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Your Guide to Green Building Design

Also in this issue:

- Construction Management
- Wayfinding Solutions
- Understanding GASB 34/35

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Your Guide to Green Building Design

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Global Partner in Learning

From the Editor

by Steve Glazner

What does "green building design"

mean to you? Energy savings? Energy savings offset by costly design (or vice versa)? A sustainable campus devoted to education? Treehugging? Walter Simpson's cover story has it all, and much more!

Walter, a two-time recipient of APPA's Rex Dillow Award for Outstanding Article in *Facilities Manager*, defines and discusses the benefits and approaches to green building design. His writing is clean and fluid, and he provides many clearcut steps to take when considering green design. Unfortunately, we were not able to publish everything Walter prepared for this article, but I urge you to visit www.appa.org/planning/index.html to read several case studies from recent effective green building designs. You'll also find a list of references for further research and assistance.

As more institutions consider creating their own in-house construction offices, a good resource for how it can be done is found in Brooks Baker and Hope Hammonds' article called "Construction from the Inside Out." The University of Alabama at Birmingham, like so many other institutions, has seen a tremendous increase in new construction. UAB has found a way to accommodate

the growing demands of the university.

Construction management services are also on the rise. Blake Peck provides a number of options available to the owner/client, and discusses the relative benefits of each. Steve Kellman then shows us some solutions to the tricky issue of campus signage and "wayfinding."

Because of the new financial reporting requirements for public facilities, we have included two related articles on GASB 34 and 35. These statements from the Governmental Accounting Standards Board affect the way U.S. public buildings, particularly educational facilities, are reported. A special thanks to Mo Qayoumi and Jerry Kokos for their insights and assistance on this timely issue.

And President-Elect Gary Reynolds shares with us the personal and professional enjoyment of his visit to Australia last September, where he was invited to participate in the Australasia annual meeting. His report demonstrates the strength of APPA's international ties and reinforces our message to be a global partner in learning. 📌

In Memoriam

We recognize and honor the following APPA Emeritus member who has recently passed away.

• **Walter Hartman**, Ohio State University

Building in a New Economy

This year the CMD Group's North American Construction Forecast Conference took place on October 24, 2000 at the National Press Club.

The conference brings together economists and analysts who are leaders in the areas of office, retail,

industrial, residential, highway, and infrastructure construction. Through discussion and speeches, the various speakers make predictions on the construction industry for the coming year and beyond.

Predictions and analysis were given on a number of construction topics, including the labor market and construction of office space. The luncheon keynote address, given by Frank Feather, who coined the phrase "think globally; act locally," discussed the impact of the digital age on our economy, lifestyle, and, specifically, the construction industry. Referring to what he calls a "webolution," Feather gave attendees advice on

building concepts, which are moving away from the strategies of the Industrial Revolution.

While the Industrial Revolution thrived on factories and office space, the digital age allows employees to work from home or someplace outside an office. Feather encouraged the construction industry to create buildings with networking and flexibility in mind, and to avoid the idea of location as a business advantage.

With the rise in distance learning at many colleges and universities, facilities professionals must also consider the "webolution" when making construction decisions on their campuses.



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There are other topics that were covered at the conference that will interest facilities professionals, if only to judge the market when contracting a construction company. For additional reports or more information, you can visit www.nacf.com.

Pesticide Gets Killed

If you are using pesticides whose main ingredient is diazinon, it's time to look for a new product. In December 2000, the EPA reached an agreement with the pesticide industry to phase out the leading bug killer that research has found can pose health risks—nausea, headaches, vomiting, diarrhea—to consumers, especially children.

The agreement requires that indoor retail products containing diazinon not be manufactured after March 1, 2001, and outdoor products must be discontinued by June 30, 2003. This agreement will eliminate 75 percent of the pesticide's use, which is more than

11 million pounds annually. However, the EPA says that there's no immediate need to throw away these products, but be sure to follow the label's instructions and precautions. Some of the more popular brands of pesticides that contain diazinon are Real Kill, Ortho, and Spectracide.

While diazinon is most widely used by homeowners on lawns and gardens, small colleges and universities may also be using these products. For more information, follow this link on the EPA's website: <http://www.epa.gov/pesticides/op/diazinon.htm>.

Honing Your Leadership Skills

Are you an effective leader? Would you like to become a leader in your organization?

Come to APPA's Professional Leadership Academy in Fort Lauderdale, Florida, June 17-21, 2001. The Academy is designed for those of you with a desire to lead. Three different leadership tracks ensure that several types

and perspectives of leadership are covered. Track I features individual effectiveness skills. Track II emphasizes organizational leadership skills. And Track III covers professional leadership issues.

In conjunction with our focus on these three leadership tracks, are the cornerstone principles that assist leadership development: education, research, and recognition. APPA uses these principles to create the classes and programs available at the Academy.

Understanding all three tracks, as well as the three cornerstones to effective leadership, prepares facilities and administrative professionals for a new level of leadership. Registration is now open. For more information go to www.appa.org/education/plc/academy/register.html. 📢



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Executive Summary

CHEMA: A Unique Partnership and Strategic Alliance

by E. Lander Medlin

Much of my job as your Executive Vice President is focused on building strong, long-term relationships with our business partners, who provide services within the facilities community, and with other associations and governmental agencies across the educational community. It is the latter group that is the focus of this article.

During the past few years, APPA has formally signed several strategic alliance agreements in an effort to more formally establish the nature and terms of each relationship. Visit our website at www.appa.org/strategicpartners for more information on these specific agreements and relationships.

Interestingly enough, it is because of these formal agreements that the membership continues to raise the question: "What about the ties with our business officers, campus planners, or purchasing agents? Aren't these extremely important relationships to build as well?" The answer is an unequivocal, resounding "yes," and, in fact, APPA is an active member of a larger organization that focuses on these relationships. This organization is called CHEMA, the Council of Higher Education Management Associations.

Although it does not take the same form as our more formal strategic alliance agreements, the spirit and intent is similar. CHEMA is a voluntary, informal assembly of more than 30 management-oriented higher education associations in the United States, Canada, and abroad. This col-

lection of organizations represents the institutional administrative and student affairs professional associations. Representation at CHEMA's meetings twice a year consists of both the chief elected officer (President and/or President-Elect) and the chief paid officer (Executive Vice President) of each association. As a member association of CHEMA, we agree to share information, compare experiences, and work collectively on projects of shared interest. In doing so, we believe CHEMA members maximize their resources and ensure substantial benefits and value for the colleges and universities they represent.

Unfortunately, the group is often overlooked, simply because of its informality, but that is also the beauty of the group. We all serve institutional constituencies—higher education—and we have more in common than many of our association counterparts. And, because we gather twice a year and connect regularly across a well-used, well-worn e-mail discussion list, we are able to network more effectively and collaborate more quickly on issues and projects that arise. This informality is deceiving to the membership in that I have not actively publicized its existence, value, benefits, and strategic outcomes as much as I have our more formal strategic alliances.

Actually, CHEMA has been in existence for 30 years. Some of the most notable joint projects were:

- published the book *Contract Management or Self-Operation: A Decision Making Guide for Higher Education*;
- cooperated with the International Initiatives Program to learn more about the management of higher education internationally;

- engaged in numerous cosponsorships and endorsements of workshops, symposia, and telecasts (such as the SCUP/PBS Telecast on Technology-Driven Planning);
- a CHEMA Best Practices website (www.chemapractices.org);
- a jointly sponsored June 2000 Campus/Corporate Partnership Forum; and
- (most recently) published the book *Benchmarking and Organizational Change*.

So what have we been able to accomplish lately?

- The CSHEMA/APPA Task Force, which focuses on the EPA college and university compliance initiative, created late fall 2000, would not have come about if not for the face-to-face connection, and subsequent dialogue, of the two elected officers (John Harrod, President of APPA, and Ray Richards, President of CSHEMA—the Campus Safety, Health, and Environmental Manager's Association, a division of the National Safety Council). Those discussions spawned the effort to coproduce an Environmental Compliance Assistance Guide to focus on the institutions without environmental safety managers or offices (publication expected early 2002). The Guide will be the topic of an educational session at our July Educational Conference & Annual Meeting in Montreal, Canada.
- The possibility and culmination of colocating our annual meeting, first with NACUBO in 2003 at Opryland in Nashville, Tennessee, and second with NACUBO and SCUP in 2006 in Hawaii, would

Lander Medlin is APPA's executive vice president. She can be reached at lander@appa.org.

not have come to fruition if not for the relationships that had already been built during previous CHEMA meetings.

- APPA and NACUBO's newly revived Institute for Facilities Finance (delivery April 8-10 in Baltimore) and a corresponding revision of the publication *Managing the Facilities Portfolio*.
- ACUTA, EDUCAUSE, and SCUP's endorsement of our most recent, first-ever Emergent Building Technologies Conference (EBTC) held in February in Las Vegas, Nevada. Their support made a major difference in attendance, as well as in the conference's educational content and focus.
- There would not have been an opportunity to present a paper at the upcoming NAEB (National Association of Educational Buyers) annual meeting in Nashville, Tennessee from May 2-

5, if not for our membership with CHEMA.

At the end of the most recent CHEMA meeting this past January, the group shared their most pressing or emerging issues (i.e., What keeps your members awake at night?). It was fascinating in that the similarities amongst these issues formed a pattern, which we can use to better focus our efforts together in the future. The top ten issues for the group are:

- staffing (recruitment & retention)/training/diversity;
- funding/revenue-generation;
- information technology (e-learning/e-business);
- facilities management/capital renewal & deferred maintenance/new construction;
- fire safety/campus safety (violence & crime);
- assessment (continuous improvement/ performance accountability/ risk);

- leadership development;
- federal regulations/EPA compliance;
- outsourcing/contract management;
- campus politics & community collaboration.

These trends or emerging issues will provide important collaborative focus for and with our colleagues in the coming years.

Overall, it is extremely important to recognize and take full advantage of the strong alliance APPA has with its higher education association counterparts. This is truly a strategic collaboration that each of us takes seriously, and uses to full advantage for our respective memberships. For me, this organization we call CHEMA is an extremely important strategic alliance that bears invaluable fruit, not unlike that of our more formal strategic alliance partners' agreements. Therefore, when you visit our website in the future, you will see CHEMA (and its Washington-based counterpart, the Washington Higher Education Secretariat) so noted on the strategic partners page with a listing of all these important associations and a link to their websites.

Our CHEMA partnership provides a gateway for APPA to achieve its most important overriding, overarching goal: to increase the awareness of the facilities profession with senior institutional officers. In addition, it is inherently linked with our strategic plan's desired outcomes of competency, collaborative relationships, and credibility. As we establish more effective "collaborative relationships" across the education community, we increase the opportunity to improve the "credibility" of our members by educating others about the "competency" provided by the facilities professional, and the ultimate value the facilities professional brings to the institution. For information about CHEMA, visit Chema-
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Membership Matters

Building Our Membership Base

by Phil Cox

Early spring marks another important point in APPA's busy calendar. It is the time of year for our annual balloting to elect new officers who will serve us over the next few years. Just as important, it is also the time of year when we elect APPA as our association of choice by renewing our APPA membership. Hopefully, each person reading this article will play an active role in each of these elections by making sure that your institution both casts its ballot and sends in its membership renewal.

A strong membership base is absolutely vital in making APPA a highly effective and valued association that is dedicated to supporting educational excellence with quality leadership, and professional management through education, research, and recognition. APPA's three largest sources of income (dues, publications, and educational programs) are derived from the membership. This makes our financial health directly dependent on the membership base. This same membership base is also the source of perhaps the greatest benefit that APPA offers its members: networking among facilities professionals. The network of APPA members is a tremendous resource, and the more members there are, the more powerful and valuable the resource is.

Phil Cox is director of facilities management at Cornell University Ithaca, New York. He is also APPA's Secretary/Treasurer and chair of the Membership Committee. He can be reached at plc4@cornell.edu.



The Membership Committee at the December 2000 committee meeting in Alexandria, Virginia.

From left: Bob McGregor, RMA, 719-549-3291, mccregor@pcc.ccoes.edu; Dina Murray, APPA Director of Member Services, 703-684-1446, ext 232, dina@appa.org; Neal Swarnes, CAPP, 417-667-6333, ext 2290, nswarnes@cottey.edu; Don Briselden, ERAPPA (outgoing), 603-777-4442, dbriselden@exeter.edu; Dan Park, PCAPPA, 509-527-5999, park@whitman.edu; Phil Cox, APPA Secretary/ Treasurer, 607-255-6874, plc4@cornell.edu; Bob Bertram, ERAPPA (incoming), 508-565-1361, rbertram@stonehill.edu; Jim Barnett, MAPPA, 309-298-2822, James_Barnett@ccmail.wiu.edu; Ron Brooks, SRAPPA, 901-678-5522, rbrooks@mocha.memphis.edu. Not pictured: John Simmons, AAPPA, johns@facilities.usyd.edu.au.

One of the three desired outcomes of APPA's strategic plan is "Collaborative Relationship-Building." Recognizing the enormous potential of what networking can do for us and our institutions, our strategic plan states that APPA will engage in symbiotic and collaborative relationships and partnerships. Further it goes on to state that APPA will be inclusive and accessible, serving facilities professionals, their institutions, and related communities. Yet how can we collaborate and fully exploit the benefits of networking among members if so many potential members are missing? Our membership represents only about one-half of the four-year schools that should be APPA mem-

bers. Even worse, our membership includes only about 20 percent of the eligible community colleges.

Progress is being made, however, in sustaining and growing our membership base. At the December Membership Committee meeting, which fell at the half-way point through a two-year membership growth campaign, a review of membership statistics showed that membership was up in all categories compared to last year. Growth in institutional and associate membership was somewhat less than targeted, whereas growth in affiliate and business partner members was greater than targeted. The table on the next page reflects this growth.

Positive membership trends are certainly encouraging and they represent the results of hard work by the APPA staff, the Membership Committee, and a vast network of membership recruiters throughout the regions. However, with greater involvement by more of us, we can strengthen our membership base even more. The committee is confident that we can succeed in our two-year growth campaign. While we developed several

tactics for reaching our growth targets, the most effective way to recruit new members is through personal contact—members reaching out to potential members on a one-on-one basis. Many times all that is needed to bring a new member on board is that first personal invitation. People need to be asked. That is why we need the help of every APPA member.

This year the Membership Committee has targeted community colleges

for growth in membership. A strategy is now being developed to recruit and retain more community colleges. This will involve finding innovative ways of reaching the community colleges and developing new services to meet some of their special needs. However, the potential for new members from this constituency is enormous.

Won't you please help? If you know someone in a nearby school that is not an APPA member, make that personal contact and invite them to join you at your next chapter or regional event. Extending a welcoming hand of friendship can make a tremendous difference.

If you need any help in contacting neighboring schools and letting them know about the advantages of APPA membership, contact the Membership Committee representative from your region or Dina Murray, director of member services, at dina@appa.org, who can provide you with useful recruitment packages. 📌

	INSTITUTIONS	ASSOCIATES	AFFILIATES	BUSINESS PARTNERS
Nov '99	1379	2609	205	204
Growth Target	+3%	+5%	0%	+2%
Growth Actual	+2.3%	+2.6%	+5.3%	+14.2%
Nov '00	1411	2679	218	233
Growth Target	+5%	+5%	+5%	+2%
Nov '01 Target	1491	2876	229	238

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Intentional Change

by James E. Christenson

"Everyone thinks of changing the world, but no one thinks of changing himself."

—Tolstoy

If you hadn't heard the word "change" recently, a reading of the November/December 2000 *Facilities Manager* magazine provided a remedy. The word was used starting on page 2, emphasized heavily in Lander Medlin's message on pages 8-11, and implied nearly everywhere else in that and most issues published in the last year. And, of course, the first segment of this column in the January/February 2001 issue raised the subject again. We can't escape change.

So why is change such a popular topic? Specifically, why should we want to deliberately cause change? Don't we have enough change imposed on us already, without going out of our way to invite more of it?

Change—even the perceived need to cause change isn't a recent phenomenon. Nearly 400 years ago, Sir Francis Bacon observed, "He that will not apply new remedies must expect new evils, for time is the greatest innovator." A more contemporary observer suggested, "Even if you are on the right track, you'll get run over if you just sit there."

Many other words suggest change: transformation, discontinuity, conversion, transmutation, metamorphosis,

innovation, reorganization, and paradigm shift. No matter which of these terms we apply, they suggest a bold slash through the sacred phrase "that's the way we've always done it." The TTWWADI phrase is rightly on the endangered species list today, but no federal protection is warranted.

The higher education facilities management business has not always experienced the need for change, because the people in the business have



usually felt secure. Whether the institution was public or private, it would always need utilities, grounds care, maintenance, and cleaning. Traditionally, staff members who provided these services were as secure as civil service employees, and some in fact were.

In the last decades, however, the drive for excellence, continuous improvement, and reengineering in the business world around us have caused

higher education administrators to ask whether they are receiving the most effective facilities services possible. This questioning has led to a variety of actions. In a few cases, for-profit service providers were brought in to replace some or all in-house staff members. In more cases, universities have put "every tub on its own bottom" and created financial systems that place college deans and other managers of resource centers in the role of entrepreneurs. These financial systems go by variations of the term, "responsibility centered management." Although some institutions place limits on the responsibility center manager's ability to exchange use of in-house staff for use of contractors, providers found in the Yellow Pages—or needy brothers-in-law—the overall effect is to put nearly all in-house facilities organizations on the "windy corner."

In this new location, facilities managers are being forced to do what they should have been doing all along: treating those we serve with the respect and effectiveness we, as one of many entrepreneurs, would provide if we were in competition for each customer's money. Many of us realized that we should be customer-focused, and we were really trying our best to serve the university community well.

Karl Albrecht and Ron Zemke were among the first to articulate those needs in a way that we facilities managers understood. They talked about "moments of truth" to impress us with the fact that the interaction of each facilities staff member with each member of the campus community creates a report card on our organization. It isn't what our boss thinks about our performance that counts.

Jim Christenson recently retired after serving 40 years in university and federal facilities management. He can be reached at jchriste@umich.edu.

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If the need to better serve the campus community isn't enough of a challenge, consider the fact that the needs of that community are changing, with a speed never before experienced. Those institutional leaders who don't recognize the need for change will find their institutions and their positions in great jeopardy. In this Age of Knowledge, which Lander Medlin referred to recently, those who do recognize the need for change will expect facilities managers to be prepared to respond quickly in supporting the changes they initiate.

Whether circumstances force change or whether we choose a new direction because it is just the right thing to do, we need to transform facilities organizations from the old, secure way of doing things. Most facilities organizations have done that long ago. But one or two changes won't do it, folks. Continually creating ways to provide better, more effective service is now a valid expectation of the campus community.

So how do we cause beneficial change? Unfortunately, deliberate change can't really be discussed without also discussing leadership, vision, empowerment/self-direction, and learning. I'll share some thoughts on these topics in the future. Meanwhile, a word on the various faces of change itself.

