are so many different voices speaking at the same time. Each one may see himself or herself as the client.

The complexity of the typical higher education project is that the client is multifaceted. The user, owner, and funding authority are at least three different entities, and sometimes four or five. The facilities manager can avoid confusing the users and the architect by clarifying project authority and making it stick. With this information the architect, users, owner, and funding authority can work in a coordinated fashion.

Decisions and Schedule

Academic schedules often mean that occupancy after mid-August is not worth much. This is certainly the case for teaching facilities and residence halls. As higher education more closely emulates business, time is money. At the same time, colleges and universities are often bound by processes that require extensive board approvals. The time between the logical conclusion of a task and board approval can be more than two months. Such attitudes do not recognize the time value of money.

Architects and engineers are often criticized for not meeting deadlines; however, the most difficult group to schedule can frequently be the university's staff. With all of the standing meetings and other project work, there can be only a few hours a week that are available for moving the project forward. In the meantime, the clock is running and deadlines are approaching. It would probably be considered poor service to stop work while each issue is resolved. Occasionally, however, that would be actually providing the best service. Even though deadlines are missed, the cost of proceeding with uncertainty is often greater than delaying to resolve critical issues.

Once a decision is made, some facilities managers expect the architect to meet the original schedule. But a house that takes one person a year to build cannot be built by 365 people in one day. Likewise, a forty-hour task cannot be completed in one hour by forty people—even if the architect had the best forty people.

Facilities managers should not expect the impossible, yet they must be on the lookout for signs of trouble with the architect's schedule performance. Many architects have a tendency to underestimate time requirements *and to over commit*. Resulting delays can compromise the project and cause a host of problems for facilities managers.

Architects and facilities managers should work together to develop realistic project schedules. However, even the best schedule is dependent on continuity of project staff. Changes in key positions require time for getting up to speed. The same is true for the facilities manager. Too many changes on both sides often results in poor communication and missed schedules.

Construction Budgets

What is the problem here? Is it that architects are always over budget? Or is it that the user's program always expands, or that projects are always underfunded? There are three reasons that the experienced observer can answer yes to each of these questions.

1. Architects suffer from a disease: trying to satisfy all the user's requirements while producing design quality,
2. Users are trying to maximize their project scope, and
3. Budgets are fixed years prior to construction.

The symptoms of the architect's disease are attempts to satisfy the expanding needs of the user within a fixed budget or attempts to provide a luxurious solution on an economy budget. The user's interests are to get as much building as possible because they may never get another chance. The budget was set based on the limits of appropriations or other fund-raising expectations.

Some architects play into this situation by promising more than they can deliver and not being realistic about construction costs and the budget. Their *raison d'être* is to satisfy user expectations and have it look great. But user expectations always exceed the budget. This is particularly true when the value of the budget has been eroded by inflation, changes in codes, and additions to institutional requirements. This shouldn't be a revelation. The same applies to our own homes. Our aspirations always exceed our means. Life would be pretty dull without this problem.

Most contracts require the architect to redesign if the project comes in over the budget. This would not be so bad if everybody wasn't trying to get seven pounds of project in a five-pound budget.

Many factors beyond the architect's and owner's control can cause projects to be over budget; these include changes in market conditions. However, the usual suspects are continuing "scope creep" and overdesign.

Architects seem to be in the pursuit of design awards, or so it seems to some facilities managers. Schedule, budget, and function are sacrificed in an effort to make an architectural statement. In such cases, the wrong firm may have been hired. Unless there is compatibility between the design expectations of the owner and the architect, everyone will be disappointed.

Balancing the realities of the project is the task of the architect, user, and facilities manager. The user must moderate his or her expectations, the architect must respect the limitations of the budget, and the facilities manager must hold the line on both budget and scope.

Errors and Omissions

Many contracts expect the architect to be faultless. The fact is that they are not. At the same time, the facilities manager should expect complete, thorough, and coordinated construc-

tion documents without significant errors. Such documents result from experienced professionals with effective quality control procedures. In general, the value of errors and omissions change orders should be less than one percent of construction value.

Fast-tracked projects should have higher thresholds due to the consequence of later decisions on earlier actions. Each project is unique and contains varied conditions. In any case, the facilities manager who demands no change orders and no errors or omissions is relying on hope in lieu of experience.

Fees

Many facilities managers assume that architects are wealthy, and their attitudes about architects' fees come from this misunderstanding. Some architects are indeed very well paid, but for the most part architects are paid about as much as facilities managers in comparable levels of responsibility. Nor are profit margins such that architects can become investors in your projects. That is what is requested when facilities managers ask for services for free.

To make matters worse, architects and facilities managers value time differently. Time is generally undervalued in an institutional setting. For example, a project meeting might take two hours. If the architect has a staff of four at the meeting, it might cost between $300 and $500 per hour, not counting travel time. However, because of the difference in structure, the owner might have more than twice as many people at the meeting. The costs of staffing meetings are frequently overlooked or dismissed.

So why do architects do it? One reason is that they love what they do. Architects create something from nothing. They fill the blank page. A corollary of the architect's disease is the need to create and to be thankful to those who make it possible, however painfully. This is the dilemma of the architect. For each new relationship is a new marriage; a new chance for the right match between ideal and reality.

In the final analysis, the issue of fees is service. The owner needs to be prepared to pay for the level of service they want, and the architect needs to provide that service. When this equation is not in balance, both the owner and the architect may feel they have been abused.

If you still want to fire your architect, here are a few dos and don'ts for working with the new firm:

DO establish an adequate construction budget
Base your budget on recent comparable experience and estimates before the project starts. Require estimates at the mid-point and end of schematic design, design development, and construction documents.

DO communicate effectively
E-mail, fax machines, and detailed meeting notes are keys to effective communication.

DO develop a complete program
Net square feet, adjacency diagrams, narrative description of project goals and expectations, and other salient project characteristics should be included. Without this information, you are crossing the wilderness without a map.

DO have a realistic schedule
If, in order to open the facility on time, it will be necessary for everything to go right, start your contingency planning *now*, because Murphy lives.

DO hire a firm with a compatible attitude about design
If cost and function are the key elements of the project, hire a firm with a track record for cost control with detailed knowledge of the building type. If you are looking for campus identity and image, a more design-oriented firm may be required. Such a firm will challenge preconceived notions and stretch the envelope. In any activity, clarity of expectation will avoid confusion and conflict.

DO resolve conflicts about resource allocation
Using the architect to resolve resource issues beats up the architect, confuses the users, and destroys communications. This can only be detrimental to the progress of the project.

DO guard against scope creep
Make it clear to all concerned that additions to the project must be matched by deletions of equal value.

DO think ahead
Contingency, contingency, contingency. Always work on the options. With each decision eliminated, some options are eliminated and others are created.

DO deliver bad news in a timely fashion
In an environment where messengers are shot, many facilities managers are tempted to use the architect as the fall guy. Bad news will not smell better with age. The sooner and more directly it is dealt with, the better.

DO NOT rely on the clairvoyance of the architect
Architects aren't nearly as smart as you might think. In particular, they do not know your institution as well as you. As a consequence, the architect will probably guess wrong in figuring out how to deal with the politics of your institution. This is in *your* job description under "other duties as required or assigned."

DO NOT promise project delivery when you do not control all of the variables
Without control over weather, product deliveries, labor shortages, bureaucratic processes, decision making, and the architect's production schedule, you will be hard pressed to deliver on the promise.

DO NOT let the architect get away with sloppy work
Just because it is a tough business and you beat them down on fee, you shouldn't accept shoddy or incomplete work. Make your quantitative and qualitative expectations known.

