

ISSUE

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Fall 2013

# LODGING ENGINEER

THE ELECTRONIC MAGAZINE FOR HOTEL & LODGING ENGINEERS



## *Hampton Inn*

*Kansas City/Liberty, MO/*



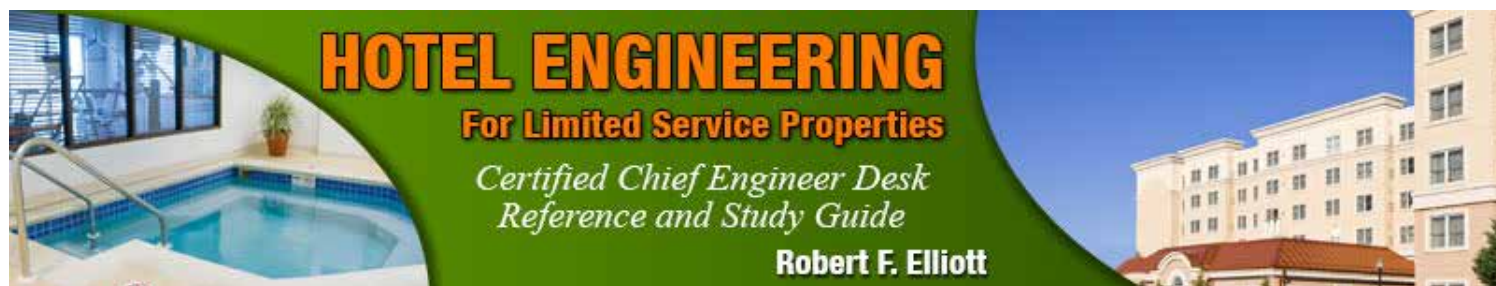
## 1ST PERSON INTERVIEW

**Jim Sorgen, CCE**  
Certified Chief Engineer  
**Hampton Inn**

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The Chief Engineer and Director of Engineering certificate programs are brought to you by partnership of the American Hotel & Lodging Educational Institute (AHLEI) and the National Association of Hotel & Lodging Engineers (NAHLE).



## Becoming the Best You Can Be

**Your Future is in your Hands . . . or is it in your Mind?**

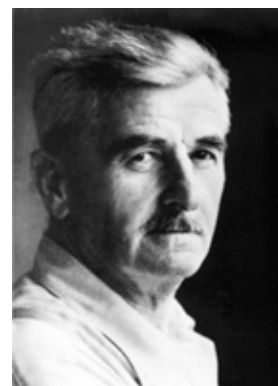
Every day, at luxurious resorts and select-service properties, Hotel Engineers quietly keep guests safe and comfortable while operating their properties at peak performance for their owners. Like a ship's captain, a Hotel Engineer spends years getting to know his craft and fine-tuning their property's performance as they keep a watchful eye on the horizon preparing to navigate through the next series of challenges. Will you be ready?



***"In your life you only get to do so many things and right now we've chosen to do this. So let's make it great. Never underestimate the power of a bold vision to move your career and the work forward. Don't just live a life; build one."** — Steve Jobs*

***"Always dream and shoot higher than you know you can do. Do not bother just to be better than your contemporaries or predecessors. Try to be better than yourself."***

***— William Faulkner***



Here is what recent graduates of the Certified Chief Engineering program are saying about the course:

*"I think that the course benefits every Chief Engineer that takes it and also the company. It helps do the work more organized and it helps understand the functions of each system you work with." words."*

*"The information was presented good and was easy to understand. The online tracking was easy to get to and follow along with. The program overall was very good. In my opinion the course was very informative because it covered very important themes focused on the system or the equipment we work with everyday at the hotel. Everything was explained with basic examples and simple words."*

*"Everything was explained with basic examples and simple words."*

*"I think the program it's great. It definitely was a reinforcement in some areas that I was familiar with and a great learning experience in others I didn't have much knowledge. Very straight forward, seems to me that whoever put this course together must have been in the field."*



**Robert Bell, CDOE, Chief Engineer**, at Marriott Renaissance Plantation Hotel in Plantation, Florida was the first designee as Certified Director of Engineering. When we started with only the full service program we used Certified Chief Engineer. We have now, after a year and a half of development completed a second certificate program for select service property engineers.

*"I've been an engineering manager for over 14 years, 10 in limited serve and the last 4 in full serve at the Renaissance Plantation. For a while I've been searching for a certification designed specifically to enhance my knowledge and competency in hotel engineering. My supervisor recommended the CCE certification from NAHLE and I must tell you this course hits all areas and key points from what you need to know to keep your facility maintained and running efficiently to being compliant with most city, state and federal codes and regulations. It's an all around great self study course for the hotel Chief Engineer and DOE, and to this day I keep my study guide on my shelf as a reference if ever needed. I am also honored to be the first person to be designated CDOE from NAHLE and a proud member."*



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## As I See It



**Robert Elliott, CCE**  
**President/CEO NAHLE**  
**Editor - Lodging Engineer**

I want to take this opportunity to thank everyone for all the effort and support we have received this past year. NAHLE continues to grow and we are looking forward to a busy and productive year in 2014.

2013 has been a great year! And, we believe our success is being shared by the industry we serve too.

According to several reliable sources, RevPar was up by 5.6% through October 2013. Similar stats are showing that hotel 'average daily rates' are increasing while committed occupancy for next year is up 2.5% compared to this time last year. This means more people spending more money for the same services.

All those pent-up Property Improvement Plans (PIPs) are likely getting dusted off as owners are also anticipating a strong growth year in 2014 and finding construction lending easier to obtain. However, financing for new construction is tight and will probably remain so at least through the 1st Quarter of 2014. And, hotel construction is increasing but, it is still below average. All this translates into strong demands on some lean inventories and even leaner available construction crews going into 2014.

Chances are good that demand for products and services will increase significantly. As more energy projects and PIPs get funded, the demand for skilled labor will increase. In some cases this demand could outstrip our industry's supply and one of two things will happen and maybe both, quality control will become more important and difficult to maintain, and prices will climb. Either way, our industry needs quality construction workers and the hotel engineer is playing a bigger role as the owner's daily eyes and ears of renovation.

I think one of the biggest challenges facing our industry next year will be ensuring quality control among products, services and workmanship.

NAHLE learned first hand how important quality control is as it took us two tries to get our website updated the way we wanted. We completed our website's build while I was on vacation (when else, right?) and since then, we have been picking up new subscribing readers/members at a rate of about 250 engineers per month. Our website still has all the old functionality plus some exciting new functionality including the ability to retrieve, play and store educational eVideos.

I am pleased to announce we've picked up some key personnel. Larry Wilhelm, formerly publisher of AH&LA's Lodging magazine, is our new publisher for **Lodging Engineer**. Larry also heads up NAHLE's business development. **Lodging Engineer** will continue to go out quarterly and we added a weekly eNewsletter this year. Our eNewsletter is first rate! Guaranteed you'll like it. I also talked an old friend and colleague, August Craanen, to host our new forum. August has written for **Lodging Engineer** in the past and was also past chair of the American Hotel & Lodging Association's Engineering and Environment Committee. August has a lot of experience as he ran the corporate engineering department for 19 hotels in downtown Manhattan for a number of years. Check out "Ask August" in 2014.

NAHLE has also been working with a major hotel REIT and with AHLA's Educational Institute to develop a second certification program. This new program is for select-service hotel engineers. Our new Certified Chief Engineer (CCE) program has already been successfully rolled-out to two (2) hotel management companies with several more slated for 2014. Should be a great year for hotel engineers!

Happy Holidays from all of us here at NAHLE!

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# 1<sup>ST</sup> PERSON

## AN INTERVIEW WITH JIM SORGEN



**Jim Sorgen**  
Chief Engineer, CCE  
Hampton Inn  
Kansas City/Liberty, MO

By Robert Elliott

*I met Jim Sorgen of the Hampton Inn, Kansas/Liberty, Missouri as he was a candidate of the National Association of Hotel & Lodging Engineers' (NAHLE) new Certified Chief Engineer certificate program. NAHLE partners with the American Hotel & Lodging Educational Institute for the certificate program. Jim turned out to be the first engineer to become certified from our initial trial rollout. Being the first one to complete the new program was quite an accomplishment. The owner's president thought so too, and personally signed Jim's certificate as well as each of the other five candidates' from the initial roll-out.*

*Jim, I hope you are relaxed now and realize this interview is for fun only. However, we guarantee you will like it and we will give you a look at it before we publish it to make sure we say it right. Jim allowed Larry and myself to call him at home after dinner and a day's work at the hotel to ask him a few questions for this interview.*

***Can we start by telling our readers a little bit about the certificate program and whether you think any other engineers should take the time to become certified?***

There were a lot of nuggets of information. It's like you're panning for gold and hey, wow there's a nugget and you know you can use it. Or, maybe it doesn't pertain to my property, but it may be good to use later.

I found myself saying, "wow I didn't know that" to a lot of things I thought I knew, but I didn't really know the why or the how. It seemed like there were nuggets of information in each section.

***Your property is what I refer to as a select-service hotel. You mentioned that you have been here going on 14 years. I think that is great. Can you tell our readers a little about your property?***

We get both business and leisure travelers during the week and on weekends we get mostly leisure guests. Our hotel opened new in April, 1999. I started shortly after that in September 2000. It is four floors with 122 guestrooms. We have two elevators. We provide our guests free wireless and cable service. We use Time Warner cable now. We have four hot water tanks, three for domestic use and one for laundry. We use two Unimacs washers and two dryers. All original equipment, performing well without any issues.

***Is there any one thing you do or use to keep you coming back after 13 years?***

Yes, I use a lot of humor and kidding around to make people feel at ease. It would be easy to let the down part of the job get to you, but I find that a little humor makes the job not seem as bad as you thought it was. A couple of laughs or giggles with the job, either way it still gets done . . .

***Before we move on, do you have a favorite funny story or maybe a humorous anecdote about the property or maybe a co-worker you want to share?***

Yea, last winter we had a big snow fall. We had a new snow blower and our GM, Glen Koch, asked to use it. When I handed it to him, it then started to shake and piece came flying off, and I said, "hey, what did you do now?" Another time Glen and myself hosted a kind-of luncheon for the hotel's employees. The GM and myself were the recipients of a

dunk tank. We wore hard hats as our fellow workers tried to drop us in the water just to let them know we really didn't want to do this. The employees all have a good time making sure the Chief Engineer and GM got dunked. We all had a good laugh over that.

***So tell me about your roof top units and HVAC systems.***

We have Trane PTAC units in each of the guest-rooms and two (2) Carrier Roof Top Units for the main hallways. One of my jobs is to make sure they run. We practice preventative maintenance and change filters on a monthly basis. Two or three times a year we clean coils and fins. We have a lot of cottonwood trees here and they get sucked into our systems. We use a regular garden hose to clean the coils and fins. We replaced our PTACs during renovation to the property three years ago. The Trane PTACs are so quiet guests call because they don't think they are running, even when the fan is on high. Some guests miss the noise from AC unit fans, so we have Hilton clock radios that provide sleeping nature sounds and white noise that helps our guests sleep.

***Did you get a chance to train your employees for the new training due December 1st by OSHA?***

Our Safety Data Sheets (SDS) sheets for all our chemicals are spaced through out the building at three separate locations so anyone can get access to them if needed. Any chemicals brought in, we make copies and distribute the SDS. We have retrained for December 1 and our main corporate people all know.

***Your property went through a complete redo recently, didn't you?***

Yes, we have updated the soft goods a few times since I've been here, but three years ago we did a major renovation for all rooms all four floors. We replaced all common area lighting with CFL (Compact Fluorescent Light) excluding the hallways. And, we did the same for recessed bathroom lights.

***Have you noticed any reductions or savings in your electric bill?***

I don't get the electric bill.

***Can you tell me about your staff and how you get everything done?***

It's just me and the entire team helping out when we need it. The houseman (Marco Paranta) and I both leave the property around 4 pm every evening. We are on call 24/7. Generally, one of us or the GM will take any calls after 4 pm that can't wait until morning.



*Jim and our Houseman, Marco Paranta*

We have a local elevator maintenance company that we use since the beginning. We use local contractors or companies for major jobs for electrical, plumbing and HVAC. We try and do everything except the lawns which we hire a service. We do a lot of the landscaping ourselves including trimming the trees. We try and keep the landscaping in perfect shape so the hotel always looks like it is brand new. We power wash the entrance regularly, but the exterior walls are mainly EIFS and do not need any maintenance.

***Tell us about your pool?***

We have both a pool and a hot tub. Our pool and spa are both indoor and are open from 6 am until 10 pm at night. In Kansas City, you need a lifeguard if you keep the pool open beyond these hours. Our pool and spa are both salt-water. It requires a little more care to

keep it running smoothly, but it is worth it. We want the guest to enjoy it. It's a great responsibility so the guest doesn't have any ill effects. With a saline pool, your skin doesn't get that dry itchy feeling. Guests say it makes their skin feel soft. It's more work with all the chemistry involved, but it is well worth it when you get a comment from a guest like, "It's really nice to be in the water."

***NAHLE just added a chapter on saline pools and dehumidification to our CCE study guide. What do you do daily to keep your pool and spa up and running?***

We test the water in both the pool and spa twice a day. We have certain test parameters and if something is out, we adjust accordingly. We keep a log and usually we only need to add salt or sometimes we add an alkalinity booster. We keep the calcium and phosphates to zero. If one thing is out of balance it will make something else out of balance. We only changed from a chlorinator and bromine regulator a little over one (1) year ago. Corporate made the change for the added comfort of the guest. If you smell chlorine something is out of balance. We then adjust the chemicals to eliminate the problem.

***Anything else with the pool?***

We don't get as much of a water line around the pool tile. We still scrub the tile . . . ***what kind of chemicals?*** We use pool water and a product we call the "magic raser" which is basically a cleaning sponge. All pools get water splashed out. We return water, it goes thru filters – we backwash - every year we replace the sand.

***Does your property have the new ADA lift?***

Yes, we put a pool lift in our pool six or eight months ago. ***Do your guests like it or find it convenient?*** The lift is used infrequently.

***Do you have a fitness center?***

We have two treadmills, an elliptical bike recumbent bike, weights and bench and Pilates balls.

***Tell me about maintenance at the Hampton Inn ...***

We have PTACs. We replaced our original units with new Trane PTACs. We change filters every month.



*KC/Liberty Hampton-Inn Indoor Pool*

***Do you get much water coming in?***

No water comes in from the outside, none, never. We have drip edges and they are sealed very good.

We had a renovation, gutted the building from top to bottom- one floor at a time. Replaced all old furniture and old beds with new including new vanities, mirrors, tub surround, tile, paint, drapes, we have roman drapes- pleated; and carpet. We kept the guestroom locks. The locks are magnetic stripe and require maintenance at least once a month, maybe in two or three weeks. We use a cleaning card to clean the locks. The batteries have two lights that flash when they are low. Deb Hall, our executive housekeeper, lets us know and we change them.

***Tell me about changing a lock's battery.***

I hold the door open so I don't startle a guest and on back of the lock using a special tool, I unscrew and unplug it and then replace it with a new battery. We always knock first and announce engineering, we do it twice and then the third time we open the door 2 or 3 inches, if there is still no response we go in. Of course if we see a 'Do not Disturb' sign we don't bother with it. We keep the door ajar for safety for ourselves and the guest, don't want to shock or surprise anyone. We replace batteries every year or so or it could be six months, it's still a battery and if you use it a lot it needs to be replaced more frequently. Batteries come from [HD Supply](http://www.hdsupply.com). We get a lot of replacement stuff

from HD Supply like toilet seats, shower fixtures and plumbing. We get our light bulbs from HD Supply too. Grainger supplies us stuff like motors and actuators for vents for dryers.

### *What's the actuator do, if you don't mind?*

It's the actuator that let's fresh air in for the dryer. When the dryer doesn't run the actuator closes the vent. We use [Grainger](#) for a quite a few things.

### *What else do you use actuators for?*

The fire dampers' are controlled by an actuator. They are located in the vent so that if there is a fire, they close off to prevent smoke from moving. Any fresh air intake will have an actuator. Our laundry room is in the center of the building on the 1st floor. It uses gas for heating and there are actuators in the duct work throughout the building. Vents will close with the fire alarm. It makes kind of a whining sound as it is shutting down the air flow. We have a company come in twice a year and our whole system is checked including smoke alarms.

Our fire doors have auto releases which get tested. It is actuated when there is a fire alarm. They are held by magnets and an alarm releases a door. The hallways will isolate each wing with the closing of a 90-minute fire-rated door acting as a smoke barrier.

### *More about the renovations and your property?*

We've done a few soft renovations over the past with carpet replacements and other items. We just had a full renovation where you take it down to nothing but the cement floors and then you start all over. We completed a full renovation in 2010.

### *How do you maintain your exterior?*

We do windows and screens. We spray under the carport and spray and wash it in spring. We keep the carport looking good. We want that first impression to always be a good impression with our guests.

*Who manufacturer's the power washer?* It's a Sears power washer.

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And, for the grounds outside we contract out for a lawn service. When it snows we use a product called ice melt. People track this in and it brings a white residue on the floor. In the past, we’ve used vinegar and water and it gets rid of it. The vinegar neutralizes the salt and then no more residue, just don’t dump too much.

Inside, we keep our floors looking great. Floors are cleaned every day. We use a neutral floor detergent on our first floor’s wood planking. The wood floors go from the front desk to each floor in the elevators. And with our recent renovation, we’ve added runners on the 1st floor lobby.



*KC/Liberty Hampton-Inn Lobby*

***Tell us about mattresses, how you maintain them and when do you replace them?***

We have a program that we use. Every three months we either flip the mattress or turn the mattress. So far, this is holding up pretty good. Guests have similar habits. They use the telephone and sit on the edge of the bed. They are all sitting in the same spot beside your phone, and if you don’t flip or turn it, the mattress breaks down sooner. We have a tag on the bed that tells you what to do next, flip or turn. We get pretty good life out of our mattresses by flipping and turning. ***Who supplies your mattresses?*** We have [Serta](#) beds.

***Do you have energy programs or other cost saving procedures you can pass on?***

We just installed new energy setbacks in the rooms. The company we used is [Lodging Technology](#) and they just completed installing their [Gem Link™](#) Wireless system. The sensors pick up the guest movement as they occupy the guestroom using infrared body heat.

Our owners have embarked on an energy reduction program and I have just learned they selected the GEM LINK™ Wireless Energy Management system from Lodging Technology. We expect a significant energy reduction in guest rooms just by implementing the setback temperature while the guests are out of their rooms. Their installation team did a great job and did not encumber any of our guests or staff. Each sensor is unique to that guestroom room. We can control the sensor’s setbacks with a handheld. We have a range from 68 -72 degrees. Once the sensor on the door goes from unoccupied to occupied, the motion sensor allows you to set a certain temperature for the room. If after so much time it is unoccupied it reverts back to the set back. This lasts for two weeks unless we override the setback. For example we could override the two weeks and do this longer for an extended stay visitor. These PTACs are incredible they don’t blast you. People actually call us and say your PTAC isn’t working, I can’t hear it. People want the “white noise” associated with a fan running. The new PTACs slow the fans down and the new ones from Trane aren’t near as loud as our old PTAC units. For our guests that want that white noise in the background, Hilton has its own “Rain Forest” and “white noise” sounds on the clock radio – you just dial in the sound you want.

***Do you have in-room safes?***

No we don’t. Guests come to our front desk where we have safety deposit boxes or lock boxes. However, we do have in-room refrigerators in each guestroom.



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Only once, child went into bathroom and the latch got stuck. We used a K99... ***a what?*** – It's a special tool that allows you to pop open a door from the outside. You slide it underneath the door and get to the handle on the other side. They are not easