

BOC Bulletin

A Newsletter for BOC Graduates, Enrollees and their Employers



SUMMER/FALL 2008

LEED Gold Certification for a New and Not-so-new Complex

LEED certification (Leadership in Energy and Environmental Design) represents a goal of "building green" to reduce the carbon footprint of a building – whether business or residential. Statistics at the US Green Building Council web site (www.usgbc.org) state that in this country, buildings represent 70% of electricity consumption, 39% of energy use and 39% of carbon dioxide emissions. A LEED-certified facility is one, either existing or newly constructed, that meets specific standards designed to minimize or offset the building's environmental impact.

Interest in green building had been steadily rising over the last decade but the more recent, dramatic rise in energy costs and the growing recognition of just how serious our planet is being compromised by pollution have seen this interest rise accordingly.

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Conference & Expo was up over 70% from the previous year. A study done by US/UK commercial real estate information company,



Construction in progress on the First Unitarian Church of Portland's LEED-certified building.

CoStar, found that "sustainable 'green' buildings outperform their non-green peer assets in key areas such as occupancy, sale price and rental rates, sometimes by a wide margin." It is no wonder then that companies and organizations seeking to be both socially responsible and fiscally prudent are incorporating LEED principles into their renovations and new constructions.

Some have been on board for a while though, and one such organization is the First Unitarian Church in Portland, Oregon.

(Continued on page 2.) See Gold Certification.

BOC Bulletin Expands its Readership!

The BOC Bulletin has been published for several years, serving West Coast states that participate in the program. We recently added readership in the North-eastern participating states and, with this issue, we are excited to announce that our circulation now extends to all the states in which BOC training is available.

Our publication aims to highlight new technologies, relate success stories of graduates and get the word out about new ideas in building operation and maintenance for energy efficiency. We are open to suggestions. What would you, as readers, like to hear about? We welcome ideas and encourage all readers to submit thoughts on content they would like to see, technologies that spark their interest on which they'd like more information, or their own success stories as facilities personnel.

Please, submit your ideas to email address: news@theBOC.info.

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Gold Certification (Continued from page 1.)

In 1998, the First Unitarian Church was looking for ways to update and unify the buildings that comprised their complex located on an entire city block. The goal was to build a new structure that integrated the existing buildings, the main sanctuary, the administrative offices building and the Elliot Chapel, so that access to all components was available through the whole complex. The design needed to be seamless and elegant, and had to include classrooms, meeting spaces, a reception area and an outdoor courtyard.

Incorporated with the design goal was the additional desire to make the construction as environmentally friendly as possible, both from an occupant standpoint and an efficiency one, so applying LEED standards was a natural path. In addition to an emphasis on energy-use reduction, the standards also consider water consumption, indoor air quality and recycling.

There were several issues to consider for the project, site constraints and budget concerns among them. While the three buildings were all at the same ground-level elevation, each had different ceiling heights which required the design to include a staircase with several landings and an elevator with doors on both sides and multiple, staggered stops.

After sending out a Request for Qualifications to area architects, the church enlisted Thomas Hacker Architects for the long-term project. P&C Construction worked on implementing the plans and broke ground in June of



Meeting areas and classrooms were an essential part of the design requirements.

2006. Gardner Grice, the church's building manager and a graduate of the BOC program, coordinated with the architects and building contractors to work towards a high green standard and LEED certification. He credits BOC training with enabling him to knowledgeably interact with the various contractors associated with the multi-faceted project.

Remarkably, 97% of all materials from the deconstruction of the existing buildings were either recycled or diverted from landfill.

Remarkably, 97% of all materials from the deconstruction of the existing buildings were either recycled or diverted from landfill. Wood waste was composted and used for landscaping. Windows, flooring and doors, perfectly usable but inappropriate for the re-design, were sold.

For rebuilding, as much as possible, regionally-available materials were used, with CMUs (cement masonry units) and bricks all locally made. The use of recyclables was also extensive. Old cotton clothing (blue jeans!), treated with borax so that it is both insect repellent and non-flammable, was used for insulation, and countertops were made with PaperStone, which is designed from recycled waste paper. To improve indoor air quality, no- or low-VOCs (volatile organic compounds) were used as adhesives, sealants, paints and in furnishings. Marmoleum, flooring made from natural materials and VOC-free, was used throughout the new and renovated structure and installed with solvent-free adhesives.

Lighting concerns were addressed in a number of ways: low-E glazing for all windows to maximize natural light, daylight sensors to set light level according to need, and occupancy sensors to shut off lights automatically when people just plain forget. For heating and cooling issues, a high-reflective roof was installed to prevent the "heat island effect" (when the usual black roof pulls in heat) and the HVAC system was CFC/HCFC-free. To reduce water use, low-flow plumbing fixtures were installed. Courtyard planters were set up as bioswales to treat stormwater runoff.

The new structure has added 20,000 square feet to its city block location, including 2,600 square feet for a reception area



Light and open areas make the facility warm and welcoming.

adjacent to a beautiful courtyard with native plantings. The setup accommodates a variety of functions from workshops to wedding receptions.

In September 2007, almost ten years after the seed idea to expand, and after lots of hard work and thoughtful planning, the new complex was dedicated and received a LEED Gold certification, the second-highest rating for excellence in energy efficiency under the US Green Building Council system. Now the challenge is to keep the complex running to the best of its "green" capacity.

While it is still too early for year-over-year comparisons on specific energy and financial savings, the foundation has been laid. Though obviously a happy consequence, LEED certification for a building involves more than energy efficiency. Although knowing that the resulting facility is approximately 30% better than code is certainly a plus, the enhanced physical environment contributes to comfort and health and thus the quality of life for occupants.

There is still a long way to go, but the increased interest and participation are promising, as materials and processes improve and become the norm. Certainly for the First Unitarian Church of Portland, the experience has been a profitable one – from perspectives beyond just the financial. [BOC](#)

Partnering for Energy Efficiency Benchmarking in Wisconsin's Schools

In his recently web-published article, *Why we never need to build another polluting power plant*, (www.salon.com), energy-efficiency guru Joseph Romm makes the case that we already have within our means the power to decrease our energy consumption as a nation by using existing systems more competently. He writes, "Economic models greatly overestimate the cost of carbon mitigation because economists simply don't believe that the economy has lot of high-return energy-efficiency opportunities. In their theory, the economy is always operating near efficiency. Reality is very different than economic models."

This message is clear to BOC-trained facilities operators, who recognize that efficient use of energy is the core of the BOC philosophy. Partners and sponsors work to present training and incentive opportunities, and to inform their constituents of ever-improving new technologies.

Wisconsin's Focus on Energy program has been a guiding force in the state for almost a decade. Before its establishment, individual utilities were running their own programs. The state stepped in to consolidate the efforts and created Focus on Energy, an agency that works with both residential and business clients to improve their energy use in cost-effective, easily-achievable ways, via dissemination of tools, information and technical assistance, as well as financial guidance and incentives.

One of the agency's recent success stories has been in working with Wisconsin's school systems on an energy benchmarking database.

In 2005, Wisconsin's Focus on Energy program partnered with the Cooperative Educational Services Agency 10 (CESA 10) to conduct a survey of energy efficiency measures in Wisconsin's public school districts. Schools were asked to participate

in the benchmark study on a voluntary basis and by April of 2006, data had been collected from 1,293 schools in 226 districts – more than 60% of the total number of K-12 public schools. Information was collected and ultimately entered into the U.S. EPA's ENERGY STAR® Portfolio Manager national database. Participating schools can now compare themselves to similar buildings and set realistic goals for their facilities based on this comparison.

A big money-saver was a unit ventilator controls modification project in which the unoccupied time was studied and the system adjusted to run as needed. At a project cost of \$5,057, therm use was estimated to be reduced by 65%.

Certainly the high participation contributes to the growing number of success stories throughout the state's schools, large and small. One such school is the Princeton pre-K-12 facility, a 91,000 square foot facility with a total enrollment of about 430. Troy Holland, the facility's manager and a BOC graduate, has worked with Focus on Energy's energy advisor Don Keck for several years now.

"Working with Don has been great. I tell him, 'This is my project. What can you do for me?' and he investigates any available resources that can help make it happen. It makes a much easier sell to the school board for each project, and I'm lucky I have a board that realizes that sometimes you have to spend money to save it in the long run," says Holland.

In 2004, the school installed five vending misers that Focus on Energy was providing at no cost to facilities. More recently, the school's two gymnasiums have been relamped from 24-400 metal halide to T-8 fluorescent fixtures, all with timed occupancy sensors. Classroom, hallway and bathroom lighting has also been changed out and

put on sensors where appropriate, and exit lighting has been switched from a combination of incandescent and fluorescent lighting to LED.

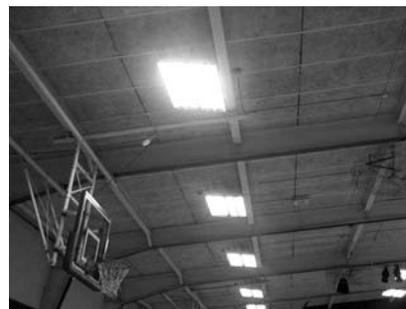
A big money-saver was a unit ventilator controls modification project in which the unoccupied time was studied and the system adjusted to run as

needed. The system in one wing of the facility was operating 24/7. Holland determined that the real need was only for 50 hours per week total, thus eliminating 118 hours of runtime. At a project cost of \$5,057, therm use was estimated to be reduced by 65%. Using a therm cost of \$1, the savings amounted to \$6,781, giving the project a payback of 9 months, an impressive enough payback on its own but even more so when a Focus on Energy rebate of \$2,632 is factored in.

When a 30-year-old two-boiler system broke down, it was an emergency project and Holland had to look at repair/replace options. The old system had originally run on fuel oil and had been converted to natural gas. The boilers could only be set on high or low and could be cycling as many as 20 times an hour. Holland's analysis determined that the boilers were definitely oversized and he was able to replace two 2.5 million Btu output boilers with Patterson-Kelley modulating boilers, one at a million Btu and one at 750,000. Energy cost savings are estimated to be over \$7,200 per year and again, Focus on Energy offered a rebate of \$4,300 to offset project costs.

The Princeton facility has been under budget in electricity for the past two years as a result of ongoing efficiency projects. Water has been over budget though, so that is Holland's next project. And he will look to Focus on Energy: Here's my project – how can you help me?

These days, when everyone's feeling the economic pinch and energy costs are on the rise, saving energy is more important than ever. Working together and exploring the options is a winning strategy. **BOC**



T-8 lighting in Princeton's relamped varsity gymnasium.



Modulating boilers replaced a broken system, saving an estimated \$7,200/year in heating costs.

BOC Grads Making a Difference

Bringing the 19th Century into the 21st



Rick Meinking

Last year, BOC grad Rick Meinking, Director of Plant Operations for Seventy Five State Street in Portland, Maine, completed a fascinating project aimed at bringing a long-neglected, 19th century Federal style house into

the 21st century. The building, known as the Cutter House, was owned by Seventy Five State Street, Portland's oldest non-profit organization, whose focus is on independent and assisted-living facilities. The ornate, cast iron fence had long since been removed from the property. Windows and shutters had been replaced with vinyl substitutes and most of the remaining original architectural details were in a serious state of disrepair. Preserving the structure and trying to maintain its historic

the foam insulation. April saw the new heating pipes, chilled water lines, electrical wires and plumbing systems put in place and the finished walls installed. The Weil-McLain self-condensing boilers, indirect water heaters and the new electrical service (480 volt 3 phase 600 amp) were all set up. Concurrently, the new finishes (painting, flooring, woodwork) were installed, as well as the kitchen cabinets and bathroom fixtures. Next in were the EnergyStar appliances and compact fluorescent light fixtures, occupancy sensors, LED exit lights. Then, the startup and commissioning of the heating/cooling system was inaugurated. By mid August 2007, the occupancy certificate was obtained and, beginning September 15th, eleven new and former residents had moved into their new apartments.