DO NOT expect perfection
Change orders, errors, and omissions are a part of life. Even the best project will have some. If you expect perfection you will always be disappointed. The key is to minimize their impact on the project.

DO NOT expect architects to respond to increasing scope without additional fee
This is part of being fair. You don't expect those you supervise to work for free. Why should you expect that from an architect or engineer? Or do you expect them to lose a little bit on every project and make it up in volume?

Conclusion

Just as there must be a balance between program and budget, there must be a balance between the expectations of the facilities manager and the architect. When this is achieved, fewer facilities managers will feel like firing their architects and fewer architects will be worthy of firing. ■

Mediation: Make Buildings, Not War

by Duane J. Fox

Illustration by Sarah Sloane

"Help!" implored my client, Paul Project Owner.

"What's the problem?" I asked.

"Litigation costs are killing me," he moaned. "Every time I disagree with an architect or contractor, we end up in court. Now, don't get me wrong. I'm not one to back down from a fight. But the cost of this litigation is killing me, to say nothing about the time and energy we spend on it. We want to make buildings, not war!"

"Well," I responded, "construction project disagreements are not going to go away. Indeed, the likelihood of disputes is greater now than ever. You must accept disagreements as an inevitable part of the construction process."

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Paul was not satisfied. "I know that," he complained. "It's the cost that is driving me up the wall. There must be a better way to deal with these problems."

"Interesting you should say that," I cautiously replied. "A process used by many of my clients may be just what you need. It's called 'mediation,' and it has proven successful in the construction industry."

I was being cautious because some owners consider it a sign of weakness for a lawyer to use the word "settle" as a means of lowering dispute resolution costs. Others overreact and settle everything, developing a reputation as an "easy touch." I wasn't sure where Paul was coming from, so I approached his concerns gingerly.

"Mediation?" Paul's skepticism was palpable. "Isn't that where you have a full-blown trial, except you use arbitrators

instead of a judge or jury? I did that once and it cost me an arm and a leg. And what did I get? The arbitrators split the baby. Some victory. It was like kissing your sister."

"No," I responded, "that isn't mediation, that's arbitration. They are very different. Binding arbitration is simply an alternative to trial. The parties obtain a binding decision from the arbitrators after a full hearing, much as they would before a judge or jury. It has some advantages, such as having a decision maker who understands the industry and sometimes being less costly than trying the dispute before a judge or jury. It has its disadvantages, too, but that's a lesson for another day."

"So what in the world is 'mediation'?" Paul was getting impatient.

"Mediation is nothing more than organized and concentrated settlement discussions, facilitated by a professional mediator," I answered.

"Mediation is nothing more than organized and concentrated settlement discussions, facilitated by a professional mediator."

As I suspected, Paul was getting nervous about this whole subject.

"Baloney," he blurted. "If I want to settle a dispute, I'll just call the jerk and tell him how much I'll take, or how much I'll give. If he doesn't like it, he can just sue me, or I'll sue him. I don't need a fancy 'mediator' to help me settle my disputes."

"Well," I told Paul, "you can do it that way, but that doesn't resolve your complaint about high legal fees. Often that approach causes endless and costly litigation. Mediation is a vehicle to break that endless and costly cycle. Perhaps I can best explain its effectiveness by describing the mediation process."

Paul didn't appear impressed. Nonetheless, I forged courageously forward.

"You see," I said to him, "there is a point in all disputes where the parties have sufficient information to arrive at the settlement value of the dispute. It may be before a lawsuit is filed, or it may not be until after a lawsuit is filed. Sometimes it is not until after depositions of key witnesses, or until expert witnesses have provided detailed reports and had their depositions taken. In some cases your opponent must be deposed to see just how he or she will hold up under cross examination."

"Also, history teaches us that difficult disputes resolve best through the assistance of a skillful neutral third party mediator. This has been done for decades in the labor/management disputes."

"Finally," I told Paul, "as you know, the reason most disputes do not settle is that the decision makers do not clearly communicate. You are the decision maker, not your lawyer."

Suddenly a light came on in Paul's head. "You're right," he said. "I usually feel that if I could just sit the other guy down long enough to get his attention, we could settle this and avoid a lot of legal fees. But it never seems to happen."

"That's because people do not take the settlement process seriously enough," I said. "That is where mediation comes in."

I then explained to Paul how the process works. I explained how the mediator sets up the mediation session and insists that the lawyer bring the decision maker to the session. It must be someone with authority to pay the maximum reasonable exposure amount without first checking with somebody higher in the company.

"Great," Paul said, "that's what we need. Get the two of us in a room and let us shoot it out."

"No, no, no," I responded. "That is just what mediation does *not* do. The session starts with each side presenting its best case to the other side through the attorneys. The decision makers are encouraged to ask questions. The mediator may ask questions. The persuasion is directed to the other side, however, not the mediator. The goal is to convince the other side of the correctness of your position."

"Well, that sounds like closing statement in a trial or arbitration," Paul observed.

"It is," I replied. "But instead of trying to convince the judge, jury, or arbitrator, you are trying to convince the other side. At the same time, the other side can evaluate just how convincing your case will be to a jury, judge, or arbitrator. That, of course, is the real test of the strength of your case."

"That's all I need to evaluate the settlement value of the claim, isn't it?" Paul asked. "We should be able to settle it then, shouldn't we?"

"Well, not quite," I replied. "The other side needs to agree with you. As they say in the movies, 'It takes two to tango.' Which is where the mediator comes in."

With that I explained to Paul how the mediator then places each party in a separate "caucus" room and meets with one at a time, going back and forth between the rooms in shuttle-style diplomacy. I explained how the mediator conveys one side's offer to the other, how the mediator explains the reasoning behind the offer, and points out what the other side considers its strengths. We discussed how the mediator helps the parties objectively evaluate their weaknesses, and how the mediator obtains a counter offer and takes that back to the other side, thus continuing the process until achieving a mutually acceptable number or discovering that the two sides can only agree to try or arbitrate the dispute.

"Does it work?" Paul asked, warming to the subject.

"Indeed it does," I replied. "Mediation has proven to be the most cost-effective way to avoid the tremendous expense of carrying disputes to trial. Although statistics vary, it is safe to say that over 80 percent of the mediations result in settlement."

Paul seemed impressed. I had learned through years of dealing with Paul that one of his strengths is his ability to respond to new situations and information. He didn't let me down.

"Well," he pondered aloud, "maybe we should set up a strategy to get that parking building dispute into mediation as soon as possible. Why don't you give me a call after you have thought that through, and we can decide how to resolve that problem through mediation." ■

An Inside Job:

Forming In-House Design and Construction Units and Making Them Work

by Ronald F. LaPorte and Greg J. Watts

Downsize, consolidate, outsource. These terms have most facilities managers thinking they need to make their department leaner, meaner, and...smaller. Certainly, taking a close look at staffing, resources, and level of service is an intelligent undertaking in any organization. But maximizing resources may not involve cutting staff, eliminating units, and stripping down services. In fact, facilities operations may benefit by adding services—in this case, in-house design and construction units.

Most facilities departments have some employees performing design and construction functions—perhaps a drafting group and a crew of painters, carpenters, and masons who operate within the maintenance unit. These groups usually are funded from the facilities department's general operating budget and are often considered part of the "overhead."

Several problems develop with this model of in-house design and construction units. First, fixed funding often means lower salaries and, thus, the units have a difficult time attracting and keeping qualified staff—especially in the design group. Second, fixed funding affects employee motivation; there is less incentive for high productivity. Finally, when construction work is incorporated into the maintenance department, money that was earmarked for maintenance is too often diverted into renovations and remodelings.

