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Lodging Engineer

1ST PERSON

An Interview with

Marvin Dixon

Director of Engineering

Four Seasons
Hotel Philadelphia

One Logan Square,
Philadelphia, PA

http://www.fourseasons.com/philadelphia

By Robert Elliott

To get us started, could you tell our readers a little about yourself and your property?

"As Director of Engineering at Four Seasons Hotel Philadelphia, I am responsible for overseeing the engineering functions of a 330,000 square foot luxury hotel. The Four Seasons Hotel, Philadelphia was built in 1982, is an 8 story property with 364 guestrooms and approximately 10,000 square feet of meeting space. The building is a sub-meter to the adjacent office building for the chilled, hydronic heat and electric services. We have a dedicated gas and district steam service feeding the hotel."

(cont. on pg 5)

Microturbines for Combined Heat & Power Generation at Hotels

By

By Capstone Turbine Corporation

www.capstoneturbine.com

U.S. government statistics show that on average, America's 48,000 hotels annually spend nearly $2,200 per guestroom on energy – about 6 percent of all operating costs (energystart.gov). With this built-in overhead, it is clearly time for hotels to reenergize. Hotel managers know that increasing the number of returning guests requires a high level of service, comfort, and a commitment to high levels of energy consumption. Fortunately, energy consumption can now be tempered by advances in combined heat and power (CHP) generation. Executives quickly are learning alternative energy systems achieve greater energy efficiency and can dramatically reduce energy consumption – thus lowering both operating costs and greenhouse gas emissions.

Three natural gas microturbines provide electrical and thermal power at the Four Seasons Hotel Philadelphia.

Combined Heat and Power with MicroTurbines

CHP is the simultaneous production of onsite electricity and thermal power from a single fuel source, which also is known as

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featured in this issue

nahle

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LODGING ENGINEER™ reports about people, events, technology, public policy, practices, study and applications relating to hotel and motel engineering, maintenance, human communication and interaction in online environments.

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INTERVIEW WITH Marvin Dixon

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Marvin Dixon joined Four Seasons Hotel, Philadelphia as Director of Engineering in February 2004. Prior to joining Four Seasons Hotel Philadelphia, Mr. Dixon served as the Regional Chief Engineer at GF Management in Philadelphia. While with GF Management, Mr. Dixon was responsible for overseeing the engineering functions for the Valley Forge Convention Center, Hilton at University Place, Holiday Inn Center City, Airport Hilton, Sheraton Baltimore North, and Four Points Hotel by Sheraton Rochester Riverside. As Director of Engineering, Mr. Dixon worked with each property to oversee engineering functions, energy controls, preparation and approval of capital projects and renovations.

In addition, Mr. Dixon has worked as the Director of Engineering at Pocono World Hotels and Omni Richmond Hotel, and was the Chief Engineer at Radisson Suite Hotel in New Orleans, Louisiana.

A native of Kentucky, Mr. Dixon attended Lexington Technical Institute where he studied Mechanical Engineering. He has also attended Rheem Heat Pump School in Lexington, KY; Servidyne in New Orleans, LA; and South Side Vocational School in Lexington, KY.

Mr. Dixon resides with his wife and children in Chester County, PA where he enjoys riding horses and spending time on his farm.

I suspect you will be the envy of many of our readers with the ability to ride horses on a daily basis, not what you would expect for a large metropolitan based property. Would you tell us a little about your staff? I understand they are responsible for a greening program that has been quite successful.

"I am directly responsible for implementation and maintenance of the engineering department's procedures, and work with my staff to ensure that the department confirms with the brand's quality system procedures. Since joining Four Seasons Hotel Philadelphia, I have been instrumental in assembling the staff "Green Team," a group of employees committed to ensuring that the hotel strives to be eco-friendly in their day-to-day operations." Under his guidance, Four Seasons Hotel Philadelphia instituted a comprehensive recycling and composting program, achieving an overall

33% waste stream diversion and reducing landfill waste by 47% from 2006 to 2009.

Additionally, Mr. Dixon's staff consists of himself, Director of Engineering (DOE), 1 Assistant DOE (Bob Siuta), 1 Administrative Support (Dawn Montaque), 2 Painters, 1 carpenter, 1 wood/furniture refinisher, 7 shift engineers, and 1 room PM.

Your property has been very proactive in managing energy. Can you tell our readers a little bit about some of your initiatives and the challenges of using micro-turbines?

The installation of the Combined Heat and Power (CHP Micro-Turbines) has really launched the department into new ways of managing and how we look at energy. Instead of trying to count kwhrs, ccf, mcf, mlbs of steam, tons of chilled water or therms, we convert it all over to btu's of heat by metering. And the approach we have, is to look at how we can better control the heat, because, it does not matter what source of energy you have entering your building, when you consume energy it turns into HEAT. And, then you either remove it through the A/C system, dump it down the drain, or exhaust it out a ventilation system. This means you use it once and then throw it away. Our new approach is that we now recycle the same heat that we used to be so quick to discard. We have been able to do this by reconfiguring our existing hydronic heating piping as a storage cell for heat. This opens up new opportunities for use to capture the waste heat from laundry, kitchen exhaust, refrigeration condenser loops and other sources that we use to remove heat. I am very proud of department staff and how well they manage the heat from the turbine. It has opened up new ideas in the ways we think and operate.

Instead of trying to count kwhrs, ccf, mcf, mlbs of steam, tons of chilled water or therms, we convert it all over to btu's of heat by metering.

I understand you did your homework before settling on a heat recovery system. Can you talk to the systems you have chosen for your property to help control utility costs and energy consumption?

Here at the Four Seasons we were challenged with finding a better solution for controlling our utility costs. After our due diligence in searching for a CHP system was complete, we settled on Capstone CHP systems here at our property. Their units technologically meet all of our needs with regard to sound, vibration, maintenance, and performance. The system cost was hard to budget and forecast because

our utility costs were changing monthly with the fluctuating cost of a barrel of oil. Prior to installing the Micro-Turbines, the Hotel heated all of its domestic water with steam from the local District Steam Company, which was the operation's most expensive source of energy.

So what did you find? Did the CHP system meet your expectations?

The entire project cost $1.1 million and included (3) 65kW units, new high pressure gas service to building, hot water piping and heat exchangers. In the first full year of operation the impact of the Turbines was significant. Had the facility not had the Micro Turbines installed, they would have seen a $376 thousand increase in energy cost.

Are you continuing to see such positive savings?

Today the Hotel is self generating 30% of all it's electrical needs, and the waste heat that is rejected from the Turbines meets the amount of heat needed to heat all of the hot water for the laundry, Guest tower, Kitchen operation and 10%-15% of the building's space heating needs. The Hotel is also able to more accurately forecast our energy cost and insulate itself from any market fluctuations by purchasing 1-2 year supplies of natural gas while the market price is low.

So would you do it all over again knowing what you know now?

As a five-star luxury hotel, the world-renowned Four Seasons Hotel in Philadelphia uses a tremendous amount of energy each day for cooking, heating, lights, laundry, showers, swimming pools and more. So, with management wanting to gain control of energy costs and reduce greenhouse-gas emissions, we decided to generate the hotel's own onsite power. In October 2009, the 8-story hotel had three natural-gas microturbines installed on its roof at One Logan Square in downtown Philadelphia.

The microturbines' combined heat and power (CHP) technology allows the hotel to generate nearly 200-kilowatts of electric power, which is about 30 percent of the hotel's overall electricity needs. Exhaust heat from the microturbines is captured and used to heat water for laundry and other hotel operations. In fact, the energy-efficient CHP application provides 100 percent of the building's day-to-day domestic hot water and 15 percent of its heating needs.

Before installing the microturbines, the hotel relied heavily on the City of Philadelphia's steam loop and the local electric grid to meet its energy needs. Today, the hotel uses natural gas to produce its own electrical and thermal power

Can you tell us about the savings in both dollars and BTUs?

"There is a great link: buy cheap gas, own your own turbine and produce your own electricity. We buy third-party transportation gas and we shop around for the best rate. This has made electricity from the microturbines 20 percent cheaper than what we could get from utility."

The hotel reconfigured its hydronic heating loop into a system that captures heat from the microturbines and distributes it throughout the building. "With such a highly efficient process, the hotel is able squeeze every dollar out of each BTU. Instead of dumping rejected heat into the atmosphere, we can reuse it," Dixon reports. "During the first 27 days of operation we saw a cost avoidance of over $27,000."

Are these systems loud?

Aesthetically the system is quiet and takes up minimal space, which was a key reason microturbines were selected over reciprocating technology. With a noise output of only 65 decibels at 10 meters, the microturbines are not a nuisance to the Presidential Suite guests directly below. "Reciprocating engines have to be rebuilt at 22,000-23,000 hours, have oil replaced regularly, consist of lots of moving parts, and have high vibration and noise. We can't have noise at a hotel – that would be a disaster," he added.

Doesn't natural gas have less carbon emissions than coal produced electricity?

The rooftop microturbines, which sit amid prime metropolitan real estate, are also ultra-low in emissions (less than 9 parts per million) — making this onsite power generation system a clean-and-green, environmentally friendly option.

Marvin expects more hotels will utilize the proven technology. In fact, the Philadelphia Four Seasons itself plans for a 2nd phase installation to occur that will include two additional microturbines and an absorption chiller which will meet the growing hotel's future energy and air-conditioning needs.

"Four Seasons is a leader in the community and accustomed to setting the standard for future generations," Dixon said. "The microturbine installation is a step in the right direction in helping Philadelphia become a more sustainable city."

For all of their efforts in lessening their carbon footprint, under Mr. Dixon's guidance Four Seasons Hotel Philadelphia received the 2007 Philadelphia Commercial Recycling Award and 2008 Corporate Energy Management Award. Mr. Dixon's efforts in establishing and implementing green initiatives has also resulted in Four Seasons Hotel Philadelphia being recognized by the Environmental Protection Agency (EPA) as a case study on composting in the hospitality industry. Mr. Dixon was recently named 2009 Energy Manager of the Year by the American Energy Engineers Association.■

Advertorial

ADA Compliancy Required!

New regulations affect your signage in commercial facilities as well as state and local government buildings

Coinciding with the 20th anniversary of the Americans with Disabilities Act, new ADA regulations will soon take effect. And, while a probationary period has been allotted for buildings to get in line with the new regulations, facility owners and managers will need to begin the process of seeking compliancy soon in order to avoid fines.

And, while fines are a good motivator in getting you in line with new ADA regulations, compliancy is also important in order to better serve your customers. Fifteen million Americans are blind or visually impaired and 21% of those identified are ages 65 and older. With an aging population, this number is likely to increase. ADA signage is greatly needed in order to assist impaired persons with wayfinding and identification.

What do you need to know about signage updates?
There is a lot of paper work to thumb through to get a handle on the new regulations in order to become ADA compliant. But, we've done the leg work for you! Here's what you need to know right now.

- **Mounting location and height –** Signs must be installed on the wall adjacent to the latch side of the door or the nearest adjacent wall. Mounting heights are 60 inches above the finish floor to the centerline of the sign. Note: your signage should be mounted so that a person may approach within 3 inches of the sign without encountering protruding objects or standing within the swing of the door.

- **Finish and contrast –** When choosing colors and finish for your signage, go with a matte or other non-glare finish. Furthermore, signage characters must contrast with their background with a minimum contrast of 70% – either light letters on a dark background or dark letters on a light background allowing for clear visibility.

- **Raised and brailled characters –** The regulations have expanded for raised and brailled characters. New regulations require characters to be raised a minimum of 1/32 inches, upper case, sans serif or simple serif type and should be accompanied with Grade 2 Braille. Raised characters shall be at least 5/8 inches high, but no higher than 2 inches.

Information provided by: access-board.gov.

SIGN★A★RAMA
WHERE THE WORLD GOES FOR SIGNS

Need to get your facility up-to-date? SIGNARAMA is well-versed on the latest ADA rules and regulations. Contact your local SIGNARAMA for more information. Find your nearest store at www.signarama.com/locations or call 1-877-581-0857.

Microturbines for Combined Heat & Power Generation at Hotels

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as cogeneration. In addition, CCHP (combined cooling, heating, and power or trigeneration) provides the ability to power heat and cool a facility from a single fuel source. Hotels, hospitals, data centers, office buildings, and even wastewater treatment plants are among the growing number of industries installing microturbine-powered CHP and CCHP systems to increase operational efficiency, ensure energy reliability, and lower emissions and energy bills.

In a CHP or CCHP application, microturbines produce reliable electricity and thermal power onsite from a single fuel. CHP and CCHP systems have the ability to run on such alternative fuel sources as natural gas, propane and biogas. As microturbines generate this low-emion electricity, their exhaust heat is captured and recycled for direct heating, hot water, steam, and process heating and/or cooling, thus greatly increasing system efficiencies and significantly lowering energy costs.

According to the United States Clean Heat & Power Association, CHP systems currently:

- Produce almost 8 percent of U.S. electric power;
- Save building and industry owners over $5 billion/year in energy costs;
- Decrease energy use by almost 1.3 trillion BTUs/year;
- Reduce NOx emissions by nearly half a million tons/year;
- Reduce SO2 emissions by nearly 1 million tons/year;
- Prevent release of over 35 million metric tons of carbon equivalent into the atmosphere.

By generating electricity and thermal power onsite, microturbines eliminate or reduce the need to produce electricity from such high-emission and expensive sources as large electric utility plants. When coupled with heat recovery systems that capture exhaust thermal energy to heat spaces and/or water, microturbines also reduce the need to use conventional heating technologies such as boilers and furnaces, which emit significant quantities of carbon dioxide, nitrogen oxide, and carbon monoxide, and require additional fuel.

In a CHP or CCHP application, microturbines produce reliable electricity and thermal power onsite from a single fuel.

In a CCHP application, an absorption chiller is added to the system, which turns the heat into a cooling source that often is used for low-cost and highly-efficient air conditioning.

Microturbines are optimal for providing electricity in CHP or CCHP applications because they are compact, flexible in connection methods, have the ability to be arrayed in parallel to serve larger loads, provide reliable energy, and emit ultra-low emissions.

What is a microturbine?

Microturbines are small, clean-and-green gas turbine systems manufactured with "jet engine" technology. Rotating speeds of microturbines are extremely high ranging from 45,000 revolutions per minute (RPM) to 96,000 RPM. This high RPM results in generator outputs that are high frequency alternating current (AC). These sophisticated distributed energy sources can operate in parallel with or independent from the utility grid.

On average, microturbines operate at 99 percent availability. This equates to 25 more operating days per year than a reciprocating engine, which averages 92 percent availability. Microturbines operate on a number of different fuels, including propane, diesel, bio-diesel, digester gas, landfill gas, jet fuel, and compressed natural gas, making them flexible for a variety of applications. These highly reliable alternative energy sources produce 30 kilowatts (kW) to 5 megawatts (MW) of power with energy efficiencies often nearing 80 percent when used in a CHP or CCHP application.

Advances in technology have produced air-cooled microturbines that operate with only one moving part. This makes the system completely dry and void of such maintenance-heavy components as water pumps, oil pumps, oil filters, radiators, and fan belts. Microturbines can run for extended periods at full power output and require minimal scheduled maintenance when compared to reciprocating engines, making them ideal for stationary prime power applications.

Microturbines help preserve the environment with their near-zero emissions profile. Installing a highly efficient microturbine is equivalent to removing up to 700 average U.S. passenger vehicles off the road, or the equivalent carbon dioxide reduction of planting 730 acres of pine and fir forest. According to the U.S. Environmental Protection Agency (EPA), microturbine systems – with or without heat recovery – can reduce emissions of carbon dioxide, methane, and pollutants including nitrogen oxides, sulfur dioxide, carbon monoxide, particulate matter, ammonia, and total hydrocarbons.

National and state governments recognize the environmental and economic value of microturbine CHP systems and often provide incentives to offset the costs of new installations.

Microturbine CHP Trends in Hospitality

According to the EPA, hotels and casinos are opportune – yet underutilized – markets for CHP and CCHP. "Of the nearly 48,000 hotels in the United States, about 10,000 have the energy characteristics suitable for current CHP technology," an EPA report states (www.epa.gov/chp/markets/casinos.html) . "More than 1,000 of these sites are likely to meet a simple payback on their investment within five years or less."

Microturbine CHP and CCHP systems in hotels and casinos:

- Reduce operating costs
- Improve energy efficiency and overall environmental performance
- Ensure guest comfort as hot water is available at all times
- Provide reliable electricity for gaming venues, even during utility blackouts
- Limit cost uncertainties by creating a

hedge against future fluctuating energy prices

The Ritz-Carlton in San Francisco, Igora Ski Resort in Russia, Four Seasons Hotel Philadelphia, and a five-star resort in Italy are among the many hotels and resorts that have turned to microturbines for reliable, efficient, clean-and-green power.

Four Seasons Case Study

To gain control of energy costs and reduce greenhouse gas emissions, the luxurious Four Seasons Hotel Philadelphia installed three Capstone C65 ICHP MicroTurbines® in 2009. Within the first two months of operation, the hotel reduced its energy cost by more than $80,000. The microturbines' CHP installation allows the hotel to generate nearly 200kW of electric power onsite, which fulfills 30 percent of the hotel's overall electricity needs.

The energy-efficient CHP system provides 100 percent of the heat needed for the building's domestic hot water used for laundry, the kitchen, and guest rooms, and satisfies 10-15 percent of the hotel's heating needs.

Before installing the C65 microturbines, the hotel relied on the City of Philadelphia's steam loop and the local electric grid to meet its energy needs. Today, Four Seasons Hotel Philadelphia uses natural gas to fuel the microturbines on the hotel's roof to produce its own electricity and thermal energy.

With such a highly efficient process, the hotel is able to squeeze every dollar out of each BTU because now we have a way to capture the heat, store it, and use it when we need it.

"Because we buy third- party transportation gas, we can shop around for the best rate," said Marvin Dixon, director of engineering at Four Seasons Hotel Philadelphia. "This has made electricity from the microturbines 20 percent cheaper than what we could get from the local utility."

Aesthetically, the system is quiet and takes up minimal space on the roof, a key reason the C65 microturbines were selected over reciprocating technology. With a noise output of only 65 decibels at 10 meters, the microturbines are not a nuisance to the Presidential Suite guests directly below.

"This new process with microturbines allows for more control over heat distribution and BTUs (British Thermal Unit)," Dixon said. "With such a highly efficient process, the hotel is able to squeeze every dollar out of each BTU because now we have a way to capture the heat, store it, and use it when we need it. This has opened new opportunities for the hotel to use the heat storage for other processes."

Dixon expects more hotels will use the proven CHP technology. In fact, Four Seasons Hotel Philadelphia plans for a Phase II installation that will include two additional microturbines and an absorption chiller to meet the growing hotel's future energy and air-conditioning needs.

"Four Seasons is a leader in the community and accustomed to setting the standard for future generations," Dixon said. "The microturbine installation is a step in the right direction in helping the hospitality industry become more sustainable." ■

The Andaluz Hotel: A Historic Property goes GREEN

By Art Attaway

I recently had the privilege to participate with Robert Elliott of NAHLE on a project to write a chapter of a textbook for a Professor at Michigan State University in conjunction with the EI (Educational Institute) of the AH&LA. The book, a project of Professor Arjun Singh, is on sustainable hotel development and our contribution was on sustainable hotel operations. During the process we had the chance to work with industry leaders across the country and learn what they are doing to go GREEN. We did a series of "case studies" on properties that were involved in energy efficiency efforts while operating a facility. The property age range was between 2 years old and 71 years old. One of the most interesting was a property named the Andaluz, located in Albuquerque, New Mexico.

In 1939 Conrad Hilton built this property designed by Anton F. Korn, and touted as being the first building in New Mexico with air conditioning, and was in fact the tallest building in the state at that time. The property operated as a Hilton until 1969, and has changed hands a number of times since then. In 1984 the Andaluz (then operating under a different name), was places on the National Register of Historical Placed. The new owner, Gary Goodman, committed 30 million dollars to restoring the 104 room property, with 5.2 million being dedicated to green energy solutions. The property just reopened in Q4 2009, and little actual comparative figures are available. As well, the capital investment would have been significant to restore this project to a fully functioning operating hotel, regardless the technology selected.

The name Andaluz retraces Korn's design concepts to its origin in a region of Spain named Adnaluz, and famous for its original and striking architectural designs. This region is also famous for the Andalusian, one of the most spectacular breeds of horses in the world.

The restoration project goal, driven by Goodman, and in addition to operating a fully committed sustainable property, is to achieve a Gold level LEED certification. The property was shutdown to complete the full restoration that included the green energy measures.

Some of their efforts include:

- Energy Savings and Initiatives:
- Solar Panels for hot water – 60% of consumption.
- Energy efficient HVAC system including chillers and towers.
- Energy efficient windows
- (BAS) Building Automation System

Unfortunately, the property is not old enough operationally to provide the ROI information. They also do not have an estimated savings number. We were provided a comparison of the hotel's utility numbers. These numbers compare Andaluz from its opening (Oct 2009 to Jun 2010) to the hotel before therenovation (averaging Oct to June for 3 years). However, some explanation is required in order to understand these numbers. See below

ELECTIRCAL USAGE

The electrical usage for Andaluz is higher than the former hotel. Although all the equipment in the hotel has been upgraded with more efficient equipment, there is greater demand in Andaluz. For example – 10 rooftop AC units were replaced along with the former chiller. These equaled approximately 200 tons of refrigeration. Replacing these are 2 chillers totaling 240 tons of refrigeration. The former chiller did not run during the winter. The 2 new chillers are operational all year long. The former hotel had traditional fans and pumps. All fans and pumps at Andaluz are Variable Frequency Drives (VFD's); however, there are presently more fans and pumps than in the former hotel. Approximately 1000 amps of power have been added to the new hotel. Previously 3 guestrooms ran off of one 20 amp circuit, now each guestroom runs off of three 20 amp circuits. In addition, numerous kitchen and housekeeping equipment have been added to Andaluz, as well as additional lighting.

Electricity kWh former hotel 9 mo aver Oct - Jun
monthly average = 106,953

Electricity kWh Andaluz 9 mo aver Oct - Jun
monthly average = 125,016

Electricity costs former hotel 9 mo aver
Oct - Jun
monthly average = $8,281.26

Electricity costs Andaluz 9 mo aver
Oct - Jun
monthly average = $10,705.36

GAS USAGE

The average gas usage is lower at Andaluz than at the former hotel. This is significant because at Andaluz we installed 2 domestic high-efficient water boilers and 3 high-efficient heating boilers, a 600,000 BTU ironer, and a solar thermal system that is designed to heat approximately 60% of our domestic hot water annually.

Gas therms former hotel 9 mo aver
Oct – Jun
monthly average therms = 6,334

Gas therms Anadluz 9 mo aver
Oct – Jun
monthly average therms = 6,003

Gas therms former hotel 9 mo aver
We do not have this amount)

Gas therms Andaluz 9 mo aver
Oct – Jun
monthly average therms = $4,508.03

WATER USAGE

The comparison on the water usage shows a huge decrease in water consumption. The former hotel had 3 gallon per flush toilets. Andaluz has dual-flush .08 gallon and 1.6 gallons per flush toilets. Andaluz has low flow shower heads. But it is also significant to note that the old hotel did not have the cooling tower running during the winter months. Andaluz' cooling tower is operational all year.

Water gallons former hotel 8 mo aver
Oct – Jun
monthly average gallons = 871,482

Water gallons Andaluz 8 mo aver
Oct – Jun
monthly average gallons = 261,052

Water costs former hotel 8 mo aver
Oct – Jun
monthly average gallons = $3,687.94

Water costs Andaluz 8 mo aver
Oct – Jun

monthly average gallons = $1,772.95

- The property expects a 21% overall annual savings in power consumption. The 21.8% present savings is based on ASHRAE 90.1-2004. This equals an $18,067 savings annually. (Note: The comparisons above are not based on ASHRAE standards. They are a comparison between the former hotel's performance and present Hotel Andaluz.)

Hotel Andaluz installed a central control room management system,

Building Automation System (BAS), at a cost of $391,460. It is a centralized plant that delivers chilled water and heating water through out the hotel including guest rooms. It is controlled locally at each space/location/room by the BAS.

Energy efficient windows were installed at a cost of $237,088 (removal, disposal, windows, installation) We do not have a ROI or estimate savings number, but the cost of these compared with more traditional windows was marginal and should produce a cost savings. The only additional cost, since new windows had to be installed regardless, was the cost difference between the possible window choices...

The property claims it will achieve a 70% overall energy savings by completing the project with the equipment and materials selected.

The property claims it will achieve a 70% overall energy savings by completing the project with the equipment and materials selected. The 70% renewable energy is in reference to the Green Power that is purchased. It is estimated based on annual energy usage and then the purchase of 70% of this amount from a company that sells Renewable Energy Credits (RECs). The RECs are from a range of renewable energy producers including biomass, small-scale hydro, geothermal and wind.

It is difficult to extract hard facts from the project numbers due to incomplete data, but at 5.2 million the initiatives represent approximately 17% of the total project budget of 30 million. To draw a comparison, it would be relevant to determine what it would have cost to introduce more traditional systems into the reconstruction and compare the difference, then compare the energy consumption reduction savings by the use of the more efficient equipment. For example, if a typical reconstruction project would have cost 4.7 million to purchase and install more traditional systems, the additional expense would have been 1.5 million. You could then analyze the reduced energy consumption cost in dollars, and derive an ROI.