Quality Circles, Total Quality Management, Total Quality Service, and similar efforts primarily promote incremental improvements. These are important improvements, often identified by workers on the front lines who know the real problems, and their customers' needs. In the 1990s, Michael Hammer suggested that reengineering was what was really required. He suggested that it wasn't good enough to "pave the cow paths," especially in the context of automating our business processes. The challenge is to know when to use

incremental change and when a "deep change" is required. Robert Quinn argues that if we choose incremental change, when deep change is needed, we are choosing a slow death for the organization. He applies the classic boiled frog analogy to that choice: boiling a frog starting with cold water.

"Change is the name of the game that must be played these days. And it isn't enough to tell the folks at the front line to change. As Marvin Pettway at the University of Michigan reminds his colleagues, "If we aren't modeling what we teach, we're teaching something else."

Deep change requires vision, leadership, risk tolerance, wholesome trust relationships between people in the organization, and change modeling. We can't avoid it. Our ability to survive in these turbulent times depends on our willingness to take risks. It also requires our supervisor's willingness to let us take those risks, or to accept our preference to ask forgiveness rather than permission.

What is the nature of risk? It exposes us to the possibility of failure, criticism, job loss, and other unwelcome effects. Why would one do that? Because a risk taken for the right reason also exposes us to the chance of accomplishing something great. It makes the work interesting. It serves the campus community better.

Deep change—change that totally reorients the organization—often cannot be planned in detail. Quinn suggests that implementing deep

change is often like building a bridge as we walk on it. We found ourselves in this position at the University of Michigan as we worked to move a major facilities organization toward better customer service and widespread individual self-direction. Just the image of building a bridge as we walk on it is an uncomfortable one. But it is important that the bridge be built, that the organization constantly move forward to better serve the customer. Gandhi expressed the view that when one discovers what is right and begins to pursue it, the necessary people and resources tend to turn up. We need to trust our visions enough to really start our journey into the chasm of uncertainty—or we'll never move from where we are.

I suggest that no facilities organization is exempt from the need to continuously move toward an upgraded vision—a well-articulated vision of ever-higher levels of service. Excellence cannot be sustained indefinitely. To remain healthy and vibrant, a system or an organization must continuously rotate through the transformational cycle. Excellence, by definition, requires continuous deviation from the norm, from each new norm that appears. If your organization is just one among many, your customers are not well served.

I think this is especially true of an in-house facilities staff. There is no reason why such an organization should not be far more effective than an "outside" contractor. Its members hold a wealth of knowledge and history about the facilities and the occupants' needs. They have loyalty to the institution that often exceeds that of the faculty and students. But there is one reason that often makes the in-house organization less competitive—the unwillingness to take the necessary risks to make customer-oriented transformations on a daily basis.

Change is the name of the game that must be played these days. And

it isn't enough to tell the folks at the front line to change. As Marvin Pettway at the University of Michigan reminds his colleagues, "If we aren't modeling what we teach, we're teaching something else." Before transforming anything else, we must transform ourselves. Only then can we persuade everyone else to leave

the safety net. Abraham Lincoln advised, "With public sentiment, nothing can fail; without it, nothing can succeed." Public sentiment is most likely to support a servant-leader that models the desired changed behavior. 🕯

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A Facilities Manager's Guide to **GREEN BUILDING DESIGN**

By *Walter Simpson*

As campus energy officer, I occasionally lecture to architecture students about the University at Buffalo's (UB) energy conservation program. I show the students a series of slides depicting the energy design failures of our buildings and how we have tried to correct those failures through literally hundreds of retrofit projects.

The students are shocked when they hear about UB's electrically heated buildings. They are also surprised to hear about new buildings where we have retrofit thousands of lighting fixtures as soon as the buildings were accepted. (The original design called for T-12 lighting a few years after T-8s had proven themselves reliable and more efficient.)

At some point near the end of my lecture, I get the inevitable question, namely, "What is UB doing to improve the design of its new buildings—so that doing all those energy retrofits won't be necessary?!"

I reply by explaining that we stopped building electrically heated buildings a decade ago (though they never should have been built in the first place), and we are making progress designing more efficient buildings. But the truth is that we have not come far enough.

Going Beyond Energy Efficiency

During the 1990s the architectural profession in the United States identified the various principles of "sustainable," "high

performance," or "green" building design. This approach goes further than energy efficiency by applying environmental principles to all aspects of building design. "Green buildings" have less impact on the natural environment. They can be healthy, naturally lit, attractive buildings with lower operating and lifecycle costs.

The multiple benefits of green building should speak to college, university, and K-12 facilities professionals. There are many reasons why we should be interested in this new architectural movement.

Most campuses have energy conservation, recycling, and green campus initiatives. An obvious next step is to include green building design in your palate of green campus programs—especially considering the substantial, long-term operational and environmental impact of new buildings. A campus commitment to green design says something very positive about a school and may provide substantial public relations, recruitment, and retention benefits as well.

According to Worldwatch Institute, 40 percent of the raw materials annually extracted from the earth are transformed into building materials. Buildings are also responsible for an estimated 40 percent of global energy consumption—and the associated smog, acid rain, and global warming emissions. Climatologists are now telling us that unless we significantly reduce fossil fuel burning and carbon dioxide emissions, average global temperatures could rise by 8 to 10 degrees Fahrenheit by the end of this century. New building design must respond to this challenge by reducing fossil fuel use and carbon dioxide emissions while producing other dividends.

Defining Green Design

Green building design is a holistic, integrative, and collaborative process. It is ecologically, not "ego-logically," driven. It should begin at the first stages of planning and design and

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consider a variety of design issues. While these elements can be broken down in a variety of ways, here is a representative list:

- "Build/No Build" decision
- Site decision, planning, and design
- Use of renewable energy
- Energy efficiency
- Efficient materials use
- Ecological building materials
- Water management
- Indoor environment
- Recycling—during construction and by occupants
- Building commissioning
- Green operations and maintenance

Pop quiz! What is the most conserving, least-polluting building imaginable? Correct answer: the building that is never built!

Green design begins with the decision to build. Our motto should be: build it small if at all. Campus leaders need to ask themselves whether a new building is really needed. Can program needs be met through renovations of existing space? Can space be designed more flexibly and used more efficiently in order to minimize construction?

Given the high cost of new construction, these would seem like obvious questions but they are often given insufficient consideration. New construction is sexy, a way to make a statement and leave a legacy. Moreover, budgetary anomalies may make new construction dollars available while renovation (as well as M&O) budgets are starved. These factors may lead to unnecessary building.

My own school is in a build-out mode, adding new buildings while campus population remains roughly the same. The end result is more "built-space" per student, faculty, and staff person than ever before. This structural inefficiency significantly impacts energy and materials consumption.

Respect and Restore the Site

Site issues become paramount once a decision to build is made. Even if a full-blown environmental impact statement (EIS) is not required by law, this is the time to do an environmental assessment. It is also time to involve the campus community in a public participation process to gain valuable input and build campus consensus.

Urban campuses may have the option of building on a "brownfield," an abandoned commercial or industrial site. While brownfield development typically involves legal and liability issues, remediating and restoring these already used sites is generally environmentally preferable to building on an undisturbed "greenfield."

"Sprawl" describes spread out development which reduces population density, increases travel needs and distances, wastes energy, and destroys open space. Sprawl can apply to campuses as well as communities. Campus siting decisions should promote density, community, and alternatives to gas-guzzling car use.

Of course, sprawl and transportation issues apply to siting new campuses as well as individual buildings. The University at Buffalo's newer campus is in the suburbs and is not well served by public transit, bicycling, or walking. A faculty colleague once estimated that UB students, faculty, and staff commute by car to and from campus a total of 120 million miles a year! A downtown campus location would have vastly reduced this car travel, annually saving millions of gallons of gasoline and thousands of tons of tailpipe pollution. A downtown UB campus would have also helped revitalize Buffalo, a city that is now a shadow of the thriving commercial and cultural center it was 100 years ago.

Trees and green space beautify campuses. Sacrificing these assets is generally a

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bad idea. Siting buildings in beautiful natural spots on campus has an appeal, but the benefit is lost if building there destroys those spots.

Having selected a site, green design asks planners to respect that site by protecting and restoring its natural systems and by trying to reconnect the site to regional natural systems. Natural assets of a site, such as trees and vegetation, wildlife and habitat, watershed, open space and aesthetics, should be conserved.

By returning rain water to the ground or a wetlands (instead of storm sewers), watershed values of the land can be respected. Paving should be minimized, but, where needed, porous paving materials should be considered. Landscaping should be low maintenance and emphasize native plants. The building should blend in with its natural surroundings, enhancing beauty and enjoyment of the site.

Energy benefits can accrue by adapting to the microclimate of a site. Can the building be shielded from cold winter winds? Can it benefit by cool summer breezes? Trees or berms can deflect or focus winds. Trees and other vegetation can also provide shade and reduce summer ambient temperatures.

Site selection should also be informed by solar access. Can a building be oriented on this site with an unobstructed southern exposure? Are there existing buildings (or other objects) which will cast shadows and block the sun's light and heat?

Sunlight to the Rescue—Using Clean, Renewable Energy

Breaking our fossil fuel addiction is imperative. Green design helps us do that by promoting the use of clean, free solar energy. Solar homes work even in cold, snowy Buffalo. But what about using solar energy in commercial or institutional buildings? At first blush it might seem difficult but it can be done. There are a number of possibilities:

- Daylighting
- Passive solar space heating
- Solar water heating (pools, domestic hot water)
- Photovoltaic electricity generation
- Buy "green power"

The most obvious and proven way to use solar energy in campus buildings is daylighting. Effective daylighting uses sunlight to provide superior lighting for occupants while reducing lighting energy costs.

There are lots of ways to do daylighting poorly. For example, direct sunlight may be introduced into buildings, producing uncomfortable glare. Sunlight also may be introduced through skylights or atria, which lose too much heat in the winter or gain too much heat in the summer (thus increasing heating or cooling costs). And too often we see daylit spaces where the electric lights are on needlessly during daylight hours.

But daylighting can be done correctly with wonderful results. Good designs avoid direct sun and glare. The light is bounced, diffused, and brought into the interior of buildings. Electric lighting is turned off or dimmed with "daylight harvesting" controls. People rave about open floor plans, access to windows, and daylit interior spaces. The best designs allow most occupants to have visual contact with the outdoors. Satisfaction and productivity in these buildings is typically very high.

Daylighting strategies go beyond high-tech windows and include horizontal light shelves on windows to reflect sunlight into a space while blocking direct solar gain in summer. Daylighting also makes appropriate use of clerestories, courtyards, and atria. A variety of glazing options are available.

Window technology has advanced significantly in the last decade. Different glass coatings and gas fills (between layers of glass) can maximize energy performance. Window selection should be fine-tuned by orientation, location, and application. Spectrally selective windows may be specified



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Passive Heating and Cooling

Passive solar heating may be defined as using sunlight for heating without the use of special collectors or mechanical fans or pumps. This is accomplished by south-facing glass that readily admits solar energy (as opposed to rejecting it). The building envelope itself becomes a solar collector. East and especially west-facing glass is minimized to prevent unwanted solar gain in the cooling season.

Clear glass that permits solar heat gain is desirable for passive solar heating. Yet this is a liability in the summer when it will add to the building's cooling load. Some means of sun control or deflection is needed to block sunlight during the warmer months. This can be accomplished with overhangs, shelves, louvers, awnings, trellises, or shades. Computer energy modeling of projected energy use can assist in glass selection, balancing the benefits of daylighting, solar heat gain in winter, and solar rejection in summer.

Since passive solar heating works best with direct sun, it is best accomplished in commercial or institutional buildings in common areas like lobbies (not workspaces). Sufficient thermal mass (or a means of removing heat) is required to avoid overheating a sun-heated space. Thermal mass may be provided by normal construction materials such as a thick masonry floor (with dark colored tiles) or a mass wall. Special features such as water drums or columns can also be used.

Green Power—Solar Electricity

A green building should run on green power! That power can be generated on site or purchased.

One option is photovoltaic (PV) electrical generation. Green designers may incorporate PV into their designs despite its relatively high cost per kW of generating capacity.

As a rule of thumb, one square foot of photovoltaic solar-electric panel will produce about 10 watts of peak electric power if the panel is facing the sun and in full direct sunlight. This is not a lot of power. Real-life energy production from PV is a function of location, time of year, time of day, weather conditions, and panel tilt angle. To power an entire building with on-site photovoltaics means a lot of PV surface area or a very efficient building (or both).

We tend to think of PV as panels set up on racks or in sun tracking arrays. But PV need not be an add-on. PV can now be incorporated into the building envelope itself. Building Integrated PV (BIPV), as it is called, incorporates PV in curtain wall and roofing materials. PV (electricity-generating) windows are being developed. Needless to say, BIPV promises aesthetic and cost-saving benefits. In any event, greater use of PV will bring costs down.

What about fuel cells? Fuel cells are not a renewable energy source as long as they are running on natural gas (as most fuel cells do today). Nonetheless, some green buildings utilize fuel cells because they produce cleaner, more efficient electricity than the grid. Fuel cell prices will also come down with greater use. Fuel cells will eventually become renewable technologies once they are powered by solar-wind-biomass-generated hydrogen.

That leaves the option of buying green power in the deregulated electric marketplace.

In early 2001, electric deregulation looks like a colossal failure. Californians are paying much more for electricity than they did before deregulation. And they have experienced rolling blackouts as demand threatens supply. In my own state, New York, deregulation undercut much of the conservation and efficiency regime that existed in the early 1990s. Not surprisingly, electricity consumption is now climbing and there is increasing concern about generating capacity.

Nonetheless, electric industry deregulation may eventually make it possible for college and university campuses to buy environmentally friendly clean electricity. This power would come from newly developed windpower, biomass, PV, or land-fill gas generating capacity. A green facility should be willing to pay a premium price to purchase green power.

Negawatts, Not Megawatts—Maximize Energy Efficiency

Green buildings must be energy efficient. By focusing on energy efficiency, the percentage of building energy needs provided by the sun can be maximized and fossil fuel reliance minimized. It is not enough to meet energy codes and standards such as ASHRAE 90.1. Green designers have pointed out that simply meeting the energy code should be no source of pride; if your building was any worse it would be illegal!

There are literally hundreds of strategies for designing energy efficient buildings. Here are some of the basic issues and opportunities:

Building Envelope

- Surface area to volume ratio (building shape, attached vs. stand alone, below ground vs. above)
- High level of insulation and tight construction for colder climates
- Location of entrances
- Super-windows (optimized for application)

HVAC—General Considerations

- First reduce all heating and cooling loads
- Size equipment smaller (for reduced loads)
- High efficiency equipment (including at part load)
- VAV vs. constant volume distribution systems
- Setback thermostats
- Proper zoning

- Heat recovery
- CO2 sensors and "demand control ventilation"
- Fuel choice (natural gas is cleanest fossil fuel; solar is much cleaner)
- High efficiency fans, pumps and motors
- EMS (to be used as more than sophisticated time clock)

Heating

- Boilers—modular, condensing; low NOX
- Cogeneration—natural gas-fired combined cycle; low NOX

Cooling

- Gas-fired chillers
- Dehumidify only when necessary
- Minimize summer reheat
- Avoid CFC and HCFC refrigerants
- Use economizer/free cooling cycles
- Operable windows (instead of mechanical AC)
- Natural ventilation including solar thermal chimneys, wind scoops, etc.
- Evaporative cooling (arid climates)
- Desiccant dehumidification (humid climates)
- Ground source heat pumps

Lighting

- Maximize daylighting
- Energy efficient T-8 lighting with electronic ballasts and reflectorized fixtures
- Lighting controls (motion detectors, photocells, daylight harvesting dimmers)
- Lower light levels (more appropriate to computer use)
- LED exit and traffic lights

Appliances and Office Equipment

- Buy maximum efficiency (Energy Star-compliant)
- Enable power management features

How energy efficient can your new building be? Efficient green commercial or institutional buildings can save 25 to 50 percent or more of the energy that would be required by conventional code-compliant building design.

Environmentally Friendly Building Materials

Green design uses resources efficiently and selects environmentally friendly building materials and products. Obviously, smaller buildings use less material. Flexible, adaptive designs allow smaller structures to meet more needs, thus conserving materials. Designing interior spaces attractively with exposed structural members and less decorative surfaces, coverings, and finishes can also reduce the amount of materials required.

Ecological materials selection is a specialty unto itself. The designer must know how to identify and specify materials and products which perform well and have the least impact on the

environment over their lifecycles. In reality, a balancing act is required but the goal is to pick materials/products which are:

- Local
- Indigenous
- Low embodied energy
- Reused, recycled and/or recyclable
- Renewable and sustainably harvested (no old growth timber)
- Non-toxic/non-polluting in manufacture, use and disposal
- Contain no ozone-depleting CFCs and HCFCs
- Durable
- Low-maintenance

The embodied energy of a product refers to the amount of energy it takes to extract raw materials and make the product. In effect, the product "contains" this energy and its energy-related pollution (as well as any other pollution created by the extraction and manufacturing process). For instance, ten simple clay-fired bricks "contain" the energy equivalent of one gallon of oil (say 140,000 Btus).

The embodied energy of a product is generally less if it is made from recycled waste material, e.g., approximately 10 to 20 percent less for recycled glass and plastic, 50 to 60 percent less for recycled steel, and 95 percent less for recycled aluminum.

Going Easy on Water

Green buildings are frugal on water. This makes sense because in many areas water is in short supply. Also, domestic tap water contains embodied energy (the energy required to purify it before use, pump it, and treat it after use) and this can be saved through water conservation.

In addition to using low-flow plumbing fixtures, green designers may specify waterless urinals and composting toilets. Gray water from sinks, showers and laundries may be reused for purposes not requiring potable water (e.g., toilets, irrigation, vehicle washing). Rainwater may be collected from roofs and used similarly. Rainwater may also be used to grow planted "green roofs," which have recreational, wildlife habitat, educational, and roof shading benefits.

Alternative water treatment strategies may be employed including the use of on-site biological waste treatment, using microbes and plants to break down waste. This can be accomplished with constructed wetlands or "living machines," which mimic the biological processes of wetlands.

A Healthy Indoor Environment

Green building design seeks to provide the healthiest of indoor environments. This enhances occupant satisfaction and productivity as well as reduces the risk of ending up with a "sick building" (and all the liabilities associated with that term). Thus, green designers address:

- Indoor air quality (IAQ)
- Light quality and light levels
- Acoustic issues and noise control
- Comfort and controllability of systems
- Contact with nature and outside

Source control is the primary IAQ strategy. Potential pollutants are identified and minimized at the source. The design seeks to exclude emissions from neighboring buildings, vehicles, and soil contamination (including radon). Air intakes must be located away from sources of pollution. Effective moisture control is used to curb humidity and prevent mold problems. Green designers specify low or zero VOC (volatile organic compounds) and odor-emitting building materials and equipment.

Ventilation is regarded as the secondary strategy for IAQ. This involves more than simply meeting ASHRAE ventilation codes and providing sufficient outside air to dilute and remove pollutants. Effective diffusers and proper zoning are essential to mix air or segregate it as appropriate.

"Economizer" cycles (which use 100 percent outside air when the "enthalpy" or "heat content" of outside air is less than that of indoor air) can be used during the swing seasons and summer to cool and flush a building. Use of heat recov-

ery systems minimizes the winter and summer energy penalties associated with mechanical ventilation of buildings.

"Demand Control Ventilation" (DCV) is another energy efficient ventilation strategy. DCV uses carbon dioxide sensors to gauge building fan zone occupancy, controlling outside air dampers and air volumes accordingly.

What about operable windows? Surely, they go against the grain of commercial and institutional building design of the last few decades. We think of these buildings as being sealed boxes. Heating and cooling costs can increase if windows are open, depressurizing spaces and allowing additional volumes of unconditioned outside air to enter.

But operable windows provide ventilation, a sense of control for occupants, and a way of getting in contact with outside—all qualities of a healthy building. Green design asks designers to reconsider operable windows and mechanical air conditioning for commercial and institutional buildings. In some regions, operable windows and passive cooling strategies may be able to replace mechanical air conditioning entirely—especially if building cooling loads are minimized.

In other regions, operable windows may be part of an efficient building cooling strategy that relies on windows (and

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other passive ventilation) for cooling during mild parts of the cooling season and mechanical air conditioning when it gets really hot and humid.

Operable windows and energy efficiency need not be incompatible. Window frame switches can be used to shut off mechanical air conditioning to rooms with open windows. The challenge is to design a system that keeps windows closed during cold weather and permits them to be open when the enthalpy of outside air is acceptable for indoor conditioning.

Recycling, Construction, and Building Commissioning

Recycling is addressed in two ways by green building designers. First, it is part of the architectural program in order to ensure that adequate systems and space are incorporated into the building design to facilitate maximum recycling by occupants. Secondly, construction and demolition (C&D) debris must be recycled during the construction process. A full waste management strategy should be developed to address construction waste, material salvage, packaging reuse, and hazardous substances.

Construction issues also include stringent environmental health and safety measures on the job site, as well as measures to protect the natural features of the site, rescue trees, salvage top soil, minimize runoff and pollution, control noise and dust, and address community concerns.

Green design recommends a commissioning process to maximize building performance. The process generally involves the following:

- Testing and performance protocols
- Dedicated commissioning agent
- Confirmation of system designs, specifications, and installation
- Confirmation that equipment and systems operate as designed
- Performance optimization
- Training of M&O facilities staff

Ideally, the commissioning process begins during the design phase of a project and concludes after the building is accepted by the owner. Commissioning adds to the first cost of a building but it produces a healthier, better performing building with operating and lifecycle savings, which can exceed the costs of commissioning many times over.

Green Buildings are Part of the Curriculum

Facilities managers at educational institutions should be particularly interested in the pedagogy of green buildings.

An ecological building should teach students, faculty, and staff. It should inspire everyone to decrease his or her "environmental footprint" and live lightly on the Earth. To accomplish this, green design features and systems should be visible. Displays or other illustrative and written materials should be available to tell the "green story" of the building. Moreover, a green building should be loudly proclaimed to the wider community. It deserves press events, newspaper articles, tours, and TV coverage to convey its message to a larger audience.

Of course, the educational value of the building can be enhanced if students, faculty, and staff (and members of the wider community) are involved in the design process. Also, the learning process can continue after the building is occupied by asking how the building can now be optimized. The designer can be challenged to produce a structure capable of evolving and improving itself.

Green Design—Tips on Getting Started

Green design begins early enough to affect the decision to build and (if yes) the decision to locate a building in a particular site. The architect or design consultant should be selected on the basis of an RFP and selection process that explicitly calls for green design credentials and capabilities.



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Your green architect should be asked to meet specific performance goals, such as the following (percentages provided for example only):

- Exceed energy code of ASHRAE/IES 90.1 by 50 percent
- Meet 20 percent of building heating load with passive solar
- Generate 15 percent of building electricity requirements by PV
- Achieve a daylight factor (DF) of 2 percent on a work plane 15 feet from the building perimeter (DF is percent of light available indoors vs. outdoors under an overcast sky)
- Specify that 30 percent of materials will be minimally 20 percent post-consumer recycled-content or salvaged, based on total materials cost.

Over-building and over-sizing equipment should be discouraged. Compensation for the architect and design team should be tied to achieved building performance.

Your architect may wish to strengthen his or her green design capabilities by hiring a sub-consultant with specific expertise in daylighting, energy modeling, green materials selection, etc. The green design process can be enhanced in other ways as well. For example, design charrettes can be arranged to permit other architects and engineers (along with students and faculty) to review and critique building design as it evolves. Green design can also be facilitated by using the LEED Green Building Rating System to guide and evaluate your design. LEED (Leadership in Energy and Environmental Design) is a voluntary, consensus-based, market-driven rating system developed by the U.S. Green Building Council.

Overcoming Barriers, Jumping Hurdles

Of course, all of this supposes that the facilities professional can overcome very real barriers to green design, including:

- Concerns about higher first costs ("We don't have the money.")
- Concerns about delaying project schedules ("We don't have time.")
- Lack of in-house green design expertise ("We don't know how to do it.")
- Heavy workload by in-house staff ("We can't do anything more.")
- Organizational culture ("We've never done it that way before.")

The costs issue can be addressed in a variety of ways (see sidebar). Time concerns may be harder to address if projects are fast-tracked. Can schedules be reconsidered so that projects are done right, producing minimum long-term costs and maximum long-term benefits?

When workload is a barrier, it may be time to reevaluate priorities and/or call for "reinforcements" in the form of outside contractors or consultants. Both approaches involve costs, but green design is worth it. Consultants can provide staff training and strengthen in-house expertise. In-house

resources and expertise can also be enhanced by selecting a green architect as the next architect you hire for your facilities team. And organizational culture can change if facilities leaders commit to green design by encouraging and rewarding managers and staff who rise to the challenge.

It's Time to Go Green—Concluding on a Personal Note

I am the happy father of a 10-year-old girl (Skye) and a 12-year-old boy (Jay). I love my children with all my heart. Sometimes I wonder what the world will be like when they are my age. What kind of world are we leaving the next generations?

We've all heard the admonition, "think globally, act locally." I try to do both. But sometimes when I reflect on the state of our world, I am overwhelmed with future fear. What will happen if human population doubles? What will happen if we do nothing about clear-cutting forests or global warming?

I must confess that for me one of the attractions of green building design is that it is not "doom and gloom." Instead it is positive, hopeful, and even inspiring. How environmentally benign and sustainable can we make our buildings? It's time we found out! 🌱

GREEN BACKS VS. GREEN DESIGN—GREEN BUILDINGS COST LESS!

Green buildings cost less, not more. Here's why.

We tend to think of the cost of a building as only its "first costs," i.e., what it costs to design and build it. We conveniently forget that buildings typically remain standing for a long time and during that period cost their owners a fortune in operating costs (far exceeding first costs).

Yes, it is true a green design may cost more than a conventional design. Yes, some green design elements may add construction costs. But these first costs must be weighed against offsetting savings.

Green design buildings can have substantially lower energy and operating costs than conventional buildings, producing much lower long-term or lifecycle costs. Also consider the value of employee productivity gains that are likely with green design. Given the high cost of labor, even small improvements in productivity produce huge dollar benefits—which can dwarf any additional first costs.

That being said, it should be noted that green design may not even increase first costs. A green building's reliance on efficiency, daylighting, and/or solar heating makes it possible to downsize conventional HVAC systems. This reduces costs, generating savings that offset additional costs for green design features or materials. Thus, it is possible to build a high-performance green building without any (or just minimal) additional costs.

The cost equation may be better yet. Subsidies may be available from utilities, and state and federal governments to offset costs associated with green design. These can make it even easier to overcome the first cost hurdle.

—WS

Construction from the Inside Out:



UAB's Successful In-House Organization

By Brooks H. Baker III, P.E., and Hope Duncan Hammonds

The University of Alabama at Birmingham (UAB) continues to have a tremendous demand for construction and renovation work to support rapid growth and change in the medical center and research areas, as well as the changing needs of undergraduate and graduate students. Three years ago, the Design Build Services (DBS) Department was created by combining two existing departments to meet

the changing needs of the university community for minor renovation and construction services. This article is intended to share some of the success stories of this department and the keys to achieving outstanding results.

About the University of Alabama at Birmingham

Since the UAB Academic Health Sciences Center was founded in 1945, UAB has grown from a small urban extension service to a nationally ranked teaching and research center, offering a full range of academic programs including arts and humanities, business, education, engineering, health-related professions, natural sciences and mathematics, nursing, and social and behavioral sciences.

After becoming an independent university in 1969, UAB has taken the lead in forging an economic revival in a city that shares its youthful entrepreneurial spirit. Originally, UAB

Brooks Baker is associate vice president for facilities at the University of Alabama at Birmingham and a past president of the Southeastern region of APPA. He can be reached at bbaker@fab.uab.edu. Hope Hammonds is director of design build services at UAB and can be reached at hhammonds@fab.uab.edu.

comprised only a few blocks in the south corner of a city whose industrial base had rusted away. Today, UAB is a comprehensive urban university and medical center that encompasses 75 city blocks and has a student enrollment of approximately 16,000. UAB is the largest single employer in the state with approximately 16,000 employees and an annual budget of almost \$1.2 billion. In FY 1999, UAB received more than \$300 million in research grants and contract awards.

Early leadership in UAB created the outline of being fast paced and entrepreneurial in every area of endeavor, including the

construction, renovation, and management of the facilities. In-house construction and renovation have been a part of the strategy for providing rapid response to the changing needs of the university since the mid-1960s—and continues to have significant presence today. In the spirit of trying new things and fine tuning systems, several iterations of in-house construction have been tried, evolving into our current configuration.

THE EVOLUTION OF IN-HOUSE CONSTRUCTION

Buildings and Alterations (B&A)

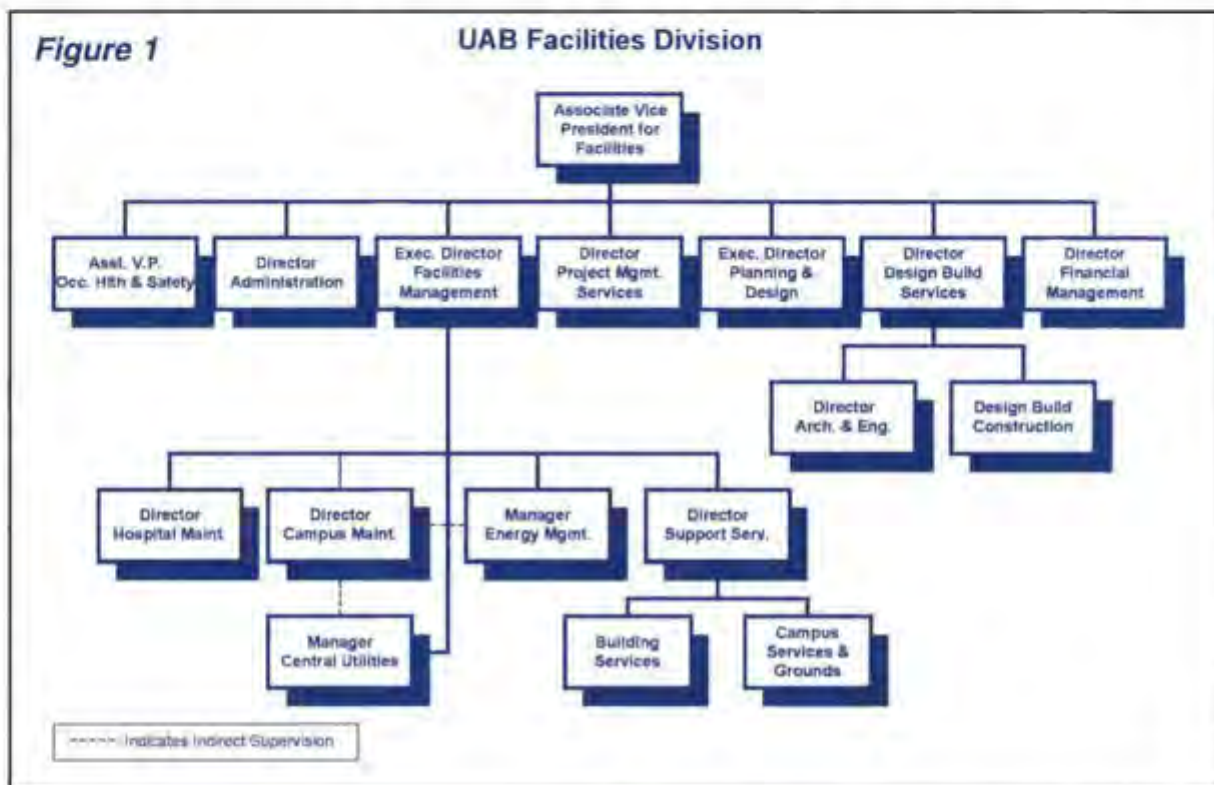
The original in-house construction group at UAB, called Buildings and Alterations (B&A), was started in the mid-1960s to respond to the need for quick delivery of projects valued under \$400,000. The main function of B&A was to renovate floors of the Hospital Buildings that were purchased from the county several years before. B&A had as many as 60 construction and management employees and provided a valuable service for many years, but eventually customer satisfaction waned and the organization almost died completely.

B&A operated as a stand-alone entity and was kept separate from the maintenance organizations. Cooperation between these departments was non-existent and infighting

was common, hurting the effectiveness of both organizations.

The Creation of the Minor Construction Department (Minor)

The Minor Construction Department was a reinvention of B&A with the intent to be a smaller, more efficient group that had a close working relationship with the maintenance departments. Maintenance personnel often worked in Minor, and Minor employees worked in Maintenance. There were numerous advantages to having these two organizations sharing employees, but several issues caused the reputation of Minor to be damaged in the eyes of the customers.



The first problem was a "customer perception" problem with utilizing Maintenance employees on construction projects. The maintenance departments were funded centrally through a typical budget allocation method, while Minor was funded on a fee-for-service basis. Customers who requested construction projects had the perception that they were paying twice if a regular maintenance employee showed up to do construction. No matter how hard we tried to explain that the customer would receive all their usual maintenance services (at no additional cost) and would only be billed for construction, the perception remained.

The second problem with the Minor Construction structure was the availability of a professional design staff. The Architecture and Engineering Department (A&E) was a separate department that did the design work for Minor, but they also served as Project Managers on major capital projects, developed the UAB Facilities Standards, performed code reviews and maintained resource drawings. There were just not

Continued on page 28

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Authors Brooks Baker and Hope Hammonds.

Continued from page 26

enough employees to handle the growing requests for "minor" construction projects plus large capital projects.

The demand for projects to be managed by Minor Construction increased significantly and the department needed to increase its ability to design and construct projects. In order to increase the capabilities of the department, expertise in construction management and project management needed to be enhanced, as well as the delivery of architectural and engineering design for these projects. Design-build was a concept of project delivery that was gaining popularity in the private construction sector, and which held many advantages when properly implemented. In 1997 the decision was made to move Minor Construction toward the concept of design-build project delivery.

Design Build Services Created

In 1997, the Department of Design Build Services (DBS) was created. The organizational structure shown in Figure 1 combined the former separate departments of Architecture and Engineering and Minor Construction into one department, with one person responsible for the management of the new organization. A separate department, called the Department of Project Management Services, was also created to manage large capital projects.

Recruitment of the appropriate director of design build services was critical to the success of the new organization. Hope Duncan Hammonds was chosen as our first director of DBS and serves in that capacity today. Hope came to UAB after a successful term as an independent construction manager for the Gulfport School

District on the coast of Mississippi. In that position, Hope managed the completion of a \$33 million building program in two years. She has a marketing degree from UAB, but grew up in a construction family and has spent most of her life in the construction industry.

With a new organizational structure and new director, DBS had major challenges ahead. In the past, Minor Construction had been completing \$1.5 million to \$3 million of construction volume each year, and the design staff was not accustomed to working directly with the construction team on projects. The new department was given an \$8 million annual volume goal to accomplish in two years; they literally had to earn their own way. To

meet this goal, DBS had to be the vendor of choice for UAB customers. Because the customers were not a captive clientele, they could request any consultant or contractor they wished for design and construction work.

With the cooperation of the two groups of employees (Architecture & Engineering and Design Build Construction), the DBS Department met its goal in the first year and completed almost \$9 million in its second year. Figure 2 shows the major reason for the dramatic improvement. Even with an overwhelming workload, customer satisfaction had risen, and has continued to do so.

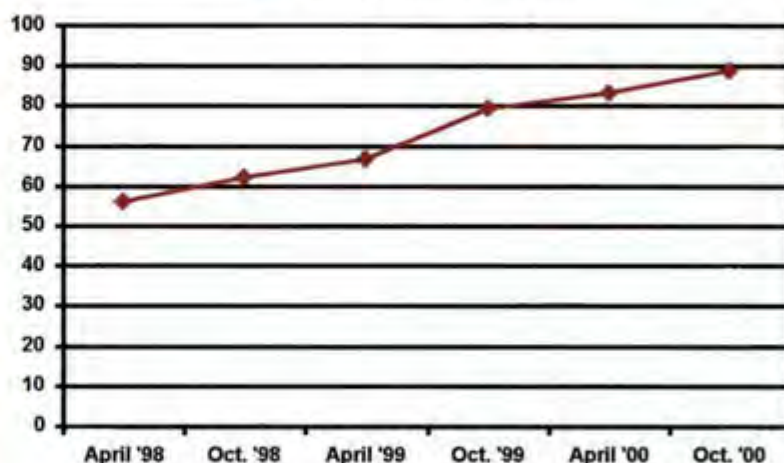
Continued on page 30

Figure 2

CUSTOMER SURVEY RESULTS

Design Build Services

— Overall Customer Satisfaction



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In addition to the employees' support and buy-in to the new goals, the increase in customer satisfaction and volume can be attributed to:

- Creation of the Quick Hit Team to perform work orders from \$25 to \$1,500;
- Development of customer relationships that lead to trust and teamwork;
- Willingness of maintenance departments and DBS to work together;
- A new construction management concept that united the design and build teams;
- Full-service options for design, estimating, construction, and asbestos abatement;
- Marketing the full-service options and construction management teams;
- Constantly measuring progress (surveys, volume reports, incoming work orders);
- Partnering with reliable subcontractors;
- Electronic timekeeping for craft hours that are billed to projects;
- Electronic timekeeping of design hours used for budget allocation purposes;
- Updated estimating software used to calculate material quantities and improve estimate accuracy;
- New project management tools (SureTrak, plotter, updated AutoCAD, etc.); and
- Complementing existing staff by filling vacancies with qualified external and internal applicants. Construction supervision, estimating, and interior design positions were filled.

Currently DBS is managing single projects up to \$1 million in scope. The variety of services and availability of work provide many project opportunities. In addition to working with UAB customers, DBS complements other facilities departments by providing supplemental work forces, design review, feasibility studies, and pre-bid demolition for contractor investigation and asbestos abatement.

One of the keys to success in the UAB Facilities Division is teamwork between the various departments. Organizational structure can be a step in the direction of creating the avenues for cooperation, but the paradigm must truly be one of cooperation and teamwork for an organization to operate at its maximum potential. The UAB Facilities Division Directors meet together regularly to discuss issues and resolve any conflicts that may arise. The synergy generated by this cooperative attitude is good for every department. Our Maintenance Departments, DBS, Department of Project Management Services, Occupational Health and Safety, Building Services, and other facilities units are encouraged to offer assistance, encouragement, and a positive word to our customers about each other at every opportunity.

It is often difficult to put a dollar value on the benefits that are provided to the University through the efforts of Design Build Services. The need for significant renovations in the basement of one of our old hospital buildings created the type of project that can cause ulcers in the best of us. This project was to be performed in a 70-year old building that had seen few renovations over the years and which hid many unknowns behind the walls and above the ceilings.

After the project was designed, conversations with contractors made it clear that unforeseen conditions and the unpredictable nature of working in a hospital building were going to force them to build in a considerable risk factor that, of course, would translate into additional dollars. One of our largest general contractors made the statement, "I wouldn't touch this job for a million dollars." In fact, their preliminary estimates were well over a million dollars, since they would have to add considerable contingencies into the project to be a viable bidder. Design Build Services was brought in to manage the project using a few of their in-house forces, but mostly subcontractors, and was able to complete the project for under \$800,000 for the same scope of work.

Successful projects like this make the department look like heroes. Another job, renovations to an old church for our honors program, had the same type of challenges. If this project had gone to bid prior to any demolition work, the bidders would have been forced to add contingencies for those things that they could not see. Design Build Services came in and did the preliminary asbestos abatement and demolition work so that the potential bidders could walk the area and see exactly what they would be facing when bidding the project. This will hopefully result in considerable savings to the university at bid day.

The Quick Hit Team that was referenced earlier has also been a tremendous asset to the university. This particular group of five craftpersons is usually assigned the projects that are under \$1,500 in total scope. They have a typical turnaround time of less than five days from receipt of the project to completion. This group typically performs over 2,000 small projects per year, and our customers love being able to get this quick turnaround on the small projects.

We mentioned a few keys to the success of this department, but the main key to success is our obsession with customer service. Regardless of how well we put together a business plan and work the plan, if the leadership and craftpersons within the department are not obsessed with pleasing the customer, we would not have achieved customer satisfaction levels like we have seen in the last two years.

The paradigm shift toward exemplary customer service is not an easy thing to accomplish, but the performance of the major renovation projects on one extreme, and the very small quick-hit projects on the other are all performed with the same goal in mind—making the customer happy. We don't always accomplish this goal, but we keep trying. ▲

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AN INVITATION FROM THE PRESIDENT

Dear Members and Friends of APPA:

Each year we have a unique opportunity to come together as educational facilities professionals at the Educational Conference and Annual Meeting. This year marks the 88th year that APPA members have gathered to share experiences and address the challenges of the profession.

This year's conference offers a selection of top-quality educational sessions that help prepare the facilities professional to embrace new and evolving roles such as information technologist, operations expert, asset manager, partner, strategist, executive, and leader. The Educational Committee has done an excellent job in preparing a program that will both expand your professional knowledge and encourage you to apply new solutions to emerging problems.

I also encourage you to take advantage of the expertise of our many business partners. Visit their exhibits in the Hall of Resources and talk with them to learn about how their solutions, incorporating the latest advances in services and products, can be successfully applied to your environment. Also pay special attention to the Poster Sessions that will be held in the Hall of Resources.

Don't miss out on this rare opportunity to join hundreds of your peers and immerse yourself in networking, renewal, and professional development. Examine the following pages to plan your itinerary and make your travel arrangements. This chance comes just once a year so join us in Montréal, where you will experience the convergence of competency and collaborative relationships, resulting in improved credibility as a facilities professional.

A stylized, handwritten signature in dark ink, appearing to read "J. Harrod Jr." with a large, sweeping initial "J".

John P. Harrod Jr.
President, APPA

Hospitality with a definite French flavor is one of the hallmarks of Montréal. This distinctive quality has made the city one of the most popular international destinations. Growing from a small French Colony in the latter half of the 17th century to a thriving metropolis, Montréal is the second largest French-speaking city in the world.

However, English is also very much in evidence, reflecting the British influence that has traditionally colored Montréal's history. Montréal is a bilingual city, with information in both French and English. Non-French speaking visitors can easily find their way around. Join us in Montréal and discover for yourself this beautiful and vibrant city. Learn more about Montréal at www.tourism-montreal.org.

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EDUCATIONAL SESSIONS

Below is a list of sessions that will be taking place at the 2001 APPA Annual Meeting. For more detailed information on sessions check out the APPA Annual Meeting website at www.appa.org.

WELCOME KEYNOTE SPEAKER

Marshall Goldsmith is widely recognized as an authority in helping leaders achieve change in behavior for themselves, their people, and their teams. He co-wrote *Coaching for Leadership*.

SCHEDULE AT A GLANCE *(Subject to change)*

THURSDAY, JULY 19

1:00-5:00pm

Executive Committee Meeting

6:00-8:00pm

Regional Representatives Meeting

FRIDAY, JULY 20

8:00-9:00am

Planning Committee Meeting

Bylaws Committee Meeting

8:00am-5:00pm

Exhibit Hall Move-in

9:00am-5:00pm

2000-01 Board of Directors Meeting

SATURDAY, JULY 21

8:00am-5:00pm

Exhibit Hall Move-in

8:00am-12:00n

APPA Committee Meetings

11:00am-5:00pm

Member Registration

4:00-5:30pm

Class Reunion for Institute,
Executive Development, and
Professional Leadership
Academy Graduates

5:30-7:00pm

First-Time Attendees Welcome
Reception

7:00-9:00pm

Annual Welcome Party
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SUNDAY, JULY 22

7:30-9:30am

Welcome Breakfast & Keynote
Address
Marshall Goldsmith

9:30-10:30am

Business Partner's Breakfast
All Exhibitors Invited

8:00-11:00am

Exhibit Hall Set-up

10:10am-12:00n

Provocateur Panel—Should

Architects and Engineers Pay for Their Mistakes? If so, When? Part II
Bill Nelson and Cloriza Lomeli, GLHN Architects & Engineers, Inc.

GASB 34/35

Mohammad Qayoumi, California State University/Northridge; Doug Betts, Carter-Burgess

APPA/CSHEMA Task Force: EPA Compliance Assistance Guide

John DeLaHunt, The Colorado College; Jack Dempsey, University of Illinois/Urbana-Champaign

Wireless Technology in Higher Education

Stephen M. Spiwak and Hildo Hernandez, California State University/Northridge

Collaborative Learning Lab—Facilities Leadership in the Learning Organization

Claudine Lowry, Nova Scotia Community College

10:30-11:30am

Spouse/Guest Orientation

11:10am-12:00n

Contemporary Work Management Practices in Higher Education—A Case Study: University of Colorado at Boulder

John Bruning, University of Colorado at Boulder

ERAPPA Regional Best Paper

12:00-3:00pm

**Hall of Resources & Poster Sessions
Open - Lunch Served (*Exhibit Hall*)**

3:00-4:00pm

GENERAL SESSION: The Role of Facilities Professionals

William A. Daigneau, University of Texas M.D. Anderson Cancer Center

4:00-4:50pm

Conflict Resolution

Dean Kazoleas, Illinois State University

1+1=3 Broadening Your Horizons and Expanding Your Resources

R. Marc Fournier, University of Massachusetts/Amherst

Building a Facility Life-Cycle Knowledge Base: A Survey of America's Education Assets

Michael Crosson, VFA; Steve Glazner, APPA

Regulatory Issues, Legal Actions, and Economic Decisions: The Department of Justice and ADA

Jerry C. Black, Duke University

Using Integration, Information, and Technology to Move Beyond Boundaries

Randy Walsh, California State University/Long Beach

How Stagnant R U?

Dr. Brent D. Ruben & Carol Trexler, Rutgers University

Occupancy Chargeback—An Overview of Different Models and a Glimpse of One Future

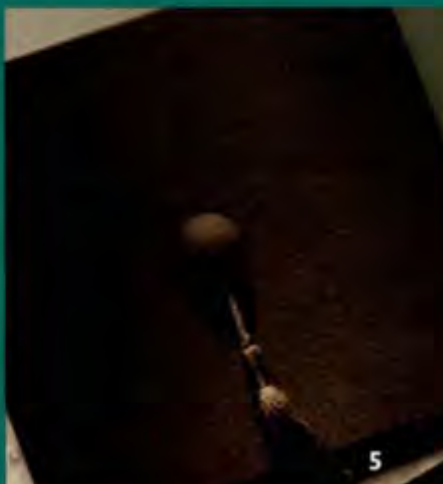
Gary Bradley & Con Mozjerin, RMIT University

AAPPA Regional Best Paper

5:30-7:00pm

Global Partner Reception

All Exhibitors Invited



MONDAY, JULY 23

7:30-9:00am

Morning Breakfast

Dr. Janet Lapp, Sponsored by ServiceMaster

10:10-11:00am

Process Management

Christopher K. Ahoy, Iowa State University

Using Facilities Assessment Data to Produce 21st-Century Residence Halls

Matt Adams, Adams Consulting; Gary Thompson, North Carolina State University

Unexplored Avenues for New Funding: What Works and What Does Not

Duncan Watt, Carleton University; Michael Crosson, VFA

10:10-12:00n

Collaborative Learning Lab—Physical Facilities Learning Opportunities: Live Web Demonstration

James E. Dertinger, Ohio State University; Robert K. Beck III, Purdue University

Collaborative Learning Lab—Beyond Environmental Regulation: The Sustainable Campus

Paul Schneller, Indiana University/Bloomington; H. Ford Stryker, Pennsylvania State University; Julian Keniry, National Wildlife Federation; Peter Reppe, University of Michigan

Provocateur Panel—To Utilize SAM or Not to Utilize SAM, That is the Question

Maggie Kinnaman, University of Maryland/Baltimore

CAPPA Regional Best Paper—Beyond Physical Boundaries: Linking Mission to Place

John Reeve, AIA, and Randall S. Moskop, Christner, Inc.; Patrick Apel, Maryville University of St. Louis

11:10-12:00n

Benchmarking Custodial Operations for Improved Performance

John Walker, Management; Mary Vosevich, University of New Mexico

University of Virginia's Balcony Collapse/Lessons Learned

Jay W. Klingel & Robert P. Dillman, P.E., University of Virginia

MAPPA Regional Best Paper—Customer Service Marketing

Eric Kruse, University of Minnesota; J.A. Bardouille Ph.D., Phil Reed, and Paul N. Guttman, The University of Michigan

12:00-3:00pm

Hall of Resources & Poster Sessions (Lunch Served)

3:00-3:50pm

Are You Ready for a Change? An RFP Case Study at Harvard Medical School

Mark L. Heroux, Sebesta Blomberg; Eric Buchrens, Harvard Medical School

A Catalyst for Career and Cultural Change

Sherwood Wilson, Ohio University; Jean Radcliff, Ohio University

Developing a High Performance Organization

Nathaniel Norman, University of Michigan

Where to Park? How to Park? Technology-Based Solutions for Urban Campuses

Christian R. Luz, PE, AICP, HNTB Corporation; Lori Kay, University of Wisconsin/Madison

Environmental Management Systems: The Whats, Whys, and Hows

Ayodele McClenney, The George Washington University; Matthew R. Van Patten, Apex Environmental, Inc.

SRAPPA Regional Best Paper—Commissioning New Construction

Robin Smith, Emory University

TUESDAY, JULY 24

6:00-7:30am

5th Annual 5K Fun Run/Walk, sponsored by TMA Systems, Inc.

7:30-9:00am

Awards Breakfast

9:30-11:00am

GENERAL SESSION: PERSONAL LEADERSHIP

Franklin Covey

11:00am-2:00pm

Hall of Resources & Poster Sessions

Brunch Served

2:00-3:00pm

Learning to Soar High with the EAGLE

Donald Hufford, Robert K. Beck III, & Lisa M. Bittles, Purdue University

Recruitment & Retention: Solicit, Seduce, Select, and Stabilize

Robert Casagrande, Southern Methodist University

Operational Guidelines for Grounds Management Report

Mike Loftus, University of Delaware

How to Use Your Palm Pilot

Performance Improvement through Benchmarking and Performance Measurement

Victor J. Atherton and Michael White, University of Miami

RMA Regional Best Paper—Facilities Design for Emerging Technologies

Mark S. Valenti, Sextant Group

Panel Discussion: How to Prepare for a Career Transition

3:00-4:00pm

Regional Business Meetings

6:00-7:00pm

Banquet Reception

7:00pm

Closing Banquet—*Featuring Music and performers from Cirque du Soleil*

WEDNESDAY, JULY 25

8:00am-1:00pm

2001-02 Board of Director's Meeting

The people who are important to you are important to us too, so please bring them! Montréal is one of the most romantic and engaging cities in North America. It is a city that has well-preserved historic sites, museums, and great restaurants. Montréal is also a great launching point for a side trip to Québec City.

Below is a list of tours that will be offered (*all prices are US dollars*):

Saturday, July 21

1:00-5:00pm

Campus Tour 1 (Cost: \$15/person)

École de Technologie Supérieure (ETS)
University of Québec at Montréal

Campus Tour 2 (Cost: \$15/person)

McGill University
University of Montréal

Sunday, July 22

10:00-11:00am

Spouse/Guest Orientation (Cost: Free)

1:00-4:00pm

Montréal City Tour

(Cost: Adults: \$20/Children (5-12): \$10)

Monday, July 23

9:00-12:00pm

Montréal City Tour

(Cost: Adults: \$20/Children (5-12): \$10)

11:00am-5:00pm

Deluxe Montréal Tour

(Cost: Adults: \$35/Children (5-12): \$10
Lunch not included)

6:30pm-12Midnight

An Evening at the Casino de Montréal

(Cost: \$50 (Adults Only))

Tuesday, July 24

1:00-5:00pm

Cruise Tour

(Cost: Adults: \$22/Children (5-12): \$14)

1:00-4:00pm

Underground Walking Tour

(Cost: Adults: \$10/Children: Free)

Wednesday, July 25

8:00am-8:00pm

A Day in Québec City and Montmorency Falls

(Cost: Adults: \$40/Children: \$25)

HALL OF RESOURCES/EXHIBIT HALL

More than a trade show, the Hall of Resources is an integral part of the conference experience. Visit our Business Partners to learn about the newest products and services that can help you do your job. The Hall also features on-site demonstrations, educational presentations, games, food, and giveaways.

2001 APPA ANNUAL MEETING EXHIBITORS *(As of 2/28/01)*

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ACT-Applied Computer Technology	Country Roads, Inc.
Adams Consulting Group	Cutler-Hammer
Advanced Technologies Group Inc.	Design Collaborative
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LOCATION

APPA's meeting will be based at the Fairmont Queen Elizabeth Hotel and the Palais des Congrès de Montréal. Fairmont Queen Elizabeth is located a short distance from the Palais, where educational sessions and exhibits will take place. All day shuttling will be provided from the hotel to the convention center. Registration fees do not include lodging or travel, and room reservations must be made separately. A room reservation form is included in this guide.

ACCESSIBILITY

APPA is committed to accommodating those with special needs. To request special materials, services, or assistance, please contact the Education Department at 703-684-1446 ext. 230 prior to the meeting.

AIR

Montréal is served by Dorval International Airport, located approximately 25 minutes from downtown Montréal. Both the Fairmont Queen Elizabeth Hotel and Holiday Inn Montréal Centre-ville/Montréal Downtown can be reached by taxi or shuttle. USAirways and Delta Airlines have been appointed as the official carriers for the APPA Annual Meeting and offer special discounted rates. To make reservations, please call the appropriate airline:

Delta Airlines	Star File # 174389A	800.241.6760
USAirways	Star File # 62161864	877.874.7687

GROUND

The Fairmont Queen Elizabeth and Holiday Inn Montréal Centre-ville/Montréal Downtown are located in the heart of downtown Montréal. Taxi fares are approximately \$25 CN to the downtown hotels. APPA has also arranged for discounted rates on rental cars with Avis. To take advantage of this discount, call Avis at 800-331-1600 and refer to discount number B229399.

REGISTRATION

FEE FOR MEMBERS:

- \$375 U.S. First Timer Rate
- \$425 U.S. postmarked or sent on-line on or before June 16, 2001
- \$525 U.S. postmarked or sent on-line after June 16, 2001
- \$150 U.S. Emeritus Members
- \$150 One-Day Registration

FEE FOR NON MEMBERS:

\$600 U.S. postmarked or sent on-line on or before May 15, 2001

\$700 U.S. postmarked or sent on-line after May 15, 2001

Spouse/Guest Fee:.....\$120 U.S.

Child/Teen Fee:\$30 U.S.

One-Day Registration Fee:.....\$200 U.S.

THE REGISTRATION FEE FOR APPA MEMBERS AND NONMEMBERS INCLUDES:

- Saturday Welcome Party - Sponsored by Johnson Controls (hot and cold hors d'oeuvres with limited bar)
- Sunday Welcome Breakfast
- Access to all meeting sessions and general session speakers from July 22-24
- Monday Morning Breakfast with Dr. Janet Lapp (Sponsored by ServiceMaster)
- Lunch/Brunch in the Hall of Resources on Sunday, Monday, and Tuesday
- Tuesday Awards Breakfast
- Tuesday evening Banquet and entertainment
- All coffee and refreshment breaks
- Daily use of the hospitality suite located at the Queen Elizabeth Hotel

FEES FOR SPOUSE/GUEST INCLUDE:

- Saturday Welcome Party - Sponsored by Johnson Controls
- Sunday Welcome Breakfast
- Sunday Spouse/Guest Program
- Access to all meeting sessions and general session speakers from July 22-24
- Monday Morning Breakfast (Sponsored by ServiceMaster)
- Lunch/Brunch in the Hall of Resources on Sunday, Monday, and Tuesday
- Tuesday Awards Breakfast
- Tuesday evening Banquet and entertainment
- All coffee and refreshment breaks
- Daily use of the hospitality suite located at the Queen Elizabeth Hotel

FEES FOR CHILD/TEEN INCLUDE:

Children and teens may participate in the social activities. Registration entitles them to the following:

- Saturday Welcome Party
- Lunch/Brunch in the Hall of Resources on Sunday, Monday, and Tuesday
- All coffee and refreshment breaks
- Daily use of the hospitality suite located at the Queen Elizabeth Hotel
- Tuesday evening Banquet and entertainment
- Please note: All children must be accompanied by an adult at all times.

INDIVIDUAL EVENT TICKETS

Tickets to individual meals and social events are available at the following prices:

♦ Sunday Welcome Breakfast:	\$15 U.S.
♦ Sunday Exhibit Hall	\$25 U.S.
♦ Monday Town Meeting Breakfast	\$15 U.S.
♦ Monday Exhibit Hall	\$25 U.S.
♦ Tuesday Awards Breakfast	\$15 U.S.
♦ Tuesday Exhibit Hall	\$25 U.S.
♦ Tuesday Banquet & Entertainment	\$50 U.S.
♦ Child's Banquet Ticket (children under 12)	\$25 U.S.
♦ Three-Day Exhibit Hall Pass	\$50 U.S.

HOW TO REGISTER

The fastest, easiest way to register is on-line with our secure server at www.appa.org. Register by May 15, 2001 and save \$100. The on-line registration page contains detailed information on sessions, exhibitors, optional events, and a list of attendees.



On-line at www.appa.org

APPA will refund the full cost of registration for cancellation received on or before July 1, 2001. Absolutely no refunds will be issued for cancellations received after July 1. APPA is not responsible for any travel or lodging charges incurred.

QUESTIONS?

Call APPA's Education Department at 703.684.1446 ext. 233 or e-mail suzanne@appa.org or andria@appa.org.

HOTEL POLICY

Reservations must be received no later than June 18, 2001, cut-off date to guarantee the APPA special rate. Reservations are on a first-come, space available basis. The room block may sell out prior to June 18, 2001, so make your reservation as soon as possible.

HOTEL RESERVATION FORM

Use this form to reserve your hotel space for the APPA 2001 Annual Meeting. A one-night deposit must accompany this form to guarantee your reservation. Please mail or fax this form, along with your deposit or credit card information to either:

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Fax: 514.878.6341

RATES:

Standard Single/Double:\$160 CN + 14.5 % tax & \$2 CN Room Tax

Executive Club Single:\$190 Double: \$210 CN

Standard Suites Single/Double:\$325 CN

I will be attending the APPA Annual Meeting July 22-24, 2001. Please reserve a room for me as indicated below. A one-night deposit is included.

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Street Address _____

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ACKNOWLEDGMENTS



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CLASS REUNION!

For the first time APPA will be hosting a reunion for those people who have graduated from the Institute for Facilities Management, Executive Development Institute, and the Professional Leadership Academy. The reunion will take place on Saturday, July 21, 4:30-5:30p.m. Don't miss a great opportunity to reconnect with friends and network with your fellow graduates!

HELPFUL HINTS ON TRAVEL TO CANADA

1. **All Visitors to Canada must show proof of citizenship**, such as a passport or birth certificate. Citizens of countries other than the U.S. should check with the Canadian Embassy, consulate, or trade office before departure.
2. If you are flying from the U.S. and have to make a flight connection, it is easier make a connection in the U.S. instead of going through Toronto. If you connect through Toronto, you will have to clear Canadian customs before proceeding to the Canadian domestic gates.
3. You can often gain a better exchange rate by paying with a credit card.
4. Although U.S. dollars are usually accepted in Canada, visitors should exchange their funds for Canadian dollars at any Canadian financial institution. Most American credit cards are honored in Canada.
5. Canada charges a 7 percent Goods & Services Tax on most goods and services sold or provided in Canada. You may be able to obtain a refund of these charges through the Visitor Rebate Program located in the airport. Rebate forms will be available at the APPA Welcome Desk and at tourism information centers.





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PRELIMINARY PROGRAM



Choosing the Best Project Delivery Method

By Blake V. Peck



A college, university, or school district embarking on a construction project must make an important decision regarding the method by which the project is designed and constructed—the project delivery method. This decision has become more difficult in recent years, as several “alternative delivery methods” have been developed to address weaknesses in the traditional design-bid-build scenario. Methods that have gained in popularity include at-risk construction management, fast-track construction, multiple prime contractors, and design-build. Proponents of particular alternative methods promise improvements over the traditional system in terms of cost, project control, and reduction in disputes.

Blake Peck, CCM, is a founding principal of McDonough Bolyard Peck, an ENR Top 100 CM Firm based in Fairfax, Virginia. He is president-elect of the Construction Management Association of America and can be reached at bpeck@mbpce.com.

For the facilities owner responsible for deciding on the project delivery method, the wealth of choices can be both good and bad. The downside is that with the variety of delivery systems—along with

the accompanying assurances of the superiority of one method over another—confusion can be inevitable. The good news is that the increased number of alternatives offers the building owner more flexibility to choose an appropriate and effective system for its particular project.

Construction management (CM) is a discipline uniquely tailored to the planning, design, and construction process of capital projects. It has proven effective regardless of the chosen contract form or project delivery method. Indeed, CM has been used successfully in all contracting methods and delivery systems by building owners who do not continuously maintain the staff expertise or numbers necessary to deal with the complex responsibilities involved in the management of major projects. The following is a brief review of project delivery methods, along with a discussion of some of the important points an owner should consider in choosing a delivery method. Throughout this article, the term “owner” refers to the person or persons responsible for the institution’s

construction projects and the decisions for their delivery method.

Owner's Requirements

A facilities owner has several areas of concern when embarking on a construction program. The following highlights some of the key considerations in developing a construction program:

• Budget

The owner has an obvious need to determine a realistic budget before a design is created—to evaluate project feasibility, to secure financing, and as a tool to choose from among alternative designs or site locations. Once the budget is determined, the owner requires that the project be completed at or near the established figure without excessive overruns.

• Design

Of foremost importance to the owner is that the desired facility function as envisioned—that the design program successfully fulfills the needs of the owner and users. Therefore, an owner requires that its design team be well qualified in the type of facility being designed. In addition, the owner must ensure that the owner's and users' program needs are clearly conveyed to the design team. Since the design of the facility must be buildable and properly communicated in order to be useful, the owner requires that the design documents are constructible, complete, and coordinated. The documents should properly incorporate unique features of the site, including

subsurface conditions, interface with adjoining properties, access, and other characteristics.

• Schedule

The owner has similar needs in the area of scheduling. The date of completion of a new facility can be critical, either in terms of generating revenue from the facility, or in terms of providing needed functional space by a particular deadline. Therefore, a realistic assessment of project duration and sequencing needs to be performed early in the planning process. The schedule should then be monitored throughout design and construction.

• Risk Assessment

The development of any facility involves many risks. In construction, issues of risk are closely tied to schedule and budget issues. The owner requires an understanding of the risks involved in construction, and should make a conscientious decision regarding accountability and allocation of these risks among project participants. In considering risk allocation, the owner should strive to assign risks to those parties that exercise control over those aspects. For example, it would typically be problematic to require that the contractor correct problems due to design errors at no extra cost since a contractor generally has little control over the cause or magnitude of such errors.

• Owner's Level of Expertise

The owner's familiarity with the building process and the level of in-house management capability will have a large influence over the amount of outside assistance required during the process. It may also guide the owner in determining the appropriate project delivery method.

Review of Project Delivery Methods

Traditional Design-Bid-Build

The traditional design-bid-build system remains the most popular delivery method for construction projects. The owner engages an architect or engineer (A/E), who prepares the design of the complete facility, including construction drawings, specifications, and contract packages.

Once completed, the design package is presented to interested general contractors (GC), who prepare bids for the work, and execute contracts with subcontractors to construct various specialty items. In many cases, the contractor submitting the lowest responsive bid is selected to perform the construction. This contractor is then responsible for constructing the facility in accordance

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with the design. The A/E typically maintains limited oversight of the work and responds to questions about the design on behalf of the owner. The A/E may also assist the owner in administering the construction contract, including determination of project progress for interim payments made to the contractor.

This contracting system offers the advantage of being widely applicable and well understood, with well-established and clearly defined roles for the parties involved. Furthermore, it offers the owner a significant amount of control over the end product, particularly since the facility's features are fully determined and specified prior to selection of the contractor. However, many construction owners have experienced a variety of frustrations using this system, which lead to the development of other methods.

Among the chief disadvantages of the traditional system are:

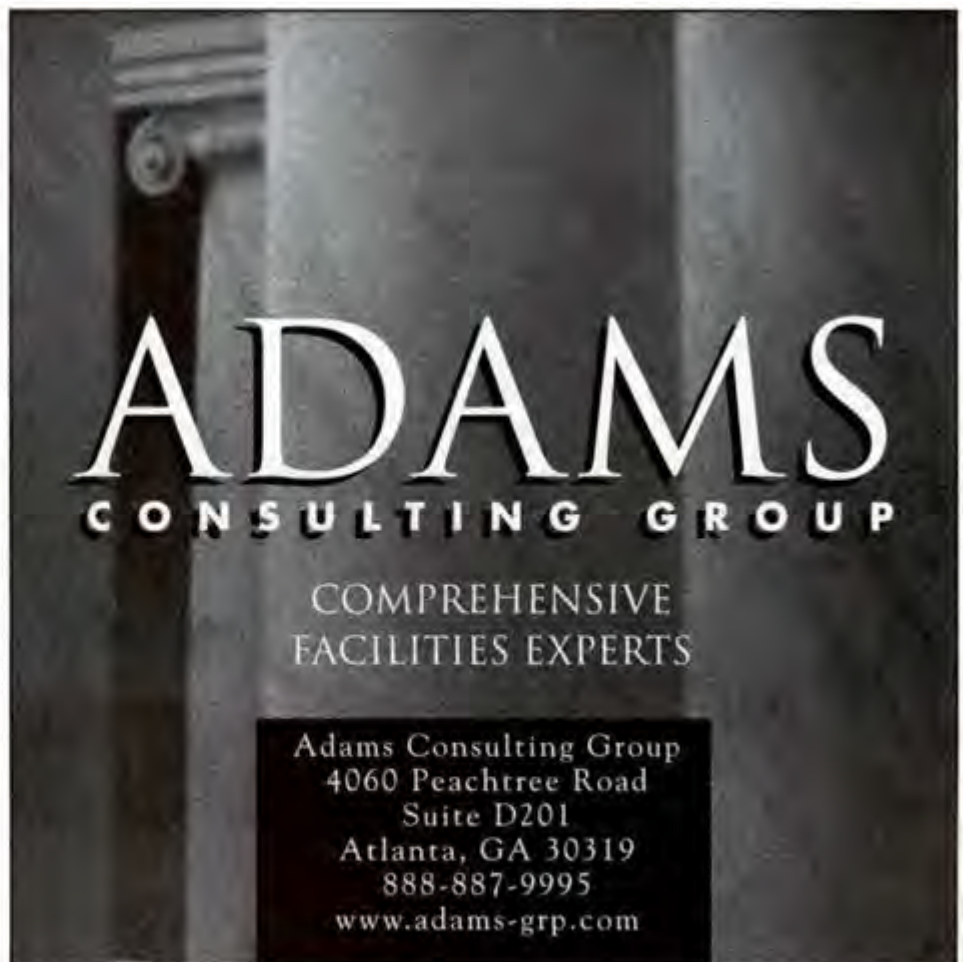
- The process is time-consuming since all design work must be completed prior to solicitation of the construction contract.
- The A/E may have limited ability to assess scheduling and cost ramifications as the design is developed, which can lead to a more costly final product.
- The owner generally faces exposure to contractor claims over design and constructibility issues since the owner accepts liability for design in its contract with the contractor.
- The traditional approach tends to promote more adversarial relationships rather than cooperation or coordination among the contractor, the A/E, and the owner.
- The contractor pursues a least-cost approach to completing the project, requiring increased oversight and quality review by the owner.
- The absence of a contractor's input into the project design may limit the effectiveness and constructibility of the design. Important design decisions affecting both the types of materials specified and the means of construction may be made without full consideration of a construction perspective.

While the most common approach to bidding a project in building construction is for general contractors to submit a sealed, lump-sum bid, many variations in contractor procurement exist in the traditional system.

Other methods include unit-price contracting, which is generally limited to projects that can be easily divided into small work units and quantified prior to construction. This is commonly found in heavy construction projects. At the other end of the spectrum is cost-plus contracting, generally used in circumstances where there is such high-risk or variability in the work that preparing a responsible bid is impossible.

Most successful owners make some effort to pre-qualify contractors, either through invitation, or through an objective set of criteria considering construction experience and financial capability. Doing so helps assure the owner that the contractor is capable of providing a high-quality product. Once the field of bidders is established, an owner bidding a lump-sum project may choose to require sealed bids, wherein the lowest responsible bidder will earn the right to perform the work.

However, many private owners prefer to negotiate bids with preselected GCs. This can be an especially powerful technique if the owner considers qualifications, history of claims, experience in related work, and price. What the owner should really be seeking is the best value for its money, not necessarily the lowest initial cost. Through a careful negotiation or contractor evaluation, the owner can maintain the maximum amount of control over the resulting construction portion of the project.



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Construction Management at Risk (CM as GC)

This system, adopted and promoted by many large general contracting firms, is similar in many ways to the traditional system, in that the construction manager acts as a general contractor during construction. That is, the CM holds the risk of subletting the construction work to trade subcontractors and guaranteeing completion of the project for a fixed, negotiated price following completion of the design. However, in this scenario, the CM also provides advisory

An owner wishing to use the construction management at-risk approach can realize many benefits. Chief among them are the opportunity to incorporate a contractor's perspective and input to planning and design decisions, and the ability to "fast-track" early components of construction prior to full completion of design.

professional management assistance to the owner prior to construction, offering schedule, budget, and constructibility advice during the project planning phase. Thus, instead of a traditional general contractor, the owner deals with a hybrid of construction manager and general contractor (CM/GC).

In addition to providing the owner with the benefit of preconstruction services, which may result in advantageous changes to the project, the CM-at-risk scenario offers the opportunity to begin construction prior to completion of the design. The CM/GC can bid and subcontract portions of the work at any time, often while design of unrelated portions is still not complete. In this circumstance, the CM/GC and owner negotiate a guaranteed maximum price (GMP) based on a partially completed design, which includes the CM/GC's estimate of the cost for the remaining design features. Furthermore, CM-at-risk may allow performance specifications or reduced specifications to be used, since the CM/GC's input can lead to early agreement on preferred materials, equipment types, and other project features.

The primary disadvantages cited in the CM-at-risk system involve the contractual relationship among A/E, CM/GC, and owner once construction begins. Once construction is underway, the CM/GC converts from a professional advisory role of the construction manager to the contractual role of the general contractor. At that time, tensions over construction quality,

the completeness of the design, and impacts to schedule and budget can arise. Interests and stake holding can become similar to the traditional design-bid-build system, and adversarial relationships may result. While the fixed GMP is supposed to address the remaining unfinished aspects of the design, this can in fact increase disputes over assumptions of what remaining design features could have been anticipated at the time of the negotiated bid.

One mitigating approach to this problem is for the CM/GC to share with the owner its subcontractor bids, to ensure openness in the process. The CM/GC may further assume risk by taking some responsibility for design errors discovered during construction, if it was involved in the review of the design prior to establishing the GMP. In addition, arrangements can be made regarding risk-sharing and profit sharing if there are over-runs or under-runs in the GMP.

An owner wishing to use the construction management at-risk approach can realize many benefits. Chief among them are the opportunity to incorporate a contractor's perspective and input to planning

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and design decisions, and the ability to "fast-track" early components of construction prior to full completion of design. However, since a commitment is made to a contractor early in the process, the proper selection of the CM/GC is important to provide the best value to the owner.

Multiple-Prime Contracting

Another alternative procurement system is multiple prime contracting, in which the owner holds separate contracts with contractors of various disciplines, such as general construction, structural, mechanical, and electrical. In this system, the owner, or its CM, manages the overall schedule and budget during the entire construction phase.

At some point early in the process, the D-B team will usually negotiate a fixed price to complete the design and construction of the facility. Once underway, the D-B team is then responsible for construction of the project, and for all coordination between design and construction.

This system, which many state agencies are required to use, gained favor in part as another method of "fast-tracking" construction. Work in each construction discipline is bid separately, allowing the flexibility of awarding construction contracts on the first portions of the project as soon as the respective aspect of design is completed. This fast-track approach appears to be a highly desirable feature of this method of procurement in cases where time of performance is a critical element.

Furthermore, the system allows the owner to have more control over the project schedule, since the owner sets the schedule for bidding individual portions of the work. For example, if an initial phase of construction (such as foundation construction) is delayed, the owner may reduce liability for delays by postponing the bidding of follow-on work. Another advantage of this system is that the owner can realize savings by directly procuring major material items, such as structural steel or major mechanical equipment, avoiding contractor mark-ups.

However, the very nature of this system is one of its primary disadvantages. There have been numerous cases where this method did not work well, due to the absence of overall authority and coordination once construction is underway. The problems primarily arise from lack of coordination and contractor delays. While the general construction prime contractor is often given contractual responsibility to coordinate the work among trades, including schedule, this

contractor lacks the contractual authority to dictate the schedule of another contractor.

For example, during the construction of a university laboratory/classroom facility, delays arose due to coordination issues involving installation of laboratory equipment. The general contractor sought damages from the owner for delays by the mechanical contractor, while the mechanical contractor blamed the general contractor for its delays. This type of dispute is far from unique in this form of contracting, even in cases where the owner has used an independent CM to coordinate scheduling issues.


Design-Build

The design-build (D-B) project delivery method has grown in popularity, and is seen by some in the industry as the perfect solution in addressing the limitations of other methods. For an owner, the primary benefit is the simplicity of having one party responsible for the development of the project. While the other systems often give rise to disputes among various project participants—with the owner acting as referee (or party ultimately to blame)—in D-B many of these disputes become internal D-B team issues which do not affect the owner.



Under this system, the owner contracts with a D-B team, which is often a joint venture of a GC and an A/E. Since GCs

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are comfortable in the role of risking corporate capital in performing projects, they usually are the lead members of this sort of team. One variation of the typical D-B team structure, known as fee-paid developer, involves the owner engaging a developer, who then selects its A/E and contractor partners. However formulated, the D-B team performs the complete design of the facility, usually based on a preliminary scope or design presented by the owner.

At some point early in the process, the D-B team will usually negotiate a fixed price to complete the design and construction of the facility. Once underway, the D-B team is then responsible for construction of the project, and for all coordination between design and construction.

Since the construction team is working together from the outset, D-B offers the opportunity to save time and money. However, the advantages of the system are offset by a significant loss of control and involvement by the owner. Accordingly, it is difficult for the owner to verify that it is receiving the best value for its money, without a great deal of confidence in the D-B team.

The primary caution for an owner considering D-B is to recognize the effort and completeness that must be behind its initial scope/preliminary design, which forms the basis of its contract with the design-builder. Often, the owner will need additional consultants to help develop the scope or preliminary design and take on the role of a traditional A/E firm.

Owners with highly specialized program needs or desires may not find it advantageous to turn over responsibility to an outside team, without ensuring adequate levels of oversight and communication. For example, a government owner constructed a high-technology research facility involving highly specialized equipment using D-B. During project development, the D-B team made several key design and equipment selection decisions without full involvement of the owner, resulting in an unsatisfactory facility that required costly changes.

With this lesson in mind, it appears that D-B is best suited to conventional projects for which project requirements can be clearly defined and for which expertise is widely available. For example, a classroom/office facility or a residence hall complex. In projects of this type, the owner is not assuming undue risk in conceding control over the project, and may benefit from the advantages of D-B.

Another primary consideration for the owner is proper selection of the D-B team. Since the owner selects a team that has been created prior to selection, it may be difficult for the owner to maintain the proper balance of design expertise, financial capability, construction experience, and experience in D-B team roles. In particular, the owner should strongly favor D-B teams with a successful track record working together on previous projects in the same D-B roles. More so than in any other delivery system, the success of a D-B project may hinge on the initial selection process.

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Agency Construction Management Services

Agency construction management (ACM), or construction management-for-fee, encompasses a range of services provided by a CM on behalf of an owner. It is a common misconception that CM-for-fee represents a distinct project delivery method. In fact, ACM consists of a distinct set of services that are applicable to any project delivery method. These services can be used by the owner, as necessary, to extend or supplement the owner's own expertise, its own staff, to manage the construction process, and to help address some of the shortfalls of the project delivery method chosen.

A CM working as an agent to the owner primarily provides the benefit of independent, professional services on the owner's behalf throughout the project. In contrast to some other project participants, the ACM has no vested interest in the project—in either its design or construction—and maintains a fiduciary duty to act on the owner's behalf and to provide impartial advice concerning the construction project.

As such, ACM firms should be selected based on qualifications, and not on a cost or low-bid basis.

Services offered by an ACM include the following:

Pre-Design and Design: As discussed earlier, there are often advantages to obtaining construction expertise during the early planning stages of a project. Some services typically offered by ACM firms during planning stages include the following:

- **Selection of a design team:** An ACM firm, based on historical experience in the market, can assist the owner in selecting the most qualified A/E team to develop project plans and specifications. Similarly, an ACM firm can also assist the owner in evaluating various potential construction sites.

- **Budget and Cost Estimating:** Preliminary budgets, based on historical data for similar projects, will assist the owner in determining the financial feasibility of their initial scope. More refined estimates are developed during the design process to pinpoint the necessary construction budget, and provide a basis of comparison to contractor bids.

- **Constructibility Review:** A review of design plans and specifications will help the owner verify that the design as presented is clear to the contractor, poses no construction conflicts, and is economically feasible to build.

- **Value Engineering:** A multi-disciplined team reviews project features to ensure that the owner's needs and building's functions are provided for in the most cost-effective way, both in terms of initial and lifecycle costs.

- **Contract Bidding:** An ACM firm can assist the owner in pre-selection of contractors and development of the bid package to ensure that the contractor selection process is fair and provides the best value to the owner.

In fact, an ACM is often most cost effective during the planning stages of the project, since the ACM firms can provide the careful planning and organizational skills that can help prevent costly problems during construction. Properly executed services such as constructibility reviews and preliminary scheduling can result in significant risk reduction and cost savings, especially in terms of limiting change orders, delays, and contractor claims. Here the owners can maximize the benefits of construction management in a professional advisory role throughout the design and construction process because the construction manager has no stake in the construction contracting.

Construction Phase: ACM firms provide a variety of services during construction, including the following:

- **Construction Inspection and Surveillance:** Virtually all owners desire some type of examination of project performance on a continuous or periodic basis to review progress, ensure compliance with specifications and plans, and to review housekeeping and safety issues.
- **Project Controls:** These services are provided to ensure that the project is efficiently and effectively managed. They include maintenance of project correspondence, conducting progress meetings, handling submittals and

requests for information, documentation of progress, review of pay requests, schedule reviews, and schedule updates.

- **Change Order Review:** These services include negotiation of change orders with the contractor, coordination with A/E over design changes, determination of responsibility for changed conditions or coordination conflict, and review of price and schedule changes.
- **Project Closeout:** Review of the project to ensure orderly and timely completion, including development of punchlists; monitoring of implementation, training and warranty periods; resolution of outstanding issues; and review and analysis of claims or disputed issues.

The most frequently cited criticism of ACM services is that they add a level of bureaucracy to a project, resulting in added costs. While it can be argued that this expense may actually reduce overall project costs, an owner can realize the benefits of the ACM services without necessarily committing to large increases in expenditures by supplementing its own project management and selecting an ACM on a service-specific basis.

The owner has the option of tailoring its use of ACM services to its needs in order to provide the best combination of project control and cost. For example, many public agencies have a large contingent of inspection personnel, but may lack sufficient management experience to enact effective project cost controls. Or, an owner may wish to have more construction knowledge built into the design process by engaging an ACM firm to perform a value engineering or constructibility review. An owner may also desire enhanced scheduling expertise in coordinating its various designers and contractors for a multiple-phase effort.

Other owners may be very comfortable with their A/E team, but may need assistance in finding qualified contractors to perform the work. Many owners use an ACM's construction closeout services to resolve intractable problems on projects that degenerate due to disputes with a contractor over schedule and delay issues.

Recommendations and Conclusion

Clearly, there is more than one right project delivery method for a given project. All of the methods discussed have been used successfully, but each have weaknesses that can limit their success. The following considerations should guide the owner in selecting the proper delivery method:

- **Type of Project:** The owner should gauge the level of complexity and uniqueness of the project, and maintain an appropriate level of control.
- **Size of Project:** The amount of outside assistance and number of project participants should match the significance of the project. Obviously, the more complex and costly a project, the greater the need for professional management and advice.

- **Owner Capabilities:** The owner should realistically assess its own in-house capabilities in evaluating project procurement methods.
- **Time Considerations:** If the project needs to be constructed in a severely compressed time limit, methods adaptable to fast-track construction should be considered. However, the owner must weigh the need for the compressed time limit against the increased risk of fast tracking.

- **Likelihood of Changes:** If the owner is aware that its requirements may change considerably during the project, this should be evaluated against the potential cost of such changes. For example, a D-B team may present the most fluid method of incorporating changes during construction, but those changes may come at a higher cost than through other methods.

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help owners in constructing the best facilities possible, on-time and on-budget. From our vantage point, professional construction management is highly desirable, if not essential, to a successful project. These services are adaptable to any project delivery method, and are scalable to meet the specific needs of the project.

We recommend that an owner thoroughly explore available options for construction procurement, and consider the benefits of professional management services regardless of the contractual approach used to deliver the project. We also urge owners to look for the Certified Construction Manager (CCM) designation in evaluating firms and individuals they are considering for upcoming projects. This certification identifies a reliable and effective resource that can help you have a successful project. 🏢



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Wayfinding Solutions *in the* **Real & Virtual** Worlds

Whether online or on-site, helping people find their way is a key to student and visitor satisfaction

By Steven Kellman

Picture this: You're a high school senior visiting college campuses and trying to decide where to spend the next four years of your life. But instead of feeling comfortable on one Big Ten campus, you have trouble even finding your way around. The campus boundary is poorly marked, there's little or no directional information along campus streets, and many of the buildings don't have signs on them identifying what they are or what departments are located inside.

That's the situation that some would-be students—and their parents—complained of at Penn State University, until university officials commissioned a massive wayfinding and signage program to help first-time visitors better navigate its main campus. Similar programs are now in the works for several of Penn State's other campuses.

Steve Kellman is the communications specialist for Corbin, an environmental graphics firm based in Traverse City, Michigan. He can be reached at steve@corbindesign.com. Corbin has developed comprehensive wayfinding and signage systems for cities, medical facilities, and educational institutions across the United States and Canada.

In both the real world and virtual world, it's important to be able to find your way around. And wayfinding is even more critical on a college campus, where a potential student's first impressions can help determine whether they'll apply for admission. Many colleges and universities are now taking a closer look at how to help their students and other visitors navigate their facilities, sometimes even before they arrive on campus. From revamping their signage systems to developing online navigational aids accessible via the Internet, these schools are finding that better wayfinding can result in happier students and visitors, higher rates of enrollment and customer satisfaction, and safer schools.

From the complete overhaul of an on-site signage system to the addition of an online component, college and university officials are exploring a range of solutions for helping their students and visitors feel more at home.

An On-Site Solution

Sometimes the solution is a wide range of on-site navigational aids, as officials at Penn State are finding out with the installation of a \$1 million wayfinding program. The new system—which involves 590 new and replacement signs installed across Penn State's 540-acre main campus—came on the heels of a \$700 million campuswide construction program that added more buildings and departments to the wayfinding

challenge. Students with disabilities also complained that they couldn't find accessible routes or building entrances.

In response, the university commissioned a committee of administrators, staff, faculty, and community figures to study the situation, determine which facilities most needed better direction-giving, and figure out the best way to give those directions. The program was coordinated by a firm that specializes in wayfinding and signage systems for cities, healthcare facilities, and schools.

The system developed uses monument-style boundary markers, two types of vehicular directional signs, customized campus maps that show the immediate area and the larger campus, and building identification signs to guide visitors from campus entrances directly to their destination or the most appropriate parking. Most of the signs were installed in late 2000, with portions of the program still being rolled out in some areas. And by all accounts, the system is a success.

"We've had many, many favorable comments about all aspects of the signage project, especially the campus maps and the building signs," said Jim Lettiere, Penn State's manager of space planning and management. "I've personally observed the campus maps being used over and over again by visitors to the campus. I've also gotten numerous e-mails, notes, and phone calls from people who are pleased with the signs. The comments come from people who live and work here and are familiar with the campus and realize that the signs are intended mostly for first-time visitors, not those of us who live here every day."



Users of the University of Virginia Health System's online wayfinding system will be shown a screen like this at the end of their search, displaying a photo of the facility they're visiting and giving written directions to the facility from various directions.

Lettiere added, "People seem to be able to find their way now, especially to points of interest for first-time visitors like the admissions office. Every new student must find their way to the admissions office with their parents, and that was a sore spot before we started the signage program. In fact, that office was on our committee, and that destination was at the top of the list."

The wayfinding program has even helped ease the workload on staff members responsible for sending out mailings regarding top campus destinations. "Frequently they would put in their own map and own directions, but now they can



This monumental vehicular directional sign on the perimeter of Penn State's campus is designed to be read easily by drivers on the main roads circling the campus. Smaller vehicular directional signs are used on campus, where the vehicle speeds are lower and drivers have more time to read the text.

rely on the signage system to get people to their office or to appropriate parking," Lettiere said.

Campus maps have also proven to be a boon to disabled students, pointing out accessible pathways and building entrances. Additionally, the maps enhance campus safety by indicating the location of well-lighted pathways, called "brightways," and emergency phones.

A key element of the program is an ongoing maintenance budget for the new signage system. This allows the university to keep the sign information up to date and to keep the system working.

Getting Visitors to the Front Door

Sometimes the solution is to help people find their way to the facilities in the first place. For the University of Virginia Health System, an outgrowth of Charlottesville's historic University of Virginia, an online wayfinding system will help employees get clients and visitors to more than 40 locations scattered across seven counties in rural central Virginia.

"My office receives a lot of requests for maps," explained Reecy Modny, creative services director for the health

system's marketing and communications department. "In order to help get patients where they're supposed to be, we've only had paper maps—paper maps that have been photocopied 10,000 times that you can no longer read, are inconsistent and out of date, and contain the wrong information."

The Web-based module currently under development for the health system will display a series of maps at different resolutions for each medical facility, zooming from major highways to the facility itself and including a picture of each building facade. The site will also include written directions to the facilities from the north, south, east, and west. Not only will visitors be able to download and print out maps at different resolutions to the facility of their choice, employees will be able to print out the maps as well and include them in mailings as needed.

"It's our hope that not only will patients call up a map from their homes when they have an appointment, but that employees can print out maps to include with their appointment sheets when they're making appointments for people," Modny said. Future plans for the site include giving patients access to doctors' schedules so they can set up their own appointments.

One important feature of the database-driven Web module is an online system allowing easy updating of the information. This feature will allow university staff to update maps, facility functions, and directions as they evolve—an important consideration in the quickly changing field of health care.

The system is also designed to dovetail with the on-site signage developed for the interior and exterior of major facilities, Modny noted. "Our challenge is to get them to the front door," she said. "We will tell them what services are behind each door, but we're just giving directions to the door."

High-Tech Form and Function

Two ongoing projects in the Detroit area illustrate the different tacks being taken to guide visitors once they arrive on campus or at a particular facility.

At Lawrence Technological University, a traditional system of exterior signage is being developed to reflect the school's position as an advanced science, engineering, and architecture educational resource. Cutting-edge technologies being considered for use in the signs include solar lighting and the use of unique alloy metals and plastics. The use of electronic message boards is also under consideration as a way to provide constantly updated information on cam-

pus events. The system's visual style is also being influenced by the school's state-of-the-art University Technology and Learning Complex.

Nearby, at Wayne State University's new College of Pharmacy and Allied Health Professions, new students and other visitors will soon be greeted by information centers that put searchable event and directory information listing departments and teaching staff at their fingertips. The electronic kiosks will also display map directories of the college.

Whether developing a traditional signage system like the one for Penn State University or cutting-edge electronic kiosks like those being designed for Wayne State University, an effective wayfinding program entails careful analysis of the existing site, its top destinations, and any current wayfinding difficulties. The program must also use a commonly accepted set of names for the destinations, and be based on a clear hierarchy of information.

It is important for the school to create a multidisciplinary team of representatives from various departments and the surrounding community to develop an effective system that works for all its users, particularly those people visiting the campus for the first time. An effective signage program reflects the institution's culture, reduces visitors' anxieties, and makes their experience more memorable. That makes it much more likely that the visitor will return. 🏠

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GASB 35: The New Financial Reporting Requirements for Public Colleges and Universities

By Mohammad H. Qayoumi, Ph.D., CMA

[Editor's note: A new financial reporting change will require all public institutions to report all capital assets, including infrastructure, and account for depreciation. The first deadline of the phased-in GASB 34/35 program is June 15, 2001. The articles by Mo Qayoumi and Jerry Kokos are designed to give you the information you need to understand the new accounting requirements and to help you formulate a strategy and approach for your institution.]

Roughly 15 years ago the Governmental Accounting Standards Board (GASB) decided to review and analyze the financial reporting of public higher education and determine how this information can be incorporated with the primary state and local government. In June 1999, GASB issued its Statement No. 34, which addressed the financial reporting requirements for state and local governments. GASB Statement No. 34 fundamentally changed the financial reporting requirements and established new financial statements as well as management discussion and analysis for state and local government.

GASB 34 excluded colleges and universities from these requirements. By November 1999, GASB issued its Statement No. 35, which amended its earlier statement, and includes higher education institutions to the same financial reporting

requirements. Therefore, in order to understand GASB 35, it is essential that one must review GASB 34.

The adoption of GASB 35 significantly changes the financial reporting of public universities. Since private colleges and universities follow FASB (Financial Accounting Standards Board) guidelines, with the adoption of FASB 117 it will be easy to perform comparisons between public and private colleges and universities. With the issuance of GASB 35 public colleges and universities are required to report all capital assets, including infrastructure, and account for depreciation. Therefore, for the first time facilities officers in public universities will be playing a critical role in providing key information for the campus annual financial statements.

The implementation of GASB 35 will pose a series of significant challenges for chief financial officers in public colleges and universities. However, this article is prepared to give facilities manager a brief overview of the new financial reporting requirements for public colleges and universities, and highlight action steps they need to take to be prepared for the implementation of GASB 35, specifically in the areas of capital asset reporting requirements.

Basic Elements of GASB 35 Financial Reporting

The significant elements of the financial reporting include three basic financial statements, Management Discussion and Analysis (MD&A), other required supplementary financial statement (RSI), and segment reporting. The basic financial statements consist of Statement of Net Assets, Statement of Revenues, Expenses, and Changes in Net Assets, and Statement of Cash Flows. Let us briefly review the highlights of these statements as well as the other elements of the financial reporting.

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Statement of Net Assets

This statement is presented with three major categories, namely assets, liabilities, and net assets. The assets should be broken into current and non-current assets. The current assets include cash and cash equivalence, short-term investments, account-receivable, inventories, etc. The non-current assets include long term elements, such as endowments, investments, and capital assets and should be displayed separately. The capital assets includes land and improvements, buildings and equipment, infrastructure, and construction-in-progress. It is critical to note that buildings, equipment, and infrastructure must be reported as net figures. In other words, with these assets depreciation must be taken into account. This is a major change that is discussed in more detail later.

The liabilities should also be broken into current and non-current subcategories. There is no appreciable change in this area. Finally, net assets should be separated as restricted and unrestricted areas. Furthermore, the restricted should be expendable and non-expendable.

Statement of Revenues, Expenses, and Changes in Net Assets

This statement should display operating revenues and expenses, non-operating revenues and expenses, capital

contributions, net assets at the beginning of the period, and net assets at the end of the period. Revenues and expenses should be reported directly as net of discount and allowances. For instance, revenues such as student tuition, fees, gifts, grants, investment income, and costs will be reported as net value. This is a departure from current practice by almost all colleges, where tuition and fees are booked at full value and any discounts are booked as an expense. The current GASB statement treats such discounts as contra-asset.

The non-operating revenues and expenses include elements such as state and/or local government appropriations, gifts, grants, investment income, capital appropriations, etc. There are two major elements that are important to note. First, the state appropriations both for operating and capital appropriation should be reported separately. Secondly, it requires that institutions must clearly separate gifts and contract. As pronounced in GASB Statement No. 33, gifts and grants should be distinguished by whether the transaction was based by an exchange and non-exchange. In other words, if there was an exchange of economic resources or service between the grantor and grantee, or the grantor hold the first right of refusal, it must be classified as a grant (contract) and not a gift.

Statement of Cash Flow

GASB 35 amends its earlier statement No. 9, and supersedes GASB 34 to include colleges and universities and require these institutions to use a direct method in presenting cash flows from their operating activities. The cash flow statement is very critical in determining the institution's ability to meet its obligations, and is used to determine if the institution needs external financing. The main classifications for cash flow statement include operating activities, non-capital financing activities, capital and related financing activities, and investing activities.

Management's Discussion and Analysis (MD&A)

This section of the financial report provides an opportunity for the financial managers to present key information in a general rather than specific manner. The institution is expected to state the most relevant information concerning the short-term and long-term analysis of the activities rather than providing "boilerplate" discussion. More specifically, data provided should reinforce analysis and result of the operation, as well as any information or condition that is expected to significantly impact the financial position of the institution. A comparative analysis between the current year and prior year's positive and negative results, with an emphasis on the current year performance, should be discussed. At a minimum, MD&A should provide the following data:

- Any noteworthy variation in net assets including the reason for the change
- Any noteworthy variation in the availability of funds such as changes in fund restriction, commitment, etc.



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- Significant activity in capital asset and/or long-term debt
- Changes in credit ratings or any debt limitation affecting plans

Finally, MD&A should state what management believes are any distinctive features of the annual financial activity and its relationship to institution mission. Furthermore, in contrast to the financial statements, MD&A is subject to a lower level of audit requirement.

Required Supplementary Information (RSI)

In addition to MD&A, the financial report should contain a separate statement as RSI. In this section the institution should present a budgetary comparison schedule between the original budget (including the general fund and any special revenue funds) and final budget. Moreover, if the institution is utilizing a modified approach for reporting infrastructure, the three-year asset condition assessment, as discussed below, should also be incorporated in the RSI.

Segment Reporting

GASB 35 requires that institutions must report financial activities of its segments. GASB 34 defines a segment as "an identifiable activity reported as or within an enterprise fund or an other revenue backed instrument (such as debt certificate of participation)". In other words, a segment has identifiable related expenses, gain or losses, assets, and liabilities. It is important to recognize that an institution can have debt without segment, but can not have segments without debt.

Segment reporting, including a note about the goods and services provided, is similar to the three primary statements namely condensed statement of net assets; condensed statement of revenues, expense, and change of net assets; and condensed statement of cash flow. This reporting requirement was primarily instituted in GASB 34 so the state and local governments could report information about utilities owned by municipalities. The original interpretation of segments would have required most colleges and universities to report every debt series as a different segment. This is an area that GASB is reviewing, and further interpretation is forthcoming.

Reporting Capital Assets

Since under this new reporting structure, colleges and universities should include buildings and infrastructures and account for depreciation, it is important to briefly elaborate on this issue. Capital assets, such as land, buildings, equipment, infrastructure (i.e., roads, bridges, tunnel systems, utility distribution systems, cable plant, etc.), are reported based on historical cost, including the construction cost and other ancillary expenses, such as freight costs, interest costs (if eligible), etc. If the asset is donated, fair market price at the time of the acceptance plus ancillary costs should be reported. The fair market value can be derived from manufacturer's cat-

alogues, construction databases, price quotes of comparable assets, etc. Except for inexhaustible assets, such as land, all other assets should be depreciated in accordance to the useful life of the asset. Institutions do not have to calculate depreciation on individual assets. In fact they can calculate depreciation for an entire class of assets, subsystems, or individual assets based on their own choice.

GASB 34 does not prescribe any particular depreciation method. In fact an organization has the choice of using any rational and systematic approach, such as the straight line, double declining balance, sum-of-the-year digits, annuity method, units of production method, hours of use, etc. Similarly, GASB 34 does not recommend any specific schedule for the useful life of any capital asset. In fact, it relegates this role to industry and professional organizations for guidelines.

Depreciation allocation for the reporting period should be expensed during the same period. Therefore, assets should be reported as in net value, namely the original-value minus the accumulated depreciation. If an institution does not want to depreciate these assets, GASB 34 enables institutions to address depreciation reporting in a different manner, which is discussed below as the modified approach:

The Modified Approach

An institution does not have to depreciate infrastructure assets if it can document that these assets are being preserved roughly at or above the condition level established and disclosed. Secondly, if the organization has an asset management system that meets the following conditions, namely having an accurate and timely inventory of the assets, conduct condition assessment using a measurable scale, and determine the yearly cost to maintain and preserve the assets in question.

This requires that a complete condition assessment of these assets needs to be done every three years at minimum. Moreover, the three recent condition assessments give adequate assurance that the assets have been preserved at or above the base level. Therefore, funds used to bring these assets to their original conditions must be expensed, except for any portion that is used for improvement or additions to any of the assets in question.

Timeline for the Implementation

These new requirements became effective in a three-phase plan based on the total institution's revenues after June 15, 1999.

- Colleges and universities with total revenues of more than \$100 million should apply the new reporting standards for reporting periods after June 15, 2001.
- Institutions with total revenues between \$10 million to \$100 million should apply the new standards for reporting period after June 15, 2002.
- And finally, if the total revenues of a college or university are less than \$10 million, they should apply the new reporting standards after June 15, 2003.

Similarly, infrastructure assets for these institutions grouping should be reported retroactively beginning the reporting period after June 15, 2005 for institutions with more than \$100 million revenues, and after June 15, 2006 for institutions with revenues ranging between \$10 million to \$100 million. Institutions with less than \$10 million revenues are encouraged, however they are not required, to report their infrastructure assets retroactively.

The Impact on Facilities Managers

With the advent of GASB 35, facilities managers in public colleges and universities play a critical role in providing the relevant information in the preparation of the institution's financial statement. This is because the functional area that is best equipped to gather the necessary information concerning the capital assets, possibly with the exception of the equipment, is the facilities unit. Although many colleges and universities may have the original construction costs of buildings and major campus infrastructure, they may not have a consistent practice in systematically collecting information about any subsequent minor renovation.

The reason is many colleges and universities either do not have any clear policies on when to capitalize and when to expense maintenance and improvement expenditures. For instance, if a roof is replaced, are the funds capitalized or

expensed? If the answer is positive, then how about if 50 percent of the roof is replaced? What is the institution's policy and practice if boiler tubes or a chiller compressor in central plant is replaced? Does the institution use any dollar threshold on when to capitalize and when to expense these transactions? If any of these projects are capitalized, is there a robust procedure in place to assure the information is

recorded in the institution's capital asset inventory.

These questions can be compounded by the fact that in some campuses various minor building modifications are funded by a variety of sources such as project funds from academic departments, the maintenance department, special state appropriation, etc. Moreover, on some campuses different buildings and infrastructures may be operated and maintained by other units in the university.

For instance, at some universities part of campus roads may be managed by the parking department, the conduit system and communication infrastructure more than likely is managed by telecommunication, and certain buildings, such as residence halls, student unions, etc. may be managed by other campus auxiliaries. Therefore, the collection and consolidation of the data related to capital assets may pose a significant challenge.

Concluding Remarks

Based on the information presented above, it behooves every facilities manager in public colleges and universities to begin taking a proactive and leadership role in working with campus financial areas on GASB 35. The first step should include reviewing the accuracy of the data concerning physical assets and campus capitalization policies.

If the campus does not have clear policies in capitalizing versus expending, facilities managers should play an active role in the formation and implementation of this area. If the institution already has a capitalization policy, it is important to make sure that the appropriate staff are aware of this. Also institute processes safeguard the integrity of capital asset data.

Since the financial reports of individual campuses or systems will be audited annually by outside auditors, steps must be taken to ensure the institution can secure an unqualified opinion by them. The key element that outside auditors look for is whether an institution has clear, rational, and written policies concerning capital assets. Also, do they have procedures in place that implement these policies. The most fundamental concept to remember is consistency. Auditors will always examine procedures to ensure consistency.

In conclusion, GASB 35 creates new and significant challenges for public colleges and universities. However, it also provides an excellent opportunity for campus facilities managers to play a leadership role in the financial reporting needs of the university. If we miss this opportunity, we have no one to blame but ourselves. 🏢

For more information:

Federal Accounting Standards Board

www.fiscals.org/standards/raa/fasb/main.html

Governmental Accounting Standards Board

www.fiscals.org/standards/raa/gasb/main.html

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Preparing Your Infrastructure for GASB 34 and 35

By Jerry Kokos

Buildings and physical infrastructure symbolize far more than basic pieces of property to colleges and universities. The structures that comprise a campus can define the very identity of a school itself, driving a college or university's enrollment, endowments, and reputation. Facing growing enrollments, changing program needs, and physical conditions, it can be difficult to define and understand fully the true conditions of the entire school building portfolio, which are typically located across several campuses within each state. Getting a strong handle on property conditions is crucial, however, for public school officials to take a strategic approach toward long-term planning and budget development for infrastructure care.

Focusing on infrastructure conditions is a vital priority for the future success of a school, yet functional suitability, maintenance, renovation, and strategies are often made on an as-needed basis, with little thought given to future repairs and upkeep 10 or 15 years from now. Viewing physical structures

as a long-term investment enables public colleges and universities to influence funding issues and regulations proactively, and to maximize capital and distribute funds effectively. This also positions schools to meet funding and reporting legislation that applies to infrastructure management on a timely and organized basis, cutting down on the overall cost to the educational institution. Proactive property management is especially significant with future standards from the Governmental Accounting Standards Board (GASB).

Statements 34 and 35 of GASB will radically change the manner in which governments compile information for their annual financial reports. It will also significantly impact how funds are obtained and distributed—a critical aspect for colleges and universities seeking public financial support. All physical assets, liabilities, and infrastructure of government must be reported, from roads and bridges to public academic buildings. As a result, state governments will be forced to incorporate detailed information about the condition and stewardship of their state colleges and universities into GASB reports. These reports must be consistent in format, in the methods used to evaluate the infrastructure, and in the accuracy of the results across the state.

Jerry Kokos is president and CEO of VFA, Boston, Massachusetts. He can be reached at jkokos@vfa.com.

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State and local governments with total annual revenue of \$100 million or more will begin the new reporting with the fiscal year ending June 15, 2002. While there are additional years allotted for full compliance, establishing what assets are in the portfolio may be overwhelming due to the lack of accurate, centralized records. In addition, many organizations are either unaware of these new financial and infrastructure reporting methods and requirements or do not have this required information readily available. If required by their states for additional funding, school officials and planners may not even know the essential first step needed to meet GASB's standards.

GASB 34 and 35 address the long-term financial and management issues of physical infrastructure, providing state and local entities the option of depreciating capital assets or actively reporting on and managing assets. Depreciation is not typically an option, as this approach would have a negative impact on a school's ability to issue bonds or otherwise finance capital progress. Developing a straightforward method for reporting on the value of capital assets, their full cost of services and who pays for them, is a benefit for all involved, including the colleges and universities themselves, funding sources, legislators, and the public.

Colleges and universities that need to avoid depreciation of physical assets will need to demonstrate an operational management system for determining infrastructure conditions, including the methods and costs required to preserve infrastructure at an established level over time. Ignoring GASB legislation is not realistic—most state college and university programs rely on public funding to finance building construction and renewal projects. While the information gained from condition reports can be used to generate support for additional community funds, not complying with GASB standards may impact the amount of financial support a public college or university receives.

In order to meet future infrastructure renewal and construction plans, school officials must develop accurate budgets that reflect current conditions and needs. As the focus on physical infrastructure sharpens with the growing recognition of the direct link between the standard of education and the quality of the surrounding environment, the ability to demonstrate unquestionably where funds are needed and prove that the money received will be a long-term investment will empower school officials to gain additional financial support. Planning for GASB is the first tool in meeting this objective. 🏢

Read more about GASB

HCI Systems, Inc. has made available two informative articles on the new GASB requirements. For more information, call 800-750-4424, or view the articles at www.hcisystems.com.

Report of a Happy Survivor in Australia

By Gary L. Reynolds

I was sincerely honored (and at the same time a bit nervous) to travel to the Australasian region of APPA (AAPPA) and attend the ATEM (Association of Tertiary Education Managers)/AAPPA conference last September in Melbourne, representing APPA. I think the nervousness started when I was informed that the presentation I was to make would be a plenary session with no other parallel sessions. Everyone, ATEM and AAPPA members alike, would be present. **Gulp!**

Fortunately for me, I did feel that I was among kindred spirits. My family lived in Tasmania, Australia from 1968 to 1974, and this

was actually my fifth trip there. I immediately felt comfortable, as Australians have a way of making you feel at home with their ever cheerful "G'day mate." You can't say "G'day mate" without smiling, and that immediately sets the whole tone.



Yarra River Walk in beautiful Melbourne

It was an exciting and rewarding opportunity to meet with so many peers to discuss our many similar issues. The conference is setup with several plenary sessions interspersed with parallel tracks. Members from both ATEM and AAPPA make presentations. I attended several very interesting sessions presented by both groups.

One stimulating session was presented in the ATEM track by Marce Conway, director of foresight at Swinburn University of Technology. She uses scenario planning as the main

Gary Reynolds is director of facilities services at The Colorado College, Colorado Springs, Colorado, and APPA's President-Elect. He can be reached at greynolds@coloradocollege.edu.

tool to help the university understand the forces acting upon it. Having just attended APPA's Leadership Academy third track, it was very interesting to see the scenario planning concept applied across the university, complete with a staff person assigned to its implementation.

For those of you who have attended APPA's Leadership Academy, Marce identified their two axes to be: Face-to-Face Content and Delivery vs On-line Content and Delivery, and Global Village vs Return to the Community. The four resulting scenarios (clockwise from upper left) were titled, Clicks & Bricks, Global Alliance, Inc., Triumph of Community, and Going, Going, Gone!

I attended the AAPP Board meeting and was honored that I was able to participate. I came away with two very strong impressions. First, the AAPP leadership and the Board are genuinely engaged in making their organization better and are strongly focused on helping their members by continuously improving AAPP. Second, and perhaps more important to me, was the profound and extremely strong ties that AAPP has with APPA. I came away with a very strong sense (and this applies to all regions) that APPA leadership needs to be constantly mindful of the impact of decisions that are made centrally on our regions. I am beginning to understand what we are undertaking with our vision of **Global Partner in Learning**.

I found the meeting to be an excellent success with many kudos to Denis Stephenson of LaTrobe University in Melbourne (a past president of AAPP) who was the key organizer on the AAPP side of the program. Also, I want to personally thank Denis for his wonderful hospitality and generous giving of his time to make my stay in Melbourne a wonderful experience.

Since I was traveling so far I wanted to take advantage of the opportunity and visit a number of universities. My first stop was Auckland, New Zealand, where Maurice Matthewson (AAPP President at the time of my visit) of the University of Auckland was my host. He did an excellent job of sharing with me his university, as well as his beautiful city, in just one day. Maurice and I traveled together to Melbourne



Denis Stephenson pointing out our location to Maurice Matthewson on the LaTrobe campus map.

where we were met by Denis Stephenson. On the way into town we took a quick tour of Denis' beautiful campus.

After Melbourne it was off to Canberra, the capital of Australia. All I can say is, "What a beautiful city." Canberra will be the site of the 2001 ATEM/AAPP conference with the conference dinner in the main hall of the new parliament building.



Sam Ragusa and Gold Coast campus facilities manager Russell Hume on the Gold Coast campus.

My wonderful host, Amanda Hart of the Australian National University, created an agenda for me that included tours of Tidbinbilla, the deep space communication site, Mt. Stromlo, the largest telescope site in Australia, the University of Canberra, the Australian Institute of Sport (the equivalent of our Olympic Training Center in Colorado Springs), the new Parliament building, the still-under-construction Australian National Museum, and, of course, ANU. I was hosted by many fine people including Graham McDonald of University of Canberra, who did yeoman's service hauling me around from AIS to the War Memorial and to many other sites.

From Canberra it was off to Brisbane where Sam Ragusa (an AAPP past-president) of Griffith University and his wife Tina were my hosts. Significant changes in the way the Australian government is funding tertiary education have resulted in many small separate institutions joining with another larger institution. Thus, Sam now has oversight of a number of campus locations, including a campus at the Gold Coast. Lucky guy!

Since each of the sites is very different I am sure it poses many interesting challenges for Sam. He also made arrangements for me to visit the University of Queensland, one of the original eight major universities in Australia known as the "Sandstone Eight." What struck me about the University of Queensland was, despite the very urban location, the beautiful park like settings they have created on their campuses.

After Brisbane it was down to Sydney. I arrived a couple of days after the Olympics were over, but the feeling of success was still in the air. I had an opportunity to visit the Olympic site at Homebush, and was very impressed with the organization of the site. I can understand, in part, why the games were such a success.

Continued on page 52



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My visit to Sydney was facilitated by Robert Kelley (current AAPPA President) of MacQuarie University. I had an opportunity to spend a day on his beautiful campus, where a significant and interesting (for an engineer like me) utility project was underway. The project is adding a total energy plant with engine-driven generators, absorption chillers, and a chilled water storage tank.

Pam Esdaile and John Simmons were my hosts for my tour of the University of Sydney (another one of the Sandstone Eight universities) and some of the Sydney area. I knew Pam



MacQuarie University student union with new energy plant and cooling tower to the right.

when she spent some time at Iowa State University so it was a real treat for me to visit her institution in return.

I had a wonderful time seeing more of Sydney than I ever had before. One evening Robert Kelley arranged a dinner with AAPPA Immediate Past President Maggie Kinnaman and her husband John (who were in Australia for the Olympics) at a restaurant overlooking Circular Quay and the Opera House. It was a wonderful evening of friendship, scenery, fine food, and Australian wine. My final afternoon and evening was spent downtown visiting "The Rocks," the Sydney Harbor Opera House, and Darling Harbor.



Sydney Harbor Opera House

I came away from this experience renewed and recommitted to making AAPPA a true global partner. Unfortunately, there is not enough room in this article to name every person who made my stay so enjoyable. So please accept my sincere thanks to everyone in Australia who made my visit both entertaining and educational.

Finally, my thanks to AAPPA for having the foresight to commit to this investment and for making this opportunity possible. I truly believe that our organization benefits immensely from this building of relationships with our "mates" from down under. 🇺🇸

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Facility Asset Management

The New Career Path of Facilities Managers

by Matt Adams, P.E.

The variety of professional backgrounds that have resulted in senior-level facilities management positions is considerable. Many facilities managers have come from military backgrounds, the Navy, the Core of Engineers, the Air Force, and even the Coast Guard are natural training grounds for facilities managers. These branches of the government operated such vast quantities of facilities that solid facility management doctrine was a necessity. Once retiring, many branch service professionals found it a natural fit to apply for positions in facilities management within universities, school districts, and other non-profit large facility-based entities.

Others have made their way into institutional facilities management by climbing over the fence. After working as private practice engineers and architects, many professionals took positions with the same institutions that were once clients. This too has been a good fit. The non-traditional career paths to the facilities management profession are varied, and often interesting. From careers in acting to law, from accounting to teaching, this profession has pulled from a large pool of talent. By most accounts this profession is good and getting better.

Matt Adams is president of The Adams Consulting Group, a management/engineering consulting firm located in Atlanta, Georgia, specializing in facility maintenance and management for higher education, school districts, and other institutions. He is co-chair of APPA's Trades Staffing Guidelines Task Force and can be reached at matt@adams-grp.com.

In fact, more and more colleges are offering degrees in facilities management. There at least 13 programs specifically dedicated to facilities management. This total does not include the many programs that focus on a construction-related curriculum. This is a good harbinger for the growth potential of our industry.

While many programs specialize in one or more of the sub-disciplines within facilities management, others are more general. Mike Hoots, program coordinator for the University of Southern Colorado's School of Facility Management supports the latter approach. The success of USC's graduates is based on the idea that a solid generalist background in facilities provides the best first step in a specialty developed after college. It is working for the class of 40 that are enrolled and now being recruited. Placement is basically 100 percent and the starting salary for entry level facilities management positions range from 42K to 47K per year. This program has existed for ten years, old by industry standards. Faculty that came from the industry and understood the demand drove its success. In the future, Hoots sees an acute demand for one or more distance learning programs in facilities management. USC intends to create a distance learning program in the future.

Another successful and cutting-edge program is the Facility Plant & Engineering program offered by the Massachusetts Maritime Academy. Only five years old, this program has become a natural variation of the theories utilized by the maritime programs. The program was driven by Brad Lima, P.E., in response to his experience and connections with private industry. Now 25 students are

enrolled and placement of the graduates is 100 percent. Unfortunately, very few of the graduates of the program take positions with universities or other nonprofit facility-intensive operations. Private companies, utilities, and large property management companies act quickly and compete vigorously for the graduates. The passive recruiting approach of the nonprofit industry doesn't catch any of their graduates.

Jim Barrett, the director of the physical plant at Massachusetts Maritime Academy, sees seasoned professionals taking courses to enhance their careers. Barrett sees a trend in the curriculum related to the business end of facilities management. There is an increased awareness that the graduates must have working knowledge of business management, environmental compliance, and human resource management practices. Engineering or architecture is not enough. At the academy, students recently used the campus library in a senior project. They conducted a complete analysis to determine if the library should be renovated or replaced. This is both practical and realistic for future facilities managers.

In addition to undergraduate programs, which are listed partially on the APPA website, are the graduate programs. Both Georgia Tech and Cornell have well respected graduate programs in facilities management. Georgia Tech's program is the newest, starting last Fall. Under the Building Construction Department, the program is a Master's degree in Integrated Facility Management. The dean of the Building Construction Department is Dr. Roozbeh Kangari, and the IFM program coordinator is Professor Felix Uhlik. This program

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BC 6300	Safety and Environmental Issues
BC 6400	Facility Planning, Project Management and Benchmarking
BC 6500	Real Estate Asset and Income Property Management
BC 6600	Facilities Management Financial Analysis

appears to be the most aggressive with respect to addressing the current challenges of the profession. The above curriculum reads like a hot-topic list from past issues of *Facilities Manager*.

In the future, Dr. Kangari sees increased emphasis on issues like planning, finance, and the environment. Georgia Tech collaborates with the Real Estate department at nearby Georgia State University. Opportunities for collaboration to meet the

varied and complex demands of the facilities management profession seem sensible. Professionals that are already in a facilities-related field attend the graduate programs. Unlike the undergraduate programs, graduate programs like Georgia Tech's include professional facilities managers from the non-profit sector, including the General Service Administration and others.

It is clear that the increase in the number and quality of facility management degree programs is in response to increased emphasis and demand from our industry. The sophistication of the programs also reflects the facilities management profession. In the next few years we can expect to see more programs and many more collaborative engagements. IFMA and BOMA already partner with universities. APPA is an obvious partner in the future. The popularity of APPA's Institute and the college facility management programs indicate that a distance learning delivery format would be very popular. Perhaps this time next year we will look into new distance learning programs for the facilities management profession. 🏛️



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Ask The Experts

by Jennifer Graham

The planning, design, and construction processes are not ones to take lightly. Innumerable considerations must be made for all phases and aspects of erecting any type of building. In this issue's Listnotes column you will find some unique and some conventional topics relating to planning, design, or construction from the APPAInfo e-mail list. Whether these topics are new to you or not, this peer list always adds a new perspective, with practiced advice and the not-so-obvious answers that are sometimes overlooked.

Question: What standards are used to provide fire protection in art galleries? We have six galleries, one has a halon system, and the others have fire sprinklers or fire alarms. Under what circumstances would you choose one or the other, would you use a dry-pipe system in sprinkled areas?

- We protect all of our art galleries with wet pipe automatic sprinkler systems. Our one art storage vault is protected with a Halon system, but also has sprinklers. If you have occupants who are really worried about water, you should consider a pre-action sprinkler system rather than a dry-pipe system, but be prepared for intense routine maintenance. Pre-action is similar to dry-pipe but has an electronically controlled solenoid valve that doesn't allow water into the sprinkler piping until a heat (usually rate compensated) or smoke (usually cross zoned) detection system opens the valve. Even knocking

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off a sprinkler head will not cause water to flow.

Question: We have had some recent complaints because of the smell of smoke right outside building doors where the smokers congregate. In some areas the exit door is very near a fresh air intake. Does anyone have policies on outdoor smoking? Has anyone dealt with this issue before?

- At a previous campus, our HVAC group worked with Public Safety at identifying air intakes and designated them as no smoking areas. Anyone within 50 feet could be subject to...you know the routine. It was a highly publicized move: a lot of identification signage in these areas, good student paper coverage, and discussion in all forums, i.e., Faculty Senate and Administration. It was and still is a relatively successful venture, though some obstinate people still exist and push the envelope to test the waters.
- The University of Massachusetts, Amherst has a 20-foot rule from all doors or air intakes.
- We installed signs around entryway doors designating the area as smoke free and we also made "smoker friendly" areas away from the building and it seems to be working well.

Question: We are in the design stage of a major renovation to a 160-bed dormitory. One of the considerations is card access. We will utilize a monitored card access system at the main entrance to the building but would like to look into card access for each room. Are there any colleges using a card access system in this environment? If so, what manufacturers have been most successful?

- We had four residence halls with individual card access and we removed the locks and replaced them with standard keyed locks. We had some problems with the hardware that we had no patience for, but we also discovered some things. Most card access devices have been designed for hotel/motel applications. We found that residence room doors had far more operations than the typical hotel/motel room door and this is the critical factor in determining how long the locks will last. We had failures due to wear in as soon as 10 months. I agree that controlling access on exterior doors with remote card readers and electric locks/strikes is very effective, but I do not recommend the use of either stand-alone battery powered or hard wired card access locks on individual doors.
- UCF residences are using hard key access. The company is called In-Tell Key. The key has a memory chip. The units have been in place for about three and a half years with minor problems.
- In Auckland we use a system called Tecom Australia. We have just increased the database capacity to 65,000 and we could accommodate every door if we wished but probably will not do so—too expensive and also people should be responsible for their own office security. However we have card access in and out of all 35 major buildings with many internal rooms such as laboratories and computer suites also card accessed. They have a website for your info which is <http://www.tecom.com.au>.

Question: I am in the process of selecting an architect and engineering

firm for a renovation project with a total cost of 1.5 million. What percentage range should I expect to pay the selected firm for this size project?

- APPA's *Facilities Management Manual for Plant Administration* provides sample fee guidelines (i.e., renovations for a \$1.5 mil project could range anywhere from 5.9 to 7.4 percent; however, there are many variables such as project complexity, schedule, etc.)
- The issue of A/E fees has a lot of stickiness associated with it of late. We're seeing consultants arguing for additional fees for some services that our state construction agency says are basic and deserve no additional fee. Here are a couple quick answers.
1. Construction costs are all those costs that are covered by the lowest responsible contractor through a bidding process plus the change orders. So all general conditions, insurance, taxes, and so on. A construction manager's fee should be separate.

2. The A/E fee is based on what you negotiate. It has typically been based on the construction cost with change orders. I don't like that for a number of reasons. First, a sloppy A/E can get extra fee because change orders for errors (that the owner must cover) will give the A/E more fee. Why pay for sloppiness? Second, I've seen good A/E's return fee because they did a good job and the bids were low (they didn't get the additional 15 percent of fee for project oversight). That isn't a good way to treat a good consultant.
3. We have a recommended fee schedule that indicates a 5.71 percent to 7.74 percent for a \$5 million of construction. However, we must negotiate the fee regardless of the recommended range. See definitions and concerns above.
4. The sub-consultants included are the ones you negotiate. There are typically more in a large project.

Finally, negotiate, negotiate, negotiate. As for what you want and pay as little as you can. But beware that cheap A/E's may deliver bad service. Expensive A/E's don't always deliver the highest quality service. Check references.

Question: We are investigating the possibility of building a greenhouse. This will be used mostly for research by the Biology and Pharmacy Departments. I know that there are companies out there that specialize in building greenhouses. Who are the good ones? Please share your experiences with me.

- I am not a greenhouse specialist, but I did select and build the greenhouse for our university. I was fortunate in that we have a local greenhouse manufacturer with a product that is shipped nationally, a very good design, at a reasonable cost. The manufacturer is Conley's Manufacturing, 909-627-0981. What I like about their design is that it is oriented towards commercial growers and is therefore well-designed, with quality materials. It was also relatively easy to build—we did it in-house. I did learn a lot about greenhouses in the process. The big issue to pursue in the early stages is how humidity and temperature can be regulated. This is where you will be spending some serious time and money. Good luck!
- Yavapai College is in the second phase of our Agribusiness Program development. We are just completing the construction on a 7200 sq. ft., totally automated greenhouse that includes a section for Aquaculture. The Greenhouse manufacturer is AgriTech, which a company called Hummert Industries supplied. Hummert Industries has been OK to work with. So far, we are pleased. If you would like further information contact program director John Morgan at 520-713-2194. 🏠

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The Bookshelf

Book Review Editor: Theodore J. Weidner, Ph.D., P.E., AIA

This column provides two reviews that correspond to the theme of planning and design. In the first review, a former university architect discusses several issues from his near 30 year experiences on a single campus. How did the campus administrative structure contribute to the planning, design, and construction? What worked well and what didn't. For those who have studied process improvement methods, this book discusses some of those process issues.

The second review touches on the subject of the costs of higher education. This book, brief though it may be, is to encourage potential students, of all ages, to consider going to college based on their intellectual merits or achievements, and not on costs.

Planning the Campus, Making No Little Plans for Colleges and Universities, by Lewis Roscoe. Amherst, Massachusetts: L&A Publications, 2000. 246 pp, softcover.

When I first picked up this book, my thoughts immediately turned to a university administrator who declared to me that his campus's master plan had been completed. Hogwash, I thought. A university that makes a master plan that it can actually complete is not making very big

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plans. This book supported my thoughts with an opening quote by Daniel Burnham, 1907, "Make no little plans; ... Make big plans; aim high... Remember that our sons and grandsons are going to do things that would stagger us." So, with a great university as the model, I dived into a subject that I love.

The Cornell University campus, the former home of the author, serves as an excellent example for the many thoughts and reflections discussed in this book. The author was a Campus Planner or University Architect at Cornell between 1965 and 1994. Thirty years of planning, design, and construction at a major research university, with two heads: private and state-funded. The campus provides a number of interesting examples and situations.

An interesting feature, not found previously in a campus planning book, is the significant discussion about administrative organization and how it affects either campus development or operations. There are four major organizational models presented. They place the campus planner and/or architect with or apart from other designers or operators of the campus. Different executives enter the picture with different ideas about organizational structure, as well as ways of interacting with the town(s). (Cornell has the added challenge of having to deal with six towns, county, and state governments because of its location and situation.) Did Cornell ever find the ideal mix of administrators, organizational structure, planning method, or project? Maybe, maybe not. The organizational structures are discussed briefly at the end of the book with comments on what worked well and what didn't; no orga-

nizational model was rated "excellent." Success is likely defined differently by the different players involved.

Therefore the author created a grading system based on the campus administrative organization with construction projects, large and small. Whether the project was a success, not necessarily architecturally, but from a process perspective, receives a grade of A through D; failures have either been omitted or were never constructed (one example given). Project grades improved from an average of 2.08, for projects between 1965 and 1980, to 2.83 for projects in the 1980's, and 3.17 for the "central avenue plan," an obvious favorite (and rightly so).

The text is sometimes difficult to follow because of the importance of architectural context, and campus plans are not easily conveyed in words alone. Occasional sketches and plans don't do much to help the reader better understand the Cornell campus and why it grew the way it did. As a one-time visitor to the campus, I struggled to "see" the different facilities. As an architect, I could envision some of the unique buildings and the challenges associated with them either because of my visit or recollection of articles in the media. But I was still unsatisfied.

There is a short section about the author's relationship with the state-funded (SUNY) side of the campus over which he had no control despite the state buildings being located on the privately maintained campus. The conflict and tension that existed here is glossed over with no resolution, if there was one. However, the importance of associations, the Association of University Architects (AUA) in this

case, is highlighted. This is important enough to merit mention here.

The book concludes with seventeen recommendations for good campus planning. I'd like to be able to select my top five from the seventeen recommendations, but they are all important. Maybe my favorite is the last—provide mentoring—because it is multi-dimensional. A good campus plan mentors for the future; it inspires designers of the present to think the big thoughts. This book should in-

spire planners and administrators to consider appropriate organizational structures to create great campus plans.

From Rusty Wire Fences to Wrought-Iron Gates, How the Poor Succeed in Getting to – and Through – College, by Beth Macy. Washington, DC: The College Board, 2000. 42 pp, softcover.

This book focuses on Pell Grants, the 28 year-old program named for Senator Claiborne Pell (originally called the Basic Education Opportunity Grant), designed to assist low-income people pay for higher education.

This book intersperses financial examples between brief life-stories of a wide variety of people who persevered and worked hard to get a college degree. There are stories of teenagers who were knowledgeable and continued with their schooling with the help of grants. There are others who moved into the working world and then discovered the importance of getting additional education. And there are some that reached for higher education to turn their lives around following a major life event. Regardless of the circumstances, the goal was reached with the help of a Pell Grant first and then grit and determination to close the financial gap or to obtain the degree.

The typical audience of this column does not have need for this book because so many of us receive significant tuition discounts or waivers as part of our employment benefit packages. However, for those who do not have access to educational benefits, this book could be the inspiration one needs to persevere and attend college.

This book is not an important reference piece. It is inspirational. It does identify the means and reasons to continue one's education. It would make a handy reference for the many high school counselors who really have no idea how to assist intelligent, but financially constrained, students with college. If I were to suggest anything, buy a copy of the book and give it to a local high school either where you live or in a neighboring community that may have more financially disadvantaged people than yourself. 📖

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Exmark Manufacturing Company announces the Exmark Ultra Vac Commercial Collection System. Formerly available only on the Lazer Z HP, it will now be available for Lazer Z and Lazer Z XP models. The multi-



bag collection system improves machine productivity with features designed for versatility, maneuverability, and performance. The UltraVac's compact design, quick-attach feature, spindle-driven blower system, and high-capacity, durable bags improve efficiency. For additional information call Exmark at 402-223-6300.



SaniGlaze International introduces SaniGlaze, a new restoration process used for ceramic tile floors, primarily in school and university restrooms. SaniGlaze extracts embedded contaminants from tile and grout surfaces and protects them from future absorption and deterioration with an impenetrable grout-glazing compound and a polymer-barrier shield. The process makes old tile floors look "like new." For additional information call SaniGlaze at 800-874-5554.

Locknetics Security Engineering, an Ingersoll-Rand company, unveils the 993 Series Programmable Access Control Exit Trim for use with existing Von Duprin 98 and 99 series exit devices. The 993 provides powerful, programmable access control in the form of easy-to-install standalone trim and electronics that require no additional wiring. Four common AA batteries power the 993 for approximately three years' life. Batteries are replaced in seconds. The 993 Series offers users a wide variety of access control credentials. For additional details call Locknetics at 860-584-9158.



Coming Events

APPA Events

For more information on APPA seminars and programs, visit our website's interactive calendar of events at www.appa.org.

Apr 8-10—Institute for Facilities Finance. Baltimore, MD. Contact Andria Krug, andria@appa.org or www.appa.org.

Jun 17-21—Leadership Academy. Fort Lauderdale, FL.

Jul 22-24—Moving Beyond Boundaries: APPA 2001 Educational Conference & 88th Annual Meeting. Montreal, Quebec, Canada.

Sep 16-20—Institute for Facilities Management. Scottsdale, AZ.

Jan 13-19, 2002—Institute for Facilities Management. Tampa, FL.

Jun 10-14—Leadership Academy. Scottsdale, AZ.

Jul 21-23—APPA 2002 Educational Conference & 89th Annual Meeting. Phoenix, AZ.

Sep 8-12—Institute for Facilities Management. Norfolk, VA.

APPA Regional Meetings

Sep 13-15, 2001—RMA Regional Meeting. Tucson, AZ. Contact Paul Smith, 520-206-4758 or psmith@pima.edu.

Sep 29-October 3—ERAPPA Regional Meeting. Hershey, PA. Contact Ford Stryker, 814-865-4402 or hfs2@psu.edu.

Sep 30-October 3—PCAPPA Regional Meeting. Vancouver, BC, Canada. Contact John Wong, 604-432-8299 or jwong@bcit.ca.

Oct 7-10—AAPPA Regional Meeting. Australia. Contact Amanda Hart, amanda.hart@anu.edu.au.

Oct 10-14—CAPPA Regional Meeting. Cape Girardeau, MO. Contact Alvin Stoverink, 573-651-2214 or amstoverink@semovm.semo.edu.

Oct 20-23—SRAPPA Regional Meeting. Roanoke, VA. Contact Bill Elvey, 540-231-4397 or wmelvey@vt.edu.

Oct 28-31—MAPPA Regional

Meeting. Madison, WI.

Contact Kris Ackerbauer, 608-265-2758 or orkackerbauer@fpm.wisc.edu.

Other Events

Apr 5-6—Innovative Approaches to Organizational Success in the New Economy. Boston, MA. Contact American Productivity & Quality Center, 800-776-9676 or 713-681-4020 or apqcinfo@apqc.org or www.apqc.org.

Apr 9-10—GASB 34/35 Reporting and Implementation Model. Redondo Beach, CA. Contact Susan Pferchy, National Association of College and University Business Officers, 202-861-2519 or spferchy@nacubo.org or www.nacubo.org.

Apr 23-27—Comprehensive Five-Day Training Program for Energy Managers. Chicago, IL. Contact Association of Energy Engineers, 770-925-9633 or www.aeecenter.org.

Apr 30-May 1—RESEARCH BUILDINGS 2001 (Part II Optimum planning models, Improved processes, Higher performance). Hilton Head, SC. Contact Jessyka Sooy, 925-254-1744 x12 or registrar@TradelineInc.com or www.TradelineInc.com.

Jun 23-27—ASHRAE 2001 Annual Meeting. Cincinnati, OH. Contact Meetings, 404-636-8400 or www.ashrae.org.

Jul 21-25—2001: A Planning Odyssey (SCUP'S 36th Annual Conference). Boston, MA. Contact SCUP, 734-998-7832 or www.scup.org/36.

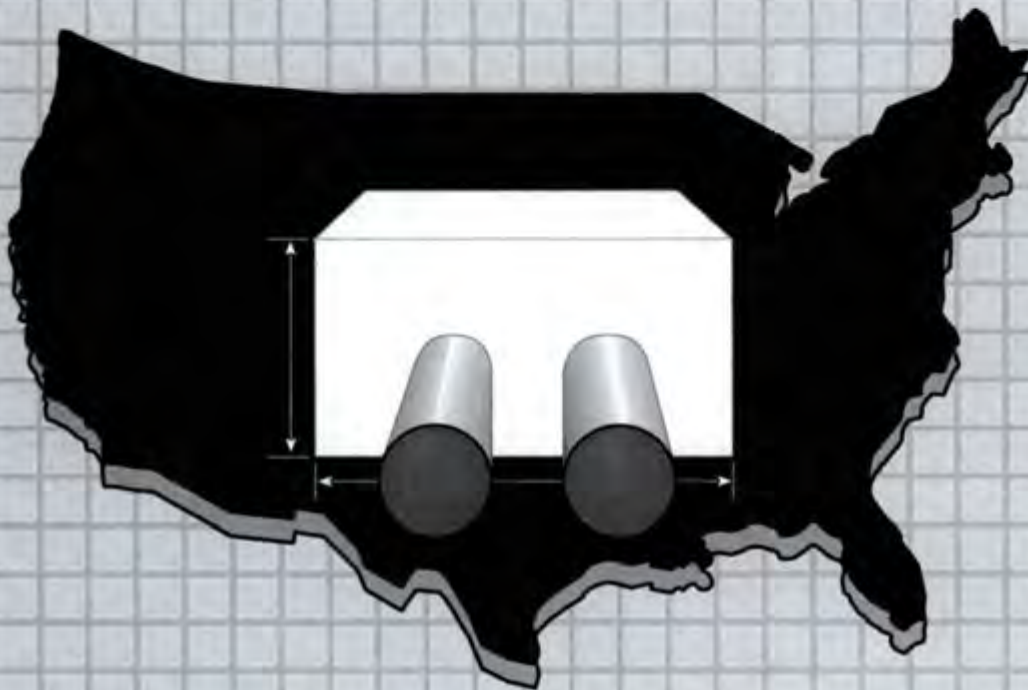
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