The in-house design and construction units described in this article are quite different from the above model. These units do not operate from general operating funds, but are fully recharged. These units employ highly qualified, professional staff such as licensed architects and engineers, interior designers, electricians, and mechanical systems specialists. As recharge-funded units, they compete for clients with other businesses in the local market. Being part of the competitive market means that the units must offer superior customer service, make continuous process improvements, and enforce a higher accountability for productivity and expenses. These in-house units are, in fact, small businesses unto themselves with market niches, specialized expertise, and productivity requirements.

Since the 1980s, Campus Facilities at the University of Missouri-Columbia has had its own in-house design and construction units. Over the last decade and a half, these units have grown in size and experience. The design unit currently has twenty-two full-time employees including engineers, architects, and interior designers. The construction unit has sixty-nine full-time employees including many individuals in the skilled trades or with specialized certifications. Last year, design work totalled over $9 million including projects built by both the in- house construction unit and construction contractors. During the same year, in-house construction projects totalled $3.9 million.

To put these numbers in perspective, the University of Missouri-Columbia (MU) has an enrollment of 22,175 students and occupies over 11 million gross square feet on 1,348 acres. Campus Facilities provides service in utilities, custodial work, grounds, and maintenance as well as planning, design, and construction.

Colleges and universities do not have to be as large as MU to support in-house design and construction units. The success of in-house units is not tied to university size, but to their ability to provide university clients with professional expertise, university experience, lower prices, and higher quality. Facilities managers at almost any size institution can achieve similar results to MU and can develop in-house units specific to their needs.

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IN-HOUSE DESIGN AND CONSTRUCTION UNITS: THE ADVANTAGES

Superior Service and Quality

In-house design and construction units can provide a higher level of service and quality to university clients due to their familiarity with the campus, experience with campus projects, accessibility, and university ties.

In-house design personnel create better designs due to their knowledge of campus buildings and university standards. Construction crews have experience from similar campus projects, and they know campus idiosyncrasies.

In-house units can be more responsive and focused than outside providers. They have a singular goal—to meet the unique needs of university clients. They can keep in touch with clients to anticipate how their needs may change in the future. In-house staff also share the same overall mission as their clients—the mission of the university. With a shared mission, the two parties don't have competing goals. They communicate more effectively and achieve an educationally tailored product.

Located right on campus, in-house design and construction units are easily accessible to clients. If clients have concerns, in-house staff are on-hand to address those concerns immediately. Contractors or consultants may be several miles or even several states away.

Finally, as university employees, in-house design and construction staff have internal incentives to produce quality work. They feel loyalty to the university. After all, this is where they work, where their coworkers work, and, perhaps, where their family members and friends work or attend college.

More Flexibility

A particularly significant advantage with in-house design and construction units is their flexibility. With in-house staff, emergency or high-priority projects can get immediate action. The ability to change priorities and shift resources at a moment's notice provides the university with problem-solving capabilities and a quick-response team at almost no cost. Outside consultants usually charge substantially more for expedited work or are unable to shift priorities because they have other contract commitments.

Shorter Schedule

The use of in-house services can significantly shorten the time needed for a project's design and construction. On the design side, the contractual time needed to hire an outside consultant is eliminated, and, if in-house construction is being used, fewer drawings are needed to communicate the design requirements.

At MU, many projects are completed using the "design-build" process. This process allows construction to proceed while the designers complete final plans. Approximately 40 percent of MU's in-house construction projects are completed with no designs. These projects, of course, save the most time because work can begin as soon as materials and equipment are received.

It is important to mention that the shorter schedule option is of special value on college campuses where projects often must be completed during a restrictive construction window tied to the academic calendar.

Lower Cost

When properly managed, in-house design and construction units cost less than outside firms. As noted above, in-house staff are more familiar with campus buildings and standards, require fewer design drawings, and spend less time on the project.

The profit motive also is limited with in-house units. Unlike outside firms, in-house units are just trying to cover expenses and retain the workforce. Any "profits" are invested back into the unit for better equipment or more training.

Designing projects in-house reduces the number of change orders by 50 percent or more. Similarly, due to their intimate knowledge of campus facilities and their close working relationship with the design unit, in-house construction crews rarely require change orders on their projects. Fewer change orders translates into less or no contingency costs built into the project budget.

At MU, design costs are at least 10 percent lower than those of outside consultants. Project costs are 20 to 25 percent less when constructed in-house.

Establishing and Managing In-House Services

Establishing and managing in-house design and construction units is not unlike starting up an independent architectural firm or construction company. Facilities managers need to consider factors such as the market, personnel requirements, equipment needs, and accounting procedures as well as university policies. Each facilities department will face different challenges in setting up and managing in-house services, but some general guidelines and suggestions can be proposed.

FORMING AN EFFECTIVE IN-HOUSE UNIT

Finding A Niche

The first step in developing an effective in-house design or construction unit is identifying its niche. To benefit the university, the in-house design or construction unit must be able to provide its services more cost-effectively than outside consultants or contractors.

At MU, the design unit's niche includes projects that cost $500,000 or less (construction cost). The majority of their projects cost $100,000 or less (construction cost). In this range, the project startup and design costs for an outside consultant are usually exorbitant and unappealing to university clients. Typical projects in the in-house unit's niche are small to medium renovation projects such as office suites, labs, and classrooms, and some larger projects such as roof or mechanical replacements in a particular building.

The MU construction unit's niche includes projects that cost $50,000 or less. Typical projects in their niche are small to medium renovation projects, painting, and sidewalk repairs.

In this range, contractors have limited interest in bidding projects due to insurance and bonding requirements. In addition, the university has disproportionate costs in administration and inspection of the contractor's work.

Organizing and Rightsizing

Once the niche is determined, the unit must be organized and sized to provide those services. The unit's structure should reflect the type of work anticipated, and the unit should be staffed where it is most cost-effective. The design unit, for example, may need six mechanical engineers and one interior designer or vice versa. Careful attention should be paid to hiring professional, qualified staff because the unit's reputation and survival will depend on it. Skimping on qualified staff also leads to higher costs due to higher incidents of design errors and omissions.

If other departments or outside consultants have stronger capabilities in a particular area, in-house units should not develop these areas. At MU, the grounds department is staffed with landscape designers and, therefore, these positions are not staffed in the design unit.

In-house units must regularly evaluate their services so that less-used services are discarded and new services are added. With the enactment of the Americans with Disabilities Act and the building renovations required for university compliance, the MU design unit had a substantial market for small projects typical of its niche, but the unit needed to develop staff expertise in this area. Certain staff members were targeted to receive specialized ADA training, and overall staffing for ADA work was increased.

In the past few years, the construction unit at MU has added services in coal tar sealing of parking lots, electrostatic painting, and removal of asbestos floor tile because staff noticed increased client interest in these services. Facilities managers who are establishing new in- house units should be prepared for some tension between wanting to meet all of clients' needs and being required to justify the cost of infrequent services.

Unit size should be determined by the anticipated project workload. It is recommended that the unit be slightly undersized to account for slow periods rather than being sized to accommodate the peak workload.

Billing Rates

Effective in-house design and construction units are set up as recharge operations. Thus, the unit's entire budget—employee salaries, supervisor salaries, employee benefits, overhead, equipment, equipment depreciation—must be recovered in client billings. As a general guideline, billing rates should cover annual expenses with a minimal profit margin—1 to 2 percent—to keep the department viable and allow for some investment back into equipment and training. If the unit is earning more than a marginal profit, then serious consideration must be given to a rate reduction.

Motivating In-House Employees

It is critical that employees in a recharge operation maintain high productivity levels. A first step toward motivating in-house employees is to develop their understanding of how the recharge operation works. They must understand that their time is charged either to the client or to lost time and that effective use of their time is essential to the unit's success. In more blunt terms, as with employees of a private enterprise, they should know that they will lose their jobs if the unit cannot compete in the marketplace.

A byproduct of understanding the recharge operation is the employees' realization that any profits earned by the unit will benefit them in terms of job security, additional training, new equipment, and specialized tools. Employees are extremely interested in the quality of their work environments, current technology, and additional training. Even in this limited form, "profits" can serve as a very real incentive for them.

Another motivator, one that has been particularly successful in MU's construction unit, is employee empower-

ment. The construction unit modified its management approach to give more responsibility to its employees. First of all, the supervisor position has been replaced with a coordinator position, which oversees a group of projects, not a group of employees. Then, for each project, a tradesperson is selected as the project lead. The project lead oversees all on-site construction activities and is paid extra for the duration of the project. Recognizing the expertise of individual employees (by selecting them as project lead) and giving them control over the projects increases their interest in the work and often reduces the time to completion.

MANAGING IN-HOUSE PROJECTS

Identifying Scope

Design services can begin only after the scope of a project has been clearly identified. It is essential to put in writing what services will be provided and what fees will be charged for those services. This written description of the project scope benefits both the client and the in-house service provider. Clients are not surprised at the end of their projects with a higher cost or longer timeline than they expected. In-house providers have some insurance that they will not have to absorb the costs of additional work requested by the client during the project. If the scope of a project does change, in-house providers should notify their clients immediately and discuss how the change in scope will impact the project budget and schedule.

Developing Fee Proposals and Bids

After the project scope has been determined, the unit can develop its fee proposal/bid to submit to the client. Projects should not be started without development and approval of a fee. Without a fee proposal, there is no agreement between the client and the unit on scope and cost. Proposals are calculated using hourly breakdowns of appropriate staff at their billing rates plus the costs for any materials and other miscellaneous expenses.

There are several options for proposal terms. In the MU design unit, the proposal can reflect a fixed fee, percentage fee, an hourly rate with a maximum limit, or an hourly rate without a maximum limit. If the proposal uses a fixed fee, for example, the client will pay exactly that amount whether the unit spends more or less on the project.

The MU construction unit has similar options for fee proposal/bid terms: clients can request a lump sum firm bid, time and materials, or time and materials not to exceed a specified amount. Approximately 60 percent of clients choose the lump sum firm bid. An addition to the construction unit's terms is the bid refusal clause. If a client rejects the in-house bid and seeks bids from outside contractors, that client cannot come back to the in-house bid if the outside bids aren't satisfactory. This policy protects the bidding market from unfair competition from in-house bidding.

The design and construction units both issue warranties on their work.

Monitoring the Project

A computerized project monitoring system is an essential tool to assess the progress of the work and the financial status of the project. The system should be updated daily and should track hours of employee labor, any funds spent on materials, and other costs for both design and construction.

Design and construction project leaders should access the system regularly to check costs and productivity and make necessary adjustments to keep the project on track. The project monitoring system also serves as an excellent client relations tool because clients can call at any time and be given an update on their project's cost and schedule.

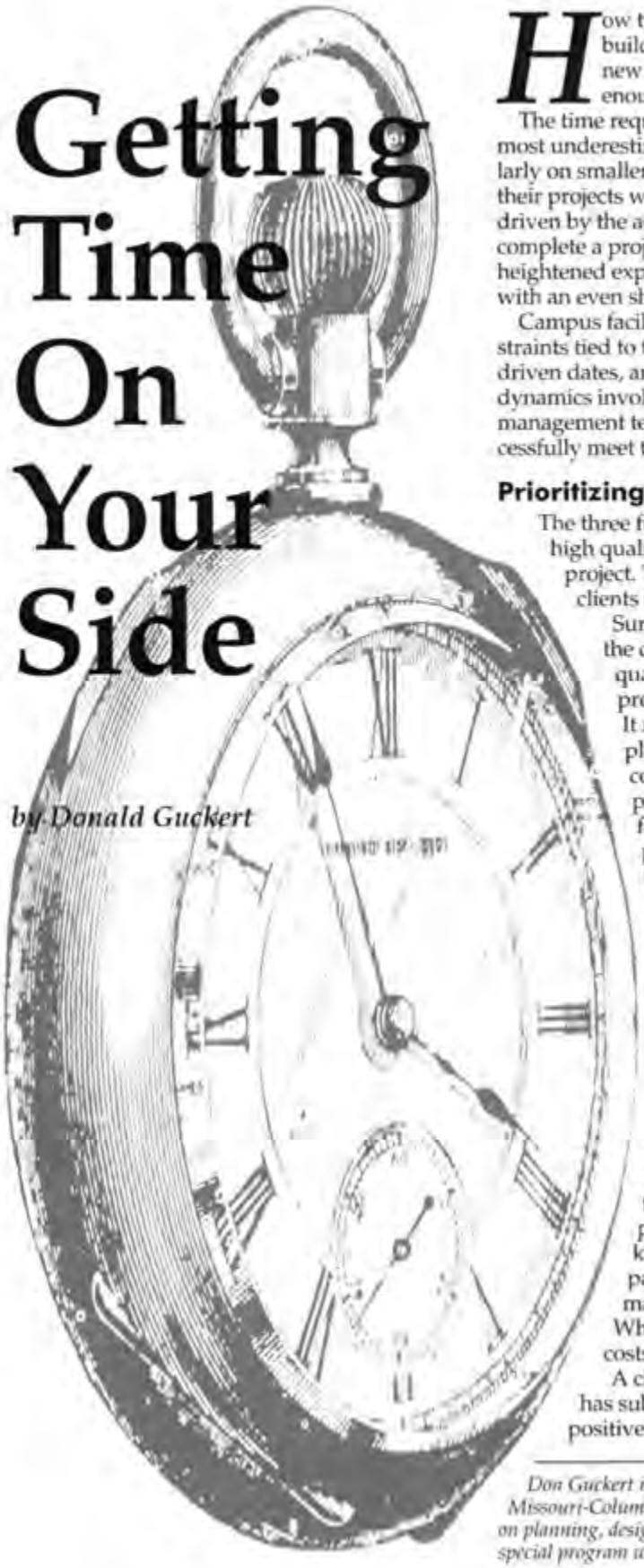
SUMMARY

When in-house design and construction units are formed and managed well, campus clients benefit from better service and quality, more flexibility, a shorter schedule, and a lower cost for their projects. Over time, in-house units will continually refine and improve their services. With each project, they enhance their understanding of client needs and learn new and better methods for meeting those needs. In-house staff and the campus clients get to know one another from different projects, and better communication leads to better projects.

The facilities operation itself becomes more responsive and forward-thinking. With the presence of in-house design and construction units, all facilities functions can be conceptualized and conducted together. Higher quality design and construction projects cause fewer problems to the other facilities units. Overall, the campus operates more smoothly, and the facilities meet educational needs more accurately. A facilities operation that maximizes its resources in this way will be leaner, meaner, and...smarter. ■

Getting Time On Your Side

by Donald Guckert



How typical is it at your campus to have plenty of time to design and build projects? How often are your clients in no hurry to occupy new facilities? Do your clients usually request their projects far enough in advance to meet their critical occupancy goals?

The time required to design and construct a campus project is perhaps the most underestimated aspect of facilities work. It is all too common, particularly on smaller projects and renovations, for campus clients to approach their projects with unrealistic time expectations and a critical completion date driven by the academic calendar. Even when facilities managers are able to complete a project on an extremely tight schedule, their reward is often heightened expectations from other clients who want their project completed with an even shorter turnaround time.

Campus facilities managers must learn how to handle these schedule constraints tied to the realities of funding cycles, research grants, academically driven dates, and other issues unique to a college campus. Understanding the dynamics involved with project schedules and taking advantage of time management techniques can help design and construction professionals successfully meet these tough schedules.

Prioritizing Project Goals

The three fundamental goals of any campus project are: 1) low cost, 2) high quality, 3) short time. These goals vary in importance with each project. The three goals often conflict with each other, and campus clients need to prioritize these goals for their own project.

Sure, everyone wants low cost, but at the expense of quality? Is the completion date more important than cost? Do we have adequate time allotted to ensure good quality? Early in the planning process, clients should be encouraged to consider their priorities. It may be more important for the campus bookstore to be completed by fall semester, for example, than to have the project cost 15 percent less or to have meticulous workmanship. The prioritizing of goals should be conducted by the client, not the facilities manager. Instead, the facilities manager's role is to point out the dynamics between the three goals of cost, quality, and time.

Compressing a project schedule too much usually diminishes quality and/or increases cost. Pushing the design professional with an aggressive time table can result in a poor set of design documents due to a lack of time for careful preparation and review. Likewise, pushing the contractor to complete a project at a break-neck pace usually makes quality the casualty. It is an unfortunate fact that contractors often find cutting corners is their only option when forced to meet a tight schedule.

Like quality, cost can suffer when schedules are tight. In bidding the project, contractors may realize that the only way to meet the schedule is to work premium time. This premium time could involve longer work weeks, double shifts, or spot premium time. Working beyond the normal forty-hour week kicks in overtime pay; double shifts may incur shift differential pay; and both approaches yield productivity losses. Contractors may also pay premiums for expedited material and equipment. When contractors have to adjust their bids for these additional costs, campus clients end up paying for them.

A client who requests a project without sufficient time allotted has subordinated the cost and quality goals to time. However, on the positive side, if projects are given a sufficient amount of time in the

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design and construction phases, quality and cost can be optimized. It is the responsibility of facilities managers to educate their clients about the substantial benefits of submitting timely project requests.

Convincing clients to submit project requests with sufficient time for design and construction is a critical first step. However, facilities managers then must meet the challenge of successfully managing the time that clients have provided.

Building the Pyramid: Decisions and Design

The four basic phases of project design are: 1) programming, 2) schematic design, 3) design development, and 4) construction documents. It is helpful to think of these four phases as building blocks in a pyramid.

Programming: All of the programming decisions stand at the base of the pyramid. In this phase, the client's program needs are analyzed and described.

Schematic design: The design team then works with the client to develop a general project layout based on their programming needs. This project layout, called a schematic design, comprises the next few blocks in the pyramid.

Design development: Design development decisions—such as the level of interior finishes and types of mechanical systems—build on the schematic design. Design development is the third tier of the pyramid.

Construction documents: Finally, at the peak of the pyramid, decisions are made on all remaining details necessary to describe the project to the bidding market.

The pyramid analogy helps to delineate the discrete phases of project design. It also illustrates the problems that occur when a decision in an early design phase is reviewed in a later phase. For example, a client may decide late in a project to change Rooms 103 and 104 from two offices to a conference room. They see this decision as a simple erasure of a line on a drawing. For the design professional, if the "erasure of the line" is made during the design development or construction document phase, it may mean lighting alterations, changes in the ventilation requirements, relocation of utility chases, elimination of a door, reconfiguration of windows, addition of casework, and so on. To return to the pyramid analogy, the pyramid is dismantled all the way back to the programming level and then rebuilt.

Clients tend to look at the design process as a flexible, open period where everything is still on paper and changes can be made at any time. Facilities managers need to inform clients why changes made late in the design process, such as converting two offices into a conference room, can cause design delays, increase costs, and have a serious impact on their overall schedule.

Scope creep is another common phenomenon of campus projects that can negatively affect the schedule. Scope creep also forces the dismantling of the decision pyramid, but with the added impact of more work to be designed and constructed. The schedule rarely is adjusted to match the increased scope because, as the name implies, the scope "creeps" up on the design team without them realizing the need for a corresponding schedule creep.

Design changes and scope creep are not the only reasons for design delays. The failure to make timely decisions can have an equally devastating impact on the schedule.

The culture of a college and university is one where most decisions are made by consensus. All constituents are invited to be heard and represented if the decision affects them. Unlike corporations, where authority to make decisions is sharply focused on a particular management representative, universities rarely give decision authority to one individual. Instead, several layers of decision makers are involved with a campus project. While the "consensus decision" culture may work well with many issues confronting a university, it can be the death knell of a project schedule if not properly managed.

Outside design firms that are unaccustomed to working with institutional clients always underestimate the time required to complete a campus design project. Consequently, the A/Es (architects/engineers) find themselves falling behind schedule and rushing through the construction document phase to meet the target advertisement date.

When a project is initiated, facilities managers should emphasize to campus decision makers, particularly the client, how delayed decisions will hold up the design process. A delayed decision that stops the construction of our imaginary pyramid is just as devastating as changes that dismantle the pyramid.

Keeping Construction On Track

Proper budgeting of time in the construction phase is critical to meeting a completion date. Usually construction schedules are set by a combination of the A/E's professional judgment and the owner's needs. Facilities managers should be aware of some inherent problems with construction schedules set in this manner.

It is all too common for a design team to become falsely optimistic about the construction schedule when time is running short due to design delays and a critical project

completion date is looming. In fact, there seems to be a strong correlation between A/Es who have fallen behind in meeting *their* deadlines and A/Es who feel a shortened construction schedule should pose no difficulties. The design team grows ever more optimistic that everything will work out once we get to construction. Besides, there is an assumption made by many facilities managers that contractors only work at the pace set by the schedule. If they are given too much time, they will never complete early. If they are given a challenging schedule, they will pace themselves accordingly to avoid the consequences of a delayed completion. While there may be some truth in this belief, applying it to the wrong set of schedule circumstances can lead to disaster.

Contractors should be consulted about the budgeted time for construction. Even in a public, open competitive environment, contractors who regularly bid an institution's work often are receptive to giving input on how much time should be allowed. Facilities managers should take advantage of this resource when setting schedules. Facilities managers may not like what they hear, but the contractor's input can serve as a reality check that might avoid problems later.

Time Management Strategies

What if the project is still short on time, and the residence hall renovation absolutely must be completed by fall semester? This wouldn't be much of an article if the answer was to simply tell the client that more time is needed, and they should wait until winter semester.

There are a number of contractual strategies that may be employed if the construction schedule is tight. The first strategy is to prequalify the contractors who will be allowed to bid the project. This is a very effective technique available to most private institutions but few public institutions.

Facilities managers should look to prequalify those contractors who have a solid track record on meeting demanding schedules. Prequalifying contractors who have done previous work for the institution or who have a comfortable working relationship with the university may not always be the best choice in a tight schedule situation. In the construction industry, as in all industries, there is a large variance of management skills between companies. Facilities managers should look for contractors who utilize critical path (CPM) scheduling, have a system for tracking shop drawings, select subcontractors and suppliers on the basis of time as well as cost, actively manage the work of subcontractors, expedite vendor shipments, and take decisive action when delays are detected.

Even public institutions that are restricted from prequalifying contractors can build many of these management attributes into the postqualification requirements of the contractor. Requiring the successful bidder to have CPM scheduling capabilities is not unreasonable, even for small projects. Additionally, requiring contractors to submit a schedule with their bids can force them to thoroughly consider the time allowed when putting together those bids.

Often, facilities managers must protect the institution from contractor management deficiencies—particularly in public bidding environments. It often has been stated that the low bidder is probably the one that made a mistake in putting together its bid. I would add, from a scheduling standpoint, that the low bidder is probably the one that is most unrealistic in how it will meet an aggressive schedule.

Owners faced with tight construction schedules will not want to award the contract to the contractor who bid a straight forty-hour work week. Consequently, owners should consider requiring, through the specifications, that contractors work double shifts during the project or require them to carry a premium time allowance in their budget. Often, a jump start on the project is all that is needed to get ahead of the schedule. If all is going well midway through the project, the owner can always relax the double shift requirement or take a credit for the unused premium time allowance.

Another possible strategy is to bid the project based on two different schedules. As discussed earlier, when time is constrained, project costs usually rise. Bidding a shorter schedule as an alternative will reveal how much the aggressive schedule is costing. This strategy works simply by bidding a reasonable schedule, such as winter semester completion, as the base bid. The aggressive completion date, such as fall semester, then is packaged as an alternate. If the client decides to allow more time in order to save money, the decision is made on firm dollars. If the client decides to opt for an earlier completion, it demonstrates to the contractor that the owner is resolved to pay for and thus enforce the earlier completion date.

Restrictive Construction Windows

Construction windows, such as spring break or summer break, are targeted for many campus projects. Summer break in particular is a period of high construction activity on college campuses. Summer break is also the time allotted for renovations or repairs to facilities that must remain in operation during the rest of the year.

The key to successfully utilizing such construction windows is to build sufficient lead time into the schedule. Many renovation projects can be completed within a period of ten to twelve weeks of on-site construction if all equipment and materials are delivered on time. The design consultant should verify that all specified products critical to the schedule are, in fact, available in the time frame required.

Timely delivery of materials and equipment is a function of shop drawing approval and manufacturing and delivery time—both of which are common causes of construction delays. Consequently, for a project with a summer construction window, the likelihood of meeting a set completion date is increased if the contract is awarded in January or February instead of April or May.

Schedule Incentive Clauses

Even with the scheduling techniques and technology available to them, contractors often lack the motivation to use these time-saving tools. Schedule incentive clauses can provide a monetary incentive for a timely project completion. The most common incentive clauses assess a damage or a penalty on the contractor for a delayed project completion.

Actual damage clause: One type of contractual incentive is an actual damage clause. Under the actual damage clause, the contractor is responsible for reimbursing the owner for all damages actually incurred as a result of a delayed completion. Damages of this nature could include the consequential cost of housing students in temporary facilities, lost bookstore revenue, and increased administrative costs in managing a delayed project. However, actual damages can be difficult to

collect because of disputes with the contractor as to whether or not the university really was damaged and to what extent. It is particularly difficult to determine the damages incurred when a classroom or auditorium is not ready for the first day of classes. It also should be noted that most construction firms do not like actual damage clauses because they impose an open-ended risk.

Liquidated damage clause: A liquidated damage clause may be used in lieu of an open-ended actual damage clause. The term "liquidated" merely signifies that the precise amount of daily damages has been established by contractual agreement. An advantage of the liquidated damage clause is the avoidance of future litigation between the owner and contractor over the valuation of damages.

Contractors generally prefer a liquidated damage clause because it reduces the likelihood of disputes with the owner over monetary damages if the project is delayed. However, setting a "daily damages" amount may backfire on the owner if a contractor bids the project figuring in the daily damages and "planning for" a late completion date. Even after figuring in the damages, the contractor may be able to underbid the competition because it does not have to pay the acceleration costs for meet the challenging deadline.

Across the industry, liquidated damages typically range from a few hundred to several thousand dollars per calendar day. The amount set for damages are legally enforceable, provided they are a reasonable forecast of the actual damages the owner would be expected to suffer in the event of a late completion. In court cases where it has been proven that the amount was arbitrary, excessive, or unreasonable, the courts have found that the damages constituted a penalty and thus have ruled the liquidated damage clause unenforceable. Therefore, it is important to validate the prescribed liquidated damages by developing and documenting a sound and fair basis for the determination of damages.

Finally, in several cases, the courts have ruled that the owner need not actually realize damages upon the late completion of a project in order to collect liquidated damages. Just a reasonable anticipation of damages at the time of bidding is necessary to mutually bind the contracting parties. Similarly, if the owner suffers real damages for delay in excess of the prescribed damages, the owner is limited to the stipulated damages only.

Bonus/penalty clause: Another third type of incentive clause is known as a bonus/penalty clause. Although the liquidated damage clause and bonus/penalty clause sometimes are used interchangeably, there is a definite legal distinction between the two. Two of the major differences are as follows:

1. Unlike liquidated damages, a bonus/penalty clause does not have to be a reasonable projection of damages (or benefits) realized by the owner for late (or early) completion.
2. If a penalty is stated, then an offsetting bonus needs to be specified as well.

It should be noted that there is a major pitfall in using bonus/penalty clauses. Many contractors have argued successfully that they were denied the opportunity to earn their bonus because of delayed decisions or actions, including change orders, on the part of the owner. Bonus/penalty projects can be documentation nightmares for the owner, where every decision or change order generates a corresponding request for a time extension. Thus, the use of bonus/penalty clauses should be limited to special cases with extremely well-crafted specifications.

The goal of a schedule incentive clause is not to collect the damages. Instead, the goal is a project completed on time. As creative and thorough as facilities managers may be with contractual clauses, nothing can substitute for competent management of the time resource. While time management lies primarily with contractors, owners need to stay on top of the schedule and use the contractual tools available to them as schedule delays arise.

Schedule Management

Early detection and reaction to delays is the key to meeting a project schedule, and the owner should require the contractor to take immediate action to compensate for delayed activities. This may involve adding additional workers, working overtime, and expediting critical deliveries. The contractors, not unlike the design team, tend to be falsely optimistic as time runs short. Falling into the trap of believing the contractor's assertion that there is enough time in the schedule to compensate for early delays has left many owners with a late project. Since each delay can lead to other delays, it is imperative to correct or compensate for delays as soon as they occur.

Finally, even the best management strategies and practices cannot protect against unforeseen delays outside the contractor's control, such as abnormal weather and owner-caused delays. Building in a time buffer between the contractor's completion date and the required occupancy date can help protect against such delays.

Summary

Facilities managers can avoid many problems related to schedule compression by following these guidelines:

- Educate the campus client on the benefits of adequate lead time in requesting projects.
- Prioritize the project goals of cost, quality, and time.
- Recognize the discrete phases of the design process and manage the decision-making process accordingly.
- Utilize contractual strategies as inducements and incentives for the contractor to meet the project schedule.
- Act immediately when delays occur during design and construction.

One final thought about time: unlike wine, bad news gets worse with time. If a major change occurs during project design that affects the schedule, facilities managers should mention it to the client and/or administration then and there. They should link the cause (the changed program) to the effect (a delayed completion) and adjust the schedule now instead of trying to justify later why there were few bidders, higher construction bids, and/or a late construction completion.

Faced with the choice of announcing during the design phase that the auditorium will not be renovated in time for fall semester or waiting until August when the contractor is expecting a late shipment of auditorium seating, facilities managers should step up to the more responsible choice. In the college environment, while the former is painful and difficult, the latter is unacceptable. ■

Information Access

Diana L. Tringali

Welcome to APPANet!

We're here—APPA enters cyberspace establishing an on-line presence. Previewing now is APPA's initial phase of on-line service options. Over the next few months we will be adding on, refining, and exploring new service options. As you access APPANet, we welcome your comments and suggestions. Your feedback will help us to refine the ease of access, as well as explore other services you would like to have access to.

Current surveys show that more than 70 percent of colleges and universities have access to the Internet. If your department does not have Internet access, contact your campus MIS department to establish an account. For those institutions that do not have Internet access, there are a proliferation of commercial providers such as America Online, Compuserve, and Prodigy that provide Internet access. Although commercial providers do have limitations on Internet access, most of these systems are moving toward offering a full range of service options. Access through these commercial providers can be done relatively inexpensively. Check for local telephone access and the hourly charges included in the package.

APPA is collecting the Internet addresses for all members. Please send us your address. One on-line service feature will be an electronic address listing for all members.

Tool Box

The Internet offers many tools for building a set of systems to provide services to APPA members. These include e-mail, FTP (file transfer protocol), gopher, and World Wide Web. These tools allow APPA to increase communication with each member as well as to provide enhanced communication routes between members.

Available right now are e-mail services and the introduction of a web server. While some services are "under construction," we plan to build the basic framework over the next six months. Keep watching *Inside APPA*, this column, and the on-line site itself for details on new service options.

The most popular and used function of the Internet is e-mail, or electronic mail. E-mail allows individuals to send messages electronically to any other person hooked up to the Internet. In order to use e-mail you need an account or mailbox where you can send and receive mail, and you need a recipient's electronic address.

Electronic addresses have their own format; let's look at some examples and how to read the parts of the address. A typical address might be info@appa.org. Think of an electronic address like a postal office address. Anything to the left of the @ sign is the local part. Usually an address starts with the user id and is followed by the mailbox information. At some institutions an entire department or many people may share a computer that receives mail. There may be several such mailboxes on campus, so each mailbox needs to have a unique name.

The @ sign and anything to the right is the Internet address of the mailbox. It includes information about where the mailbox is located, similar to the street address, city, and state information contained in your postal address. Like your mail address, an Internet address is unique.

For example, my address is diana@appa.org. The first part prior to the @ is my user name. Some systems use variations of first and last names, while others use combinations of letters and numbers. In all cases, there are no spaces allowed. Occasionally an address will contain an underline or dash to represent a space like: d_tringali. The @ plus the next character

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string tells you that the host computer is located at APPA. The . plus the following character string is the domain. It tells you what type of system the organization belongs to. The "org" indicates nonprofit organizations and associations. Most APPA members will have a designation of "edu," which indicates educational institutions. Commercial users use "com," government users use "gov," and military sites use "mil."

Addresses outside of the United States are usually replaced by a two-letter country designation. This geographic designation is growing in popularity in the United States. Many international members will include a country code as part of their address, such as "ca" for Canada and "au" for Australia.

Most systems on the Internet are case-insensitive for Internet traffic, but not all. It is best to copy the address exactly as you receive it. Generally, if you are unsure, using lowercase will work with most addresses.

As with a wrong number by phone, it is possible to get "bounced" mail, which is mail that cannot be delivered. If you get this type of error message, check the characters for an error or try sending a message to "postmaster@ (location address)" with a request for assistance to locate an individual.

In composing an e-mail message you need to set up an e-mail header, which is basically composed of several lines. These are similar to a memo format in printed correspondence. These lines include date, from (who is sending the mail with full Internet address), to (who it being delivered to), and subject. The subject line is essential, as many people use this to prioritize messages, file messages in folders, and sort replies.

Make your messages short and to the point. Remember that the individual on the other side is reading on a computer screen. This means you want to try and confine lines to 60 characters and message length to fit a screen.

E-mail has developed as a less formal system of communication than written correspondence. Rarely do e-mail messages start with "Dear." Online "netiquette" has a few rules. Don't type your e-mail in all capital letters; this is considered rude, the equivalent of shouting. To create emphasis in a message you can accentuate words using asterisks, carats, and dashes. As with written communication, style guidelines are being developed for this medium and there are several good books available on the subject of "netiquette."

Mail Servers

Besides the ability to communicate to other APPA members and staff, e-mail can also provide other services. Some e-mail addresses are not to an actual individual but rather to a server. Servers can be set up for automated file distribution. APPA will be setting up an automated e-mail system to provide membership information, service information, educational programs information, publications information, and other request services that can be responded to quickly and easily.

This will allow the customer to customize an information request and receive back only what you want to receive. This same feature will eventually allow us to conduct on-line surveys. We are planning to include a customer feedback survey, as well as some short informational surveys to help APPA find out more about our membership.

Listservs or Discussion Groups

Another popular function of e-mail services are discussion groups. According to the surveys we conducted last year in assessing member opinion about on-line services, the number one member priority was discussion groups. This feature allows groups of people with similar interest to form an interactive communication base.

This is an online format to discuss issues, ask for help in solving a problem, or share success stories with colleagues. We are asking for your input on what types of discussion groups you would like to be involved in. They can focus on subjects, geographical interest, or job functions. The initial offerings are based on the top priority issues as defined in the Member Opinion Survey conducted a few years ago.

At the time of publication, the following were planned discussion groups (specific subscription information available from APPA).

- Chief facilities officer
- Energy & utilities issues
- Leadership issues
- Customer service
- Construction issues
- Environmental/regulatory issues
- Upward Bound

The listservs are set up so that you can subscribe to the list by sending an e-mail message with your subscription information to the mailserver at APPA and indicate which list you are interested in. It is an automated process. Within forty eight hours you will receive a reply message welcoming you to the list and providing you with some additional information on posting messages, how to unsubscribe to the list, and other relevant information.

After subscribing or joining a list, the listserv software begins e-mailing copies of all messages posted to the list directly to the user. Lists can generate high volumes of traffic. There are many testimonials from people who have gone away on vacation for a week and did not manage their mail to return home to 300-400 messages on their e- mail. This can be done by setting the list to "no mail" or "unsubscribing" to a list.

Lists can be moderated or open and unmoderated—meaning messages will be sent automatically without screening. Review by a moderator allows monitoring of the postings—to keep a list on track with its stated purpose. At this time, APPA is running open lists in the sense that postings are not screened and approved. We will, however, monitor the listings to help facilitate communication and examine content to help focus future efforts.

Lists can also operate as open or closed. Open enrollment allow anyone to subscribe. A user can also sign up via an automated system with no human intervention. A closed list would be reserved for subscription services or communication channels for specialized groups, such as Upward Bound members. Although within the APPA confines we will not restrict access to any list to any employee of an APPA member institution, we are at this time restricting access to the discussion groups to APPA member institutions.

Lists can be archived for users to search, in addition, many lists also include a frequently asked questions (FAQs) document. These documents are helpful for new subscribers to familiarize themselves with the list content and the formality of discussion. They can also help a user to avoid discussion of the same subject over and over.

How Will E-Mail Help You?

E-mail is fast and timely. There is no sensitivity to time zones, or the schedule of the post office. Messages can be sent for less than the cost of a first-class stamp. E-mail is convenient anytime you can hook up your computer to a phone line—it can be part of your mobile office. You will have a communications link to thousands of facilities colleagues and the APPA staff.

E-mail provides the tools to facilitate information sharing. Have a problem, need an immediate answer—ask your colleagues for help.

You will have 24-hour access to a range of APPA materials, like conference programs, publications information, and APPA services update.

As many of you reengineer your mission on campus, APPA too will experience a realignment of how we provide services, what on-line options we offer, what services change format, and how we can use the advantages of this system to offer our customers timely, responsive services. As we "roll out" these services, we hope to hear from you. Your feedback is vital. Hope to meet you "cruising" on our highway. ■

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Software & Solutions

Howard Millman

How To Solicit Bids For A CMMS & Get The One You Want

For the last one hundred years, when facilities managers developed a Request for Proposal (RFP), they described in flawless detail the product or service they wanted to buy. As part of the description, they quantified their requirements; for example, six cylinders, four plies, or two coats. And when the vendor delivered the vehicle, installed the new roof, or completed the painting job, they could count, measure, or weigh it.

Even when contracting for architectural or engineering services, they could identify what they wanted: design our new 28,000 SF student center, reduce electrical costs 15 percent in one year, or thermal scan our transformers. Here too, the traditional system of specifying conditions and stipulations in the RFP worked because managers could, in some fashion, measure what they received.

That's over when soliciting proposals for vertical market software, because its feature list is only one of many characteristics you need to consider. Vertical market applications is software that caters to a specific need of a specific industry. Maintenance management software meets that definition.

Software is not a product in the classic sense nor is it a service, it's a methodology—a way of accomplishing something. It falls under the definition of what the lawyers call intellectual property, a non-material item of worth. Don't allow yourself to be misled because the floppy disks and manuals are physical. They are just the wrapper. Like a candy bar, the good stuff is on the inside.

Purchasing intellectual property has two pitfalls for you. First, the stuff is amorphous; it can change its appearance seemingly at will. Consequently, if you specify that your CMMS should contain, say, a field for lock and key numbers, the software vendor adds it and now the product meets another of your provisos. More or less.

After years of analyzing the features of computerized maintenance management software packages and why some work better than other, I know that there's not a whole lot of difference in features. The real differences lie in how well the features work, integrate and perform.

So that segues to the second, and thorniest, issue—how well does the software meet your needs. If you wish to avoid a challenge from an unhappy bidder, and possible reversal, you need a bulletproof way to quantify how well a vendor implements a feature set.

Depending on your school's policies, some facilities managers have applied sole-source guidelines and negotiated the bid to obtain the product they want. These lucky few are a minority. Most managers are hard pressed to accept any but the lowest bid and sometimes fail to receive the product they think is best for the job.

The solution I crafted for my clients is a dynamic "you-tell-us" model of the RFP, which differs from the traditional "we-tell-you" format. Using this new era RFP, you specify only the essential requirements, for example the operating system and network transport protocol. Then you ask the vendor what features the software has. If you require additional bulletproofing, you can assign numeric priorities to these features. This approach, which is seeing increased adoption by the fedaral government and other jurisdictions, helps resolve the complex issue of defining how easy an application is to use. That's a subjective decision best made after a hands-on demo session with the software.

Admittedly, change comes slowly to most universities, but as times change so must methods. I suggest that you speak with your purchasing department and maybe the general council's office to obtain their guidance and support for implementing this new purchasing paradigm.

By using a new RFP format, you will receive more advantageous pricing, a wider range of features to select from, and ultimately, the system that best suits your needs today and tomorrow. ■

Howard Millman, a systems integrator, helps universities and hospitals implement facility automation systems. He can be reached at hmillman@mcimail.com.

Coming Events

APPA Events

Contact the APPA Education Department at 703-684-1446.

July 16-18—**82nd Annual Meeting and Educational Conference.** Philadelphia, PA.

August 13-18—**Institute for Facilities Management.** Arlington, VA.

Regional Meetings

Sep. 20-24—***Australasian Region.*** Hobart, Tasmania, Australia. Contact: David Archer, University of Tasmania, 61-02-20-2796; fax 61-02-20-2797; e-mail david.archer@admin.utas.edu.au.

Sep. 30-Oct. 4—***Pacific Coast Region.*** San Diego, CA. Contact: Jack Hug or Norma McKinnon, 619-534-2341.

Oct. 1-3—***Rocky Mountain Region.*** Montana State University. Contact: Robert Lashaway, Montana State University, 406-994-2001.

Oct. 1-4—***Eastern Region.*** Valley Forge, PA. Contact: Howard Holden, Albright College, 610-921-7535.

Oct. 13-19—***Southeastern Region.*** Norfolk, VA. Contact: Dick Plante, Old Dominion University, 804-683-4281.

Oct. 14-18—***Central Region.*** Manhattan, KS. Contact: Ed Rice, Kansas State University, 913-532-5967.

Oct. 22-24—***Midwest Region.*** Madison, WI. Contact: John Harrod, University of Wisconsin/Madison, 608-263-3077.

Other Events

Aug. 1-3—**Identifying Stone in Art & Architecture,** New York University. Contact The Conservation Center, Institute of Fine Arts, New York University, 212-772-5847; fax: 212-772-5851; e-mail: sass@is2.nyu.edu.

Aug. 7-8—**Identification of Regulated Hazardous Waste,** Hilton Head, SC. Contact Government Institutes, Inc., 4 Research Place, Suite 200, Rockville, MD 20850; 301-921-2345.

Aug. 7-11—**Rocky Mountain Comprehensive Review of Industrial Hygiene,** Salt Lake City, UT. Contact Rocky Mountain Center for Occupational and Environmental Health, Department of Family and Preventive Medicine, Bldg. 512, Salt Lake City, UT 84112; 801-581-5710; fax: 801-585-5275.

Aug. 10-11—**Chemistry for Nonchemists,** Hilton Head, SC. Contact Government Institutes, Inc., 4 Research Place, Suite 200, Rockville, MD 20850; 301-921-2345.

Aug. 15-18—**Housekeeping Management School,** San Francisco, CA. Contact Roesel, Kent & Associates, 404-998-1691.

Aug. 21-25—**Asbestos Abatement for Inspectors and Management Planners,** Salt Lake City, UT. Contact Rocky Mountain Center for Occupational and Environmental Health, Department of Family and Preventive Medicine, Bldg 512, Salt Lake City, UT 84112; 801-581-5710.

Aug. 25—**Achieving ADA Access to Historic Buildings at Shelburne Museum,** Shelburne, VT. Contact The Preservation Institute for the Building Crafts at Windsor House, Main Street, P.O. Box 1777, Windsor, VT 05089-0021; 802-674-6752.

Aug. 29-31—**Instructional Techniques for New Instructors,** Toronto. Contact Langevin Learning Services, 1990 River Road, Manotick, Ontario, Canada K4M 1B4; 613-692-6382.

Sep. 12-15—**Housekeeping Management School,** Boston, MA. Contact Roesel, Kent & Associates, 404-998-1691.

Sep. 19-22—**Thermographic Applications for Predictive Maintenance,** Level I, Baltimore, MD. Contact John Snell & Associates, 17 First Ave., Montpelier, VT 05602-3119; 802-229-9820.

Sep. 27-30—**College and University Personnel Association 1995 Annual Convention.** Orlando, FL. Contact CUPA, 1233 20th St., NW, Suite 301, Washington, DC 20036; 202-429-0311.

Oct. 6-11—**World Elevator Expo.** Boston, MA. Contact National Association of Elevator Contractors, 1298 Wellbrook Circle, NE, Conyers, GA 30207-3872; 404-760-9660; fax: 404-760-9714.

Oct. 15-17—**FM '95: Managing Facilities in a Technological World.** Cambridge, MA. Contact International Society of Facilities Executives, 336 Main St., Room E28-100, Cambridge, MA 02142-1014; 617-253-7252; fax: 617-258-8247; e-mail isfe@mit.edu.

Oct. 24-27—**Thermographic Applications for Predictive Maintenance,** Level II, Atlanta, GA. Contact John Snell & Associates, P.O. Box 6, Montpelier, VT 05601-006; 800-636-9820; fax: 802-223-0460.

Nov. 8-10—**18th World Energy Engineering Congress,** Atlanta, GA. Contact Ted Kurklis, WEEC, P.O. Box 1026, Lilburn, GA 30226; 404-925-9648.

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