Some of the operating policies and procedures and renovation decisions focused on the environment include:

Operation

- Comprehensive recycling program that includes cardboard, paper, plastics, glass, metals and composting of all the food waste
- Recycled paper for hotel stationary and office use
- Locally grown fruits, vegetables, and meats used in hotel kitchens
- Mounted amenity soap dispensers in lieu of small bottles
- Rubberwood toiletry amenity holders
- Green features and practices education and training for hotel staff
- Cork tabletops in restaurant
- Filtered water stations to cut down bottled water
- Occupancy light sensors for public restrooms, storage closets
- Light timers for public spaces
- Restaurant wait staff will ask before pouring a glass of water

Indoor Environmental Quality

- Increased air quality by using low emitting adhesives, sealants, paints, stains, carpets, and carpet padding
- High level of lighting control for employee and guest comfort
- High level of temperature control for employee and guest comfort

Solar Panels Produce 60% of Hotel's Domestic Hot Water Needs

Water Conservation

- 45% reduction in water usage with dual flush toilets, oxygen assisted shower heads and low flow fixtures
- 50% reduction in water consumption for landscape - utilizing water efficient landscaping fixtures
- Zero potable water use for landscape irrigation - utilizing captured rainwater

Energy Efficiency

- 21% less energy usage than similar traditional buildings
- Integrated building energy management system with occupancy sensors in each guestroom that place room in energy setback mode when unoccupied
- Solar heated hot water production on-site producing 60% of hotel's domestic hot water needs
- High performance windows increase building's insulation properties
- High efficiency quick-recovery boilers and chillers reduce energy needed to keep occupants comfortable
- Environmentally accepted refrigerant used in chillers
- Fluorescent and LED lighting throughout building minimize energy load
- 70% of hotel's power has been offset with renewable energy

Materials and Resources

- Extensive construction and demolition waste management plan diverted 75.6% of debris from the landfill during renovation process
- Extensive hotel recycling plan
- Reuse of salvaged building materials – public restroom vanities, various wood trim, meeting room ceiling tile, guestroom bed frames, glass panels, various doors and hardware, brick sidewalk
- Bamboo furniture in guestrooms
- Recycled content in many of the building materials
- Recycled content and rapidly renewable materials in carpets and padding
- FSC wood floors – library and penthouse suite
- Local artisans provided the majority of art in the hotel

Site

- Located in downtown with pedestrian access to a large number of basic services
- Brownfield site cleanup and redevelopment
- Convenient access to City's public transportation hub
- On site bike racks and available showers, lockers and changing facilities
- Preferred parking for low-emitting and fuel-efficient vehicles
- Storm water runoff reduction to help limit disruption of natural hydrology
- High reflective hardscape and roofing materials to minimize heat island effect

We applaud their efforts and wish them the greatest success with this magnificent property. Rangers Lead the Way! ■

Electrical: Not Too Hard To Understand Once You Get the Feel Of It

By Todd Isbell

Another of the many aspects of hotel engineering is electrical. The wires switches and buttons that seem to light up, turn off and on, raise and lower, start and stop things to make our lives so much easier. Basic electrical is not too hard to understand, once you get the feel of it.

A couple of terms we use with electricity are volts, and amps. Volts measure electricity, and amps measure how much electricity is used. When you look inside a breaker panel, you see switches that have numbers on the end of them. These numbers represent the amps supplied for that particular circuit. A 20 amp breaker supplies 20 amps of electricity to the electrical run and so on. This can be for one circuit, or broken into several circuits such as a receptacle and a light fixture, or for numerous receptacles usually found in the same room. Some are broken into even larger sources of power, which in the end is not a good idea as it causes circuits to become overloaded when too many things are plugged in. In the scenario of several receptacles on different walls in a room, if you have a lamp that uses 2 amps of power plugged into one receptacle and a copier or fax machine using 18 amps in another plug tied in on the same circuit, then you've used all the amperage supplied for that particular circuit, even though they are plugged into different receptacles and on different walls. What happens when you use more than the maximum amperage for a particular circuit? It trips the breaker, preventing a fire or damage to the equipment plugged in, and shuts off power to the receptacle. Sometimes when there are several receptacles on different walls of the same room wired to the same breaker, no one notices they've overloaded the circuit until the breaker trips. Always before resetting a breaker, make sure you understand why it tripped. It's not simply because something got hot, it got hot because something was drawing too much amperage and heated the breaker to tripping point.

Always before resetting a breaker, make sure you understand why it tripped.

Read the template on any appliance. It doesn't always tell you the amps used, they will sometimes have horsepower, ohms, or watts, and you will then have to utilize formulas to determine the amperage needed or used. To find wattage, you multiply volts X amperes. To find Kilowatts, you divide volts X amperes by 1000. Amperes = volts divided by watts. Ohms = volts divided by amperes. These formulas will help you to determine how many appliances or electronics can be run on a circuit of delegated amperes.

There are two kinds of circuits; Series and Parallel. In a series circuit, think of four light bulbs and a 12V battery. If you start from the battery with a wire, and join each bulb to the next in a line and then back to the battery, then the bulbs are wired in series. If each bulb is wired to the battery in a separate loop from the battery to the individual bulb and back again the bulbs are said to be in parallel. If the four light bulbs are connected in series, the same current flows through all of them, and the voltage drops across each bulb and will probably not be enough to make them light. If the light bulbs are connected in parallel, the current flowing through the light bulbs combine to form the current flowing in the battery, making the voltage drop less across each bulb and they all glow. In a series circuit, every light must function for the circuit to be complete. One bulb not burning in a series circuit breaks the circuit thus causing all on the other side of the break to not work. In a parallel circuit, each light has its own circuit, so all lights could be working but one, and they will all still function.

What steps would we take in troubleshooting a lamp that doesn't work? Before changing out the bulb of course, first, we want to check the switch, turn it on; sometimes this actually is the problem. Next, see if the bulb was unscrewed, if not then see if the lamp is plugged in, if so, proceed to change the bulb; simple steps before changing the bulb will save a lot of time.

Sometimes there is another problem, if the light still doesn't come on, and we've checked the switch, plug and bulb we next will want to check power at the receptacle. If we have the correct voltage, try plug-

ging the lamp into a different circuit, not necessarily on the opposite wall as we've already determined sometimes receptacles are on the same circuit on different sides; try it in a different room. If it works there, then we know the problem is in the receptacle or circuit. Usually if you have power to the circuit and the fixture doesn't work, you have lost a neutral connection somewhere. A neutral wire carries current in normal operation which is connected to ground at the service panel with the main disconnect switch or breaker. Go to the panel room and turn off the breaker for that particular room. Place the lock out tag out tag on the breaker and lock it with your personal lock. Back in the room; remove the receptacle cover, and screws holding it in place. Check all connections, wire nuts, and tighten the screws on the receptacle itself. Sometimes heating and cooling of the copper wires can cause screws to loosen, and cause problems especially in aging buildings. If the room is wired together on the same circuit, you will also have to check all the others for loose wires as well. Once done, replace the receptacle into the wall, and turn the breaker back on. If this didn't work, then you will have to remove the front of the breaker panel, and check the connections to the breaker as well as ground and neutral.

Receptacles are usually always energized; however you can add a switch to break the circuit to one or both plugs so you can turn off and on an appliance or lamp from an entrance door before entering a room. This way you don't have to walk into a dark area, or to you can turn off and on other equipment from a desired or allocated area. A switch is designed to make or break a circuit that you don't want to be on continuously, or that you want to control when the circuit is energized. Remember though, when working with a switch, just because the switch is turned off, and the appliance is not energized, the power is still going TO the switch and you can still be injured if you touch the energized wires. Always be sure to turn off the breaker, and use the lock out tag out system before removing the covers of any electrical machine or appliance.

Turn off lights and electrical equipment such as TV's and appliances that are not in use, and whenever possible install motion sensors for lighting in back hallways, and linen closets, this will help save energy and reduce your utility bills. ■

KNOW HOW TO CONDUCT SUCCESSFUL SAFETY MEETINGS WITH THE VIEWS OF OSHA

By Manny Higazzi

Many of you in the hospitality industry have the knowledge of what OSHA is all about. We should be familiar with the rules and regulations set by OSHA and our company policies. Both work hand in hand in assuring a hazard free and healthy working environment at your property. Visit www.OSHA.gov. Yes, you will find many resources and information that may be overwhelming. Based on your profession or your type of business, this is what you need to search on the resourceful site. If you are a hotel property don't waste your time researching warehousing information. Stick to the basics, the basic will help you and your staff stay focused on the information that most fits your job description. Now in planning a successful safety meeting with the views of OSHA, lets figure out how to gather ideas for the meeting.

On your property level make a list of key areas you want to focus on that you have observed for the previous month that you feel were not correctly handled. I say the word correctly because I want us to focus on an idea of a set rule, meaning that it should be done this way and only this way by the rules and regulations. After gathering your observations, pick two that you feel were of most importance. Most importance, I would say, possessed a danger or threat and that if it continued the result will be resulting in injury. Example observation 1: Past month you walked the floors and noticed housekeeping forgetting to close the storage doors. Example observation 2: Past month in your shop you have seen your staff using the grinder without safety goggles next to the yellow fire cabinet that is open storing flammable liquids and gas.

So let's focus on example 2, believe me you will find many topics to talk about for safety meetings. With many staff members at your property I don't think you will find everyone follows the rules 100% unless it is a military school. Ok, now that we have one topic of interest and importance, research OSHA's site for information on your topic. For safety equipment and goggles you will find set rules, as well as set rules for storage of flammable liquids. Print out OSHA's regulations and rules as well as in house company policy about safety rules.

Now that we have the topics we need to organize a meeting committee. The safety meeting committee has to consist of one member for each department and if possible include the property manager. There are many set forms from companies that are used for minutes of such meetings that I will not touch on in this article. Also, keep in mind that all your staff must be present. If you preach it, they will teach it knowing the information first hand. It helps to keep the set rule and regulations clear without hearing it from other people but yourself.

One other step is get a new binder and label it for all the safety meetings that either were or will be covered. Don't throw away the observations you have gathered. Maybe on the next meeting you can make that one of the topics. Observations are not to be ignored, you wrote it down because you want to address it. So, address it. Get the word out and continue to train, retrain and educate your staff. Attack it from both sides and both views combining OSHA and company policy. Set the rule straight from the beginning and they will know you are not making these things up. If everyone follows policy, rules and regulations it will create a friendly and safe working atmosphere. Be good and be safe. NAHLE appreciates your feedback or comments to this article. NAHLE is currently producing a set of OSHA regulations for hotels accessible from our website (http://www.nahle.org). ■

Hotel Maintenance; The basics

By August Craanen

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Preventive and scheduled maintenance are needed for protection of the building's/ owner's assets; the structure from the façade or building envelope, the integrity of the floors, walls, ceilings and all of the furniture, fixtures, and equipment (FF&E) contained therein. In addition, poor maintenance will influence the guest's perception of the property and will be a factor of the guest's decision to return to the property on another occasion (repeat business).

Many hotels, both chain and single operations have Preventive Maintenance and Work Order Software in place. This combined with proper execution of the maintenance and repairs should keep costly breakdowns to a minimum, however in many hotels the execution of the preventive/scheduled maintenance and repairs leaves much to be desired.

Inspections in several hotels, industry-wide revealed increasing evidence of poor and declining maintenance both for equipment and guestrooms.

Possible reasons for the poor / inclining maintenance:

- Preventive maintenance program lacking detailed instructions for tasks to be performed
- Inadequately trained maintenance staff
- Inadequate supervision / quality control
- Understaffed

Surely, there are more reasons which can be added to this list.

It is essential that the above listed reasons are corrected; in future articles we will review the individual items and suggested ways to correct them. ■

Today's Maintenance Tips

www.minibarna.com

There is very little maintenance requirement on an Absorption cooling minibar. There are no moving parts and it has a life expectancy of 12-15 years.

The following should be done on regular basis:

1. Cleaning and dusting the cooling element on the back of the bar.
Use a vacuum and damp cloth only; should be done every 6 month.

2. Inspect all welded joints on the back for corrosion or rust (any yellow material build up represents a micro leak and the cooling unit should be replaced).

3. Verify that proper ventilation is in place and no blockage for warm "exhaust" air to exit

4. Oil hinges and locks on a yearly basis

NAHLE Is Scheduled to Provide Certified Chief Engineer (CCE) Program This Summer!

By Robert Elliott

NAHLE reported in our 2009 May issue of Lodging Engineer that the foremost strategic goal of the National Association of Hotel & Lodging Engineers (NAHLE) is to advance professionalism in the lodging engineering community through education and training. It has taken us two years to this month to develop our Certified Chief Engineer program and study guide. As you can imagine producing a book on this subject is no small task, but we believe our product is unmatched in the industry and well worth your wait. Our CCE designation will be instantly recognized worldwide and the curriculum has been purposely slotted to bridge the knowledge gap between the AH&LA Educational Institutes' Maintenance Manager program and their CEOE program. For those of you already in the industry, accredited training, such as EI's current Certified Engineering Operations Executive (CEOE) or Certified Maintenance Manager (CMM) programs, provides a well-defined career path for advancement. Furthermore, for those of you wanting to enter the field of hotel engineering and maintenance, advance training such as NAHLE's CCE program provides prospective employers a way to gauge your knowledge and commitment.

"Bob Siuta of Four Seasons Philadelphia; NAHLE's CCE diploma will look good on any wall."

Our program will provide a printed study guide covering building systems, HVAC, plumbing, electrical, lighting, landscaping, swimming pools, vertical transport, etc. to name just a few. Continuing education and training of any maintenance staff for any building, not just hotels, maximizes an owner's investment by protecting capital assets and for lodging properties, this additionally contributes to guest satisfaction which equates to repeat business. As there is an ever present need within the hotel engineering community to provide uniform education and training programs specifically tailored for hotel engineers and maintenance personnel, the National Association of Hotel & Lodging Engineers will be offering curriculum, regional reviews and online testing later this summer! . NAHLE annouunces our educational partner in our Summer Issue of Lodging Engineer.■

UPCOMING INDUSTRY EVENTS

Hotel Engineering Association (Houston)
19 May, 2011 McCrory Engineering
16 Jun, 2011
Four Seasons Hotel
21 Jul, 2011
Hilton Americas

Hotel Engineers Association of New York
Renovating a Hotel While Keeping the Lights On
May 18, 2011
8:00am to 10:30am
Steelcase Showroom
4 Columbus Circle, 7th floor
New York, NY

Puget Sound Hotel Engineers Association
http://www.pshea.net/
May 26th 2011, 5:15 PM, Doubletree Suites- South Center
June 30th 2011, 5:15 PM, GE & Graybar M's game

Central Florida Hotel & Lodging Association
Next Engineer Board Meeting
Date: Thursday, June 2, 2011
Time: 8:00am
Location: The NEW CFHLA Offices

The Next Meeting of the Greater Philadelphia Hotel Engineer Association (GPHEA) is:
Wednesday, May 18, 2011
at 5:00pm at the Sheraton University City Hotel located at
3549 Chestnut Street
Philadelphia, PA 19104
Hotel Association of Washington DC
Hotel Engineer's Association

Hotel Association of Washington, DC
HAWDC Hotel Engineer's Association is back!
We will be hosting a meeting next month for all hotel engineers to discuss the organization of the association and elect new leadership. For more information you may contact Lisa Abrams at lisa@hawdc.com or 202.289.4448.

ALPHABETIC INDEX OF ADVERTISERS

I hope you enjoy our magazine.

Robert Elliott, Executive Director

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