While the rehabilitation of the beautiful old edifice was exciting enough, the real kick for Meinking has been monitoring the performance of the building and its new systems. Putting to use the energy accounting

methods learned from the BOC classes, he has been able to show substantial savings in the natural gas consumption. Auditing the energy usage from January through April of this year has shown proven savings of over \$4,000 for the residence. The graph at left shows a striking comparison of gas usage for the winter months over a three year period between Cutter House and a similar

facility owned by the company but as yet not renovated. On the electricity conservation side, the only incandescent bulbs in the entire 7,600 square foot building are located in the oven, refrigerator, and range hood. Unfortunately, because the electricity had previously been supplied by an adjacent building, savings estimates could not be determined.

Recently, Seventy Five State Street was presented with a 2008 Preservation Honor Award for Excellence in Rehabilitation for its work on Cutter House. Restored to its original elegance as one of Portland's earliest landmarks, its tenants now enjoy the comforts of a modern, energy efficient facility in the atmosphere of a gracious past.

Meinking also undertook a comprehensive energy audit on the 148,000 square foot

facilities at Seventy Five State Street. Results yielded a variety of energy conservation projects, many of which had rebates from Efficiency Maine as part of the equation. Investment costs less energy savings (estimated at over 200,000 kW hours) for the projects gave an average payback time of 1.78 years. With the rebates, that payback time was reduced to 1.46 years.

"The BOC Level I course has really rejuvenated my facilities management career. I was recently a guest speaker at a Maine State Housing Authority meeting talking about the success I have had after completing a major project at my facility. For the last six years I have been the chairman for the Maine Health Care Association's Environmental Services Committee and this year at the association's annual conference I have been contracted to give two training workshops for administrators and facility directors. I will be doing these same two workshops, "One Bulb at a Time" and "Be an Energy Bean Counter" at the 18th Annual NERAHMS (North East Regional Association of Housing Maintenance Supervisors) Conference."

Saving Energy While Boosting Staff Morale

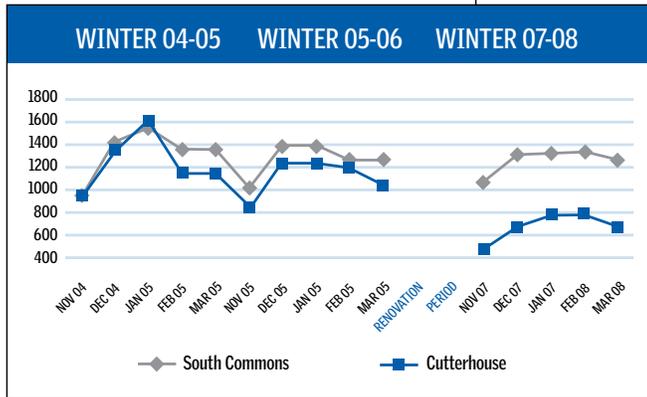


Kelly Prutch

With no capital outlay, Kelly Prutch, Facilities Maintenance Supervisor for the City of Eugene in Oregon and BOC graduate used her BOC energy-efficiency training to effect major changes in the cleaning

procedures of the city's public buildings. The goal was to reduce lighting costs during the off-hours activities required in Eugene's public library, public works building, city hall and the emergency services & training building. A related capital project to improve the lighting control was implemented several months after the team cleaning changes.

Previously, the clean-up practice used a small number of staff for each site and took about ten hours per facility. A review of this set up revealed that it made much more sense to work as one large team, tackling one site at a time. Making this change meant that, together, the team could finish a site in anywhere from three to five hours.



integrity was significant because it was one of the few Federal-era mansions on the Portland peninsula to survive the Great Fire of Portland in 1866.

Prior to 2006, its configuration provided apartments for eleven independent-living senior citizens. With approval from the Portland Historical Board acquired and city permits received, the renovation project started in December 2006. The eleven residents were temporarily moved elsewhere within the campus of Seventy Five State Street.

The demolition of all interior walls flooring and windows took nearly a month. By mid February, new walls were constructed and the re-configured apartments were beginning to take shape. In March the new double-pane windows arrived and were installed, along with

Sustainable Operations Analyst, Lynne Eichner-Kelley, also a BOC grad, completed an analysis of the late night energy use at one of the buildings, the library, before and after the team cleaning changes. Using 15-minute interval data available from local utility Eugene Water & Electric Board, this analysis showed that overall electrical demand for the

building between 2am and 6am was reduced by 15-20% simply by the change in cleaning procedures.

This simple but effective alteration of a traditional daily routine, from a more solitary method to a team approach not only saved energy – and thus, money – for the City of Eugene, but also improved work efficiency, as well as staff morale. It also defines the most basic of BOC training principles: energy efficiency and savings without capital expenditure.

"Our custodial staff was asked to vacate the library building one evening, so engineers could do some research for the changes to the control system. As I worked out the schedules so we could get our work done that day, I realized we had a real opportunity to decrease energy use by making the "team concept" a more permanent arrangement.

Without my BOC training, that never would have occurred to me," says Kelly Prutch.

The project to add occupancy sensor based control was completed several months after the change to team cleaning. The addition of improved controls brought the demand savings up to 30 and 40% for those late night hours. Prutch plans to continue improving the night-time energy use of City of Eugene buildings by shifting custodial work from the current 8pm to 7am shift, to an earlier swing-shift time 3pm – 2am.

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Chipping Away at Energy Costs



Steve Shadrick

After attending BOC Level I training, Steve Shadrick, facility operator for over twelve years for Beltrami County in Bemidji, MN and Facility Manager for the past four, started looking at ways to cut electrical and gas

costs at the county's administrative buildings. The result? He was able to implement a number of projects that would show Beltrami County a savings of over \$82,500 for the year 2007, lowering his natural gas usage by over 45,000 therms and electrical usage by over 341,000 kWh.

Though upgrades were performed in three of the buildings, the main focus was the ten-year-old Community Services Center building, which houses many county departments along with numerous other non-profits and leasers. For the first project said Shadrick, "We installed a high-efficiency boiler that allows us to drop the boiler water temps below the normal 140 degrees we need to maintain with our other boilers. In doing this, we only heat the water to the degree needed to maintain a comfortable environment. We utilize this system mainly during the spring and fall, however we do run it during the winter and our remaining boilers are staged on as needed."

Next on tap was the installation of a Honeywell direct digital control system that allowed them to reset the supply air temps leaving the rooftop units. Doing this eliminated the need to run a boiler during the summer months for supplemental heat, which had been done for the last ten years.

The third project completed was the installation of timers on all exhaust fans. In the past, these fans were running 24/7 and also exhausted out conditioned air the whole time – a significant waste of energy and, therefore, money. A smaller project was the installation of photo sensors on all exterior lights on buildings and in parking lots. In the past they had been controlled by timers that required seasonal adjustment manually. Say Shadrick, "Now we are not only saving energy by having better control, but have also lowered our labor costs by not having to reset timers several times a year."

Shadrick gives high marks to his BOC training and its usefulness as a guide to productively examining his own facility. "In both Level I and Level II BOC programs, instructors stressed ways of reducing energy while still meet-

ing occupancy needs. They give you realistic ways to help achieve your goals, which was a refreshing change from some of the other training sessions I've attended. After each level program finished, I had close to a page full of ideas to be researched to determine if they were good energy saving projects that would help improve our campus. Most of these items were implemented and we have seen a very significant cost savings in our operations.

"Even though I'm the one that puts new projects on the table, I know I have a great maintenance team that is now on board with our goals. We have made great strides implementing these projects. They see firsthand just how significant the cost cutting changes resulting from the work they do and how it benefits the county. In some cases we have actually lowered our work requests because people are more comfortable, which allows staff to concentrate on other projects."



Todd Simkins

Addressing HVAC in IT Server Rooms

Todd Simkins, BOC graduate and Facilities Engineer for Providence Health & Services, conducted a detailed analysis of IT server rooms for the company's Everett, WA

facility. The server room on the Colby Campus already had difficult cooling issues but it was evident that the system required expansion, which would tax the current set up even more. Most business lifelines today revolve around computing capacity and keeping equipment at steady, cool temperatures ensures a more reliable and long-lasting system.

The server room was not being used according to the original design intent, with the then-current one-row utilization less efficient than the original two-row design. There were complaints that the room wasn't being supplied with enough cooling but to be more accurate, as Simkins concluded, it was the equipment, not the room, that needed the cooling and it wasn't getting it.

As an evaluation starting point, Simkins focused on the general considerations for server or data center design: room size, cooling required versus total projected heat load, power needs and power backup. He observed, "Many server rooms feel cold which can be a huge waste of energy. The focus should not be the room but rather the air temperature going into the equipment and the temperature com-

(Continued on page 6.) See MAKING A DIFFERENCE.

MAKING A DIFFERENCE (Continued from page 5)

ing out of it. Occupancy comfort is secondary.”

What Simkins found was that there were many structural set ups in the server room that could be easily and inexpensively adjusted to create a greater air flow efficiency. Exhaust ducts were improperly located and were cooling the air as it left the room rather than the reverse. The original two-row design for equipment had been changed to a one-row setup. As a result, 82.8% of the cooling capacity was being wasted.

“Cooling a room in general is a brute force approach to server room cooling and is a bad way to operate. It is inefficient and also causes hot spots where the equipment will overheat. So, one wastes more energy and

gets less of what is expected. Most of our changes were directed at air flow, redirecting to the equipment (cold isle) instead of the room in general. It is a great example of being energy efficient with little added cost and larger savings,” Simkins observed.

The major changes made to the room were:

- 1) repositioning and adding to the supply and return ducts in the proper configuration for a Hot Isle/Cold Isle implementation.
- 2) installing blanking plates in cabinets.
- 3) increasing and re-arranging the ventilated floor plenum tiles.
- 4) sealing holes in the floor plenum tiles.

By directing the air to the equipment (cold isle) instead of the room in general, the efficiency of delivering cooling to the equipment rose from 17.2% to just above 90% over the second part of the project implementation.

Simkins is adamant that there should be a policy to determine proper room temperature for equipment of this kind. “There is a correlation between room temperature, equipment life and energy savings, but for “room temperature” you have to look at the whole picture – both server and occupant level – and adjust air flow accordingly. Without a policy that states what the supply air temperature minimum and maximum are, energy savings become rather ambiguous. The policy should state what the highest temperature can be at the direct server level without adverse effects to the life or performance of the equipment. In terms of room occupants, that temperature could be quite different,” he believes.



Rodney Schauf

Water Reclamation Project Yields Significant Water and Energy Savings

The constant turnover of clientele in the hotel sector means that one of the largest resource demands is for water. Laundry is the major component

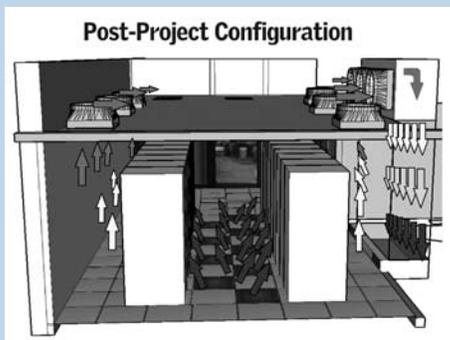
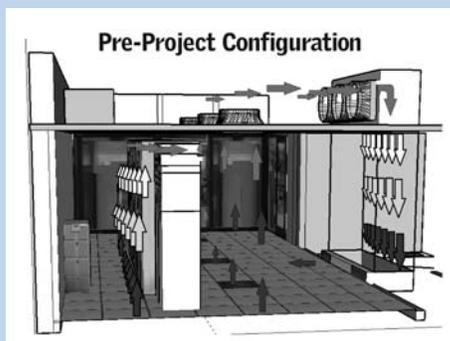
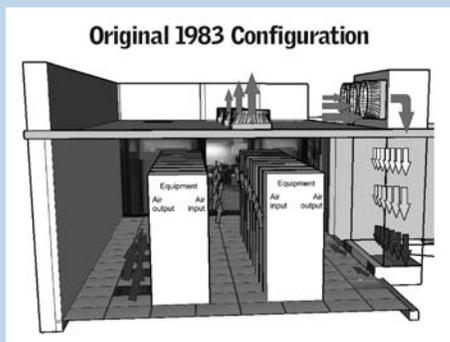
of this demand, which also requires significant energy resources for use of hot water. At the Westin Seattle Hotel in Washington, Director of Engineering and BOC graduate Rodney Schauf helped tackle this issue with a project designed to recycle the laundry water through a filtration and sanitization system.

After installation, water usage for laundry was reduced by 70%. The hotel was already using an ozone cold water system for its laundry, for which estimates are that, generally, an ozone system can save around 30% on water and over 50% on the fuel costs to heat the water. There was a small increase to the electrical building load due to the installation of four 1.5 HP electric pumps used to get the water to and through the recycling system, but the trade off on this was minimal. In twelve months, the savings for water and sewer charges was \$121,500, equal to an approximate 9.5 million gallon change, more than justifying the additional electrical charges of almost \$3,000.

With the 70% recycle rate and a subsequent conservation grant of \$68,000 from Seattle Public Utilities, the project cost of \$170,000 has a payback period of just fourteen months. The subsidy was calculated by providing sub-metered stats for the laundry water supply for a twelve-month period. ROI for the project was eleven months. Once the readings were verified and the unit installed, Schauf and his staff provided tracking for a 90-day period. Again the readings were verified by the utility and a check was mailed to the hotel for the utility conservation grant. The successful results of the project were presented at the annual meeting for the Starwood Hotels & Resorts last year and interest ran high. Says Schauf, “I don’t know how long it will take to get it all in the works, but the use of the recycling equipment will definitely expand. In the last three weeks I have received inquiries for recommendations from hotels across North America including Hawaii.”

Ever on the lookout for new energy-conservation projects, Schauf and his staff worked with Seattle City Light to replace all HID lighting in the hotel’s parking structure with T5 lights, reducing consumption while improving light levels, and received a \$12,000 rebate on the \$36,000 dollar lighting retrofit. They are also working on upgrading chiller controls and programming for greater building temperature control.

“BOC training is helpful because they are always current in new technology, stimulating creativity and getting people to think outside the box,” says Schauf. 



BOC Certification Renewal

To retain BOC certification, graduates must accumulate continuing education (CE) hours each year, following a full calendar year after their graduation. Level I certification renewal requires 5 CE hours each year, and Level II renewal requires 10 CE hours each year. The hours may be earned in any of the following ways:

- **Continued employment in building operations**.....2 hours / year
- **Continuing education in building operations**Actual hours of classroom time
- **Energy efficiency projects completed at your facility**.....Up to 11 hours / year
- **Membership in a building operations membership association**.....1 hour / year
- **Offices held in membership associations**.....2 hours / year
- **Awards received for efficient building operations**2 hours / award
- **BOC Newsletter quiz (see below)**1 hour / passed quiz
- **Completion of an energy consumption benchmark for the previous 12 month period using ENERGY STAR® Portfolio Manager or alternative energy accounting tool**3 hours / year

You will be notified by mail when your certification is up for renewal (your renewal date appears on your wallet card). Once you have received a renewal notice, complete the short application, provide a list of your certification renewal activities from the past year and return the information to NEEC. For 2009, the renewal fee is \$55 for each of Level I and Level II, or \$85 for a "combo" renewal of both Level I and Level II.

EASY CERTIFICATION RENEWAL CREDIT

Another easy way to get some continuing education credits for your yearly certification renewal requirement is right here in the BOC Bulletin. Just read the featured technical articles (pages 8-9), then take the short quiz provided on page 11 of the newsletter. Send or fax it back to us for one CEU credit hour per quiz passed, *along with your recertification application. Please do not send separately.*

Continuing Education Opportunities for Certification Renewal Credit

Below you will find listings for the web sites of various national organizations that offer continuing education courses that are applicable to annual BOC certification renewal. Check out the Education, Professional Development and Events Calendars at these sites. Keep in mind that your local utilities sponsor energy education events and their sites are sources for training opportunities as well. Regional industry associations also offer a number of options for further education.

BOMA:
Building Owners & Managers Association
www.boma.org/TrainingAndEducation/BEEP/

BOMI:
Building Owners & Managers Institute
www.bomi-edu.org

ENERGY STAR®:
Live web conferences, pre-recorded trainings, self-guided presentations
www.energystar.gov/index.cfm?c=business.bus_internet_presentations

FEMP:
Federal Energy Management Program Workshops & Conferences
www.eere.energy.gov/

GreenBuild:
US Green Building Council
www.usgbc.org

HVACR Education:
On-Line Learning for the HVACR Industry
www.hvacrededucation.net/

IFMA:
International Facility Management Association
www.ifma.org

The International Facilities Management Association has several regional chapters, all of which can be accessed from the association's main web site address above. Be sure to check out the site for the variety of learning options available both online and via seminar.

Technology Innovations in HVAC

The online June 2008 issue of Buildings.com highlights new HVAC solutions in its article *4 Alternatives to Traditional HVAC* by Leah Garris, the magazine's senior associate editor. Linking occupancy productivity to overall building costs, Garris points out that increased productivity due to a more comfortable and controlled indoor environment – even in small increments – can yield huge dividends. Productivity brings profits; increased productivity brings increased profits – which could potentially cover your energy costs for a whole year!

The four alternatives discussed are:

1. chilled beam systems
2. geothermal
3. night-sky cooling
4. thermal energy storage.

Each alternative is presented with a detailed explanation of exactly what it is and how it works, the benefits and the drawbacks. An assessment of the most suitable types of facilities and locations is also included, since these systems can be quite situation-specific. To find out if one of these innovations is a solution for your facility, the full article can be found by going to www.buildings.com and checking out their archive issues for June 2008.

FREE BOC WEBCAST

The webcast allows you to conveniently view and listen to an overview of the BOC program from the comfort of your office. All you need is a desktop browser and a telephone.

The next webcasts for fall 2008 are:

Tuesday, Sept 9th
Thursday, Oct 30th

- 8:30AM - 9:30AM (PST)
- 9:30AM - 10:30AM (MST)
- 10:30AM - 11:30AM (CST)
- 11:30AM - 12:30PM (EST)

To sign up go to:
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Prep for Winter When it's NOT an Emergency

By Thomas J. Hand

While it may seem early to be thinking about prepping for the cold weather, there is a lot to look for and starting well ahead of time just means minimizing unpleasant surprises. Maintenance is a lot easier when it doesn't have to be done under the gun. Think of this as a pre-season checklist and avoid the headache of an ill-timed emergency.

When we think of cold weather, the first thing we want to make sure of is that the heat is going to work to maintain a comfortable environment. But preparing the heating system is just one of many tasks that should be completed before winter arrives. The facility operator should focus attention to all of the elements of the work environment.

The roofs should be inspected and repairs underway before the cold drizzles of late November. Meet with your roofing contractor or consultant and arrange to walk the entire roof, paying close attention to penetrations and flashings. Make sure that the roof drains and gutters and downspouts are clear of debris such as leaves and objects that can clog the drains and cause interior damage. Check such things as parapet walls and metal or tile caps to assure they are securely in place. Examine caulk joints at all points and look for cracks in the materials.

Windows should be examined to check for tight closure and condition of the caulking and seals. Exterior doors should operate easily and reliably. Doors that function well in the warm months can become difficult to operate due to freeze thaw cycles lifting up the sill plate. Exterior steps should be checked for needed repairs and interior entryways equipped with adequate matting to prevent falls and damage to floor finishes. Locks should be lubricated with special lock lubricants.

Interior and exterior lighting systems are sometime forgotten about during the long days of summer and will be required to operate longer hours during the winter. Systematically check interior fluorescent lighting and establish either a bulk change out procedure or mark all newly installed bulbs with the date of installation. Check timers and occupancy sensors that control lighting times. Exterior lighting for parking lots and security needs to be checked at night and incandescent entry-way bulbs changed annually.

Walk the grounds and examine plantings and trees and imagine how they will be affected

by snow load. Branches overhanging roofs, drives and walks should be brought up if they will hang too low covered with snow. Has the irrigation system been shut down for the winter and blown out with compressed air? Forgetting this detail will cost major dollars to correct next spring. Examine recent changes on the grounds such as relocated trash receptacles, or building additions to determine how these will affect traffic and snow removal efforts. Call your snow removal contractor to assure that your contract is in place for the winter. Check and service the snow removal equipment used by custodial staff and discuss snow removal procedures. Inspect and repair parking lots to minimize problems associated with cold weather. Arrange to have these areas sealed and re-stripped and renumbered if needed. Make sure that handicapped spaces are identified with blue paint and also marked with a sign.

Arrange to meet with the IT people to discuss testing of back up generators and emergency power supplies. Generators should be inspected and tested in accordance with the manufacturer requirements and serviced accordingly. Have the generator fuel checked and if it has degraded, have the tanks cleaned out and fresh fuel delivered.

Various types of facilities will have different critical systems that support their business function. For example, freight companies and fire departments rely on overhead doors and should focus on preventive measures for cold weather readiness. It is up to the person responsible for the facilities to know the physical plant and how it performs year around. Listening for anecdotal information from internal customers and maintenance staff is extremely important, and very helpful to discovering what really needs to get done before cold weather arrives. What can be fixed when it is five degrees outside is more easily fixed when the weather is pleasant. [BOC](#)

Thomas J. Hand, CFM, CFMJ is a certified Facility Manager with thirty-five years of experience in the facilities management field. A BOC instructor and an academy instructor for the IFMA, Mr. Hand is the principal of T. J. Hand Facility Management Consultant in Dayton Ohio. He can be reached at tjhand@voyager.net

HVAC Maintenance Recovery: Assuring a clean, dry, oil free pneumatic control air supply

By Tom Olsen

The following information can help you extend the life of your pneumatic temperature control devices.

- Many facilities still have pneumatic temperature control systems. Critical to their proper operation is a clean, dry, oil free source of air. The heart of a pneumatic temperature control system is the air compressor and the following information will help you extend the life of your pneumatic temperature control devices. We recommend that you follow these guidelines closely.
- Operate air compressor systems on a year-round basis. You do not want warm, moist air entering the air lines when the system is off.
- Drain water from the air tank daily, year-round. Make certain that the air is drained from the bottom of the tank, not the midpoint on the end of the tank, through a siphon. Have the drain line from the tank, and the refrigerated air dryer, piped to a container, to keep from having oil spread all over the floor.
- Keep an eye on the liquid in your container. Is it all clear water? That's what it is supposed to look like. If it is white or milky looking, this indicates the presence of oil contamination.
- The optimum design for a temperature control air compressor is 4 minutes on – 8 minutes off. This extended off time allows the compressor cylinder(s) to cool. This total on/off cycle time adds up to 12 minutes, or 5 on/off cycles per hour.
- Compressor systems with more than five on/off cycles per hour have a need for further investigation. Either the tank is too small; you paid too much for an oversized compressor; both of the above; the on/off pressure differential is too small; or the system has lots of air leaks. Again, the compressor cylinder(s) will not cool if the system has too-frequent on/off cycles. This heats the lubricating oil to the point of

vaporizing. As that oil is carried throughout the system, it condenses, plugging restrictors and damaging control devices. Keeping the oil from entering the air lines is much less expensive than removing it after the fact.

- Another major concern is the runtime ratio. Compressor systems whose on time exceeds the off time either have a compressor that is worn out, too small or the system has too many leaks. Again, oil contamination is a probable result.
- Between the air compressor and the refrigerated air dryer, there should be no filters or pressure reducing valves. Moisture is certain to condense at these points, shortening the life of these devices.
- A properly sized, good quality refrigerated air dryer is a must. When at the compressor, draining the tank on a daily basis, grab a hold of the outlet of the refrigerated air dryer. It should feel either cold or hot to the touch. The refrigerated air dryers of years ago, used to have a separate condensing coil for the refrigerant. That means that the heat of compression is put back into the space, making the airline leaving the refrigerated air dryer feel cold, when operating properly.
- Today, many refrigerated air dryers use the cold air from the air dryer to condense the refrigerant. For those dryers, the outlet airline should feel hot to the touch. So, if the outlet airline is neither cold, nor hot, seek immediate attention. You simply can't afford to have moisture in your pneumatic temperature control systems.
- The minimum compressor on pressure should be 60#. This allows the air to be in the refrigerated air dryer long enough to cool to the condensing temperature and wiping out the moisture.
- Clearance between the wall, and the compressor flywheel, should be a minimum of 14". This allows the flywheel to operate as a fan and help cool the cylinder(s). Be certain that the flywheel rotation blows the air across the compressor. It cools the compressor better than trying to draw the air across the compressor.
- Use two air intake filter elements on the compressor. Alternate them twice a year – minimum. More frequently, if the area is dirty. Use a good quality, washable type filters. Put the freshly washed filter in a clean, dry location between changes.
- Compressor oil should be changed only once a year. Remove the access plate and clean the sludge out of the bottom of oil sump, at every oil change. For pressure lubricated compressors, clean the oil pump pickup screen at the same time. Be certain to have a new access plate gasket on hand. Replace the access plate gasket, if it was damaged in removal.
- Use a good quality, heavy-duty compressor grade oil only. Do not use any type of automotive grade oil. Not even non-detergent automobile oil. Automotive oil is designed to go everywhere. That's good for cars, but it is not what is needed for temperature control air compressors.
- When a temperature control air compressor fails, replace it immediately, with a slow RPM, pressure lubricated compressor, specifically designed for temperature control use. At least one major manufacturer makes their temperature control air compressor with side-seal rings. The ends of the rings are made at opposing angles, so that they overlap. Our experience is that a few extra dollars in a properly sized air compressor of this style, is well worth the investment.
- Another important issue for future discussion is the after-air dryer filters needed to assure a clean, dry, oil-free source of air for pneumatic temperature controls. [BOC](#)

Tom Olson, a BOC instructor, was a principal and founder of Minnesota-based Climate Makers (www.climatemakersinc.com), mechanical & temperature control specialists, with an emphasis on energy optimization, comfort improvement and indoor air quality. Now retired from the daily business routine, Tom still maintains the company's free monthly HVAC Maintenance Recovery Training Program. You are welcome to subscribe to the lessons by sending an e-mail note to: cmi@climatemakersinc.com.

BOC Graduate Numbers Continue to Grow to Over 5,500 Nationally!

As BOC expands across the country, the graduates multiply. Graduates from this year and last hail from Idaho to Rhode Island, from Michigan to Kansas, and represent a variety of sectors: education, healthcare, hospitality, property management, state and federal governments, municipalities, military and manufacturing. Among the many BOC boosters are:

- Able Engineering
- Amgen
- Boston Scientific
- Cablevision
- CB Richard Ellis
- California State University
- University of California
- Chicago Public Schools
- Commonwealth of Massachusetts
- Community Transit
- Connecticut Department of Corrections
- County of San Diego
- Cushman & Wakefield at Adobe
- Massachusetts Division of Capital Asset Management
- Eastern Suffolk BOCES
- Fairmont Olympic Hotel
- U.S. Forest Service
- General Services Administration
- Hines
- Hormel Foods
- Kaiser Permanente
- LA County Sheriff
- Lawrence Livermore National Laboratory
- Lamoore Naval Air Station
- Macys
- Northrup Grumman
- Onizuka Air Force Station
- Port of Seattle
- Raytheon
- Sprint
- Stanford
- State of Washington General Administration
- YMCA

To see a listing of recent BOC graduates, please go to the national web site at www.theBOC.info and click on "Recent Grads".

Find A BOC Training In Your Area

There are currently over five thousand BOC graduates throughout the country and that number will continue to grow because the need for educated facilities operations & maintenance personnel is stronger than ever. BOC training is offered in 20 states and that number, too, is continuing to grow.

BOC Level I Certification

The Level I series comprises 74 hours of training and project work in building systems maintenance. Courses include: Building Systems Overview, HVAC Systems and Controls, Facility Electrical Systems, Indoor Air Quality, Operation & Maintenance Practices for Sustainable Buildings, Efficient Lighting Fundamental and Energy Conservation Techniques.

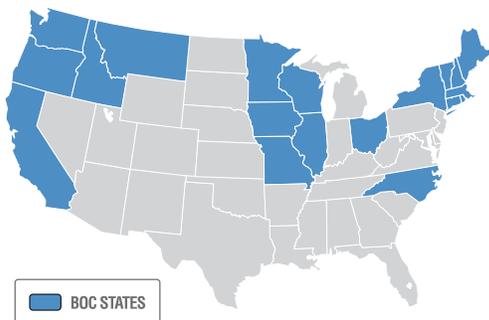
BOC Level II Certification

Level II has 61 hours of training and project work in equipment troubleshooting and maintenance. Courses include four core classes and two supplemental classes. The four core classes include: Preventive Maintenance & Troubleshooting Principles, Advanced Electrical Diagnostics, HVAC Troubleshooting & Maintenance, HVAC Controls and Optimization. See the website for supplemental class topics.

To find a Level I or Level II training in your area, please visit the BOC website at www.theBOC.info. On the main page, you will see "BOC® Around the USA" and just underneath that is a link to "FIND training near you." Click on the map and you will find detailed listings of course series available, with dates, locations and information on how to register.

Training is available from Maine to California!

Building Operator Certification States – 2008



Conferences & Symposiums 2008-09

Labs 21 2008 Conference

The San Jose McEnergy Convention Center
San Jose, CA
September 16-18, 2008

More info: www.labs21century.gov/conf

The 10th annual three-day international conference has dozens of technical sessions highlighting new and innovative products designed to usher in the next generation of laboratories.

IFMA World Workplace 2008 Conference & Expo

The Dallas Convention Center
Dallas, TX
October 15-17, 2008

More info: www.worldworkplace.org

Plan your attendance at World Workplace more efficiently by researching session topics online by track, knowledge level or session time.

GreenBuild Expo

The Boston Convention & Exhibition Center
November 19-21, 2008
Boston, MA

More info: www.greenbuildexpo.org

National Facilities Management & Technology Conference/Expo

The Baltimore Convention Center
Baltimore, MD
March 10-12, 2009

More info: www.nfmt.com

This event also includes the Maintenance Solutions Expo, the GreenBuild Conference/Expo and the Safe Building Expo.



New BOC Class on O&M for Sustainable Buildings

Reflecting the constant evolution of facilities management, BOC always looks for ways to update training. The latest change is BOC 105: Operation & Maintenance Practices for Sustainable Buildings.

This one-day training provides an overview of best O&M practices for green or high performance buildings and addresses exterior site issues, water efficiency, cleaning products, material and supply purchasing, energy, and indoor environmental quality. National green building rating systems such as LEED™ and tools through ENERGY STAR® for evaluating the sustainability of the existing buildings are also explored. Class participants will learn to identify and apply O&M practices for improving the performance of both existing buildings and newly-designed green buildings.

REMINDER:

2008 BOC Grads

By March 20, 2009, you will need Continuing Ed credit to renew your level certification. Level I renewal requires 5 hours annually and Level 2 requires 10 hours. See page 7 in this newsletter for details.

BOC Graduate Energy Efficiency Incentive Rewards Programs!

Several utility sponsors of the BOC training have initiated special BOC awards programs for BOC grads and/or their employers who successfully earn the BOC credential and submit energy efficiency project applications for utility approval. Rewards can include cash rebates on BOC tuition and a cash incentive for submittal of a project rebate application for an energy saving project in your facility.

Currently offering rewards are: Efficiency Maine, National Grid, NStar, and Seattle City Light. For details and applications, go to www.theBOC.info/wa in the Seattle area. In the Northeast, go to www.theBOC.info/ne.

Prep for Winter / HVAC Maintenance Recovery Articles

Here is an easy way to earn one continuing education hour towards annual BOC re-certification. Read the articles on *HVAC Maintenance* and *Prepping Your Facility for Winter* that begin on page 8 and take this short quiz based on that material. Mail or fax your answers to our offices, with your certification renewal application, as directed at the end of the quiz.



With a passing grade, we will apply one credit hour to your record.

CHECK YOUR ANSWER(S):

1) Who are the critical people to liaise with in determining the preparedness of backup generators and power supplies?

- a. _____ Human resource personnel.
- b. _____ Department heads.
- c. _____ IT personnel .

2) How do you prepare to prevent possible snow damage?

- a. _____ Check for physical changes on the grounds – relocations, additions.
- b. _____ Ensure that the irrigation system is clean.
- c. _____ Walk the property to see if or how branches may be affected by snow load and it is a potential threat to the facility.
- d. _____ All of the above.

3) Generator fuel will not degrade over so short a time as a summer season

- a. _____ TRUE b. _____ FALSE

4) What is probably the easiest issue to overlook when preparing the facility for winter operation?

- a. _____ Potential interior/exterior lighting loss due to the long summer days.
- b. _____ Servicing snow removal equipment.
- c. _____ Possible roof leaks..
- d. _____ Preparation of the heating system.

5) When you drain water from the air tank in a compressor, this should be drained from:

- a. _____ the top.
- b. _____ the middle.
- c. _____ the bottom .

6) Draining of the water from the air tank system should occur.

- a. _____ Monthly .
- b. _____ Bi-Weekly.
- c. _____ Weekly.
- d. _____ Daily.
- e. _____ At open and close of business day.

7) Optimum design for a temperature control air compressor is:

- b. _____ five minutes on, ten minutes off.
- c. _____ four minutes on, eight minutes off.
- d. _____ five minutes off, ten minutes on.
- e. _____ four minutes off, ten minutes on.

8) With a compressor system, too many on/off cycles per hour can indicate

- b. _____ The system has air leaks.
- c. _____ The tank is too small.
- d. _____ The compressor is oversized.
- e. _____ All of the above .

9) High-grade non-detergent automotive oil is appropriate for temperature control air compressors.

- a. _____ TRUE b. _____ FALSE

10) The outlet airline on refrigerated air dryers that use the cold air from the air dryer to condense the refrigerant should feel.

- b. _____ hot when touched.
- c. _____ cold when touched.
- d. _____ lukewarm when touched.
- e. _____ damp .

END OF QUIZ

We include a quiz like this in each of our bi-annual newsletters. To submit your completed quiz for re-certification credit (1 credit per quiz passed), please complete the following and either fax it to 206-292-4125, or mail it to: **BOC Quiz, NEEC Office, 605 First Avenue, Suite 401, Seattle, WA 98104. Please remember to send it with your certification renewal application and NOT as a separate item.**

Your Name: _____

Title: _____

Employer: _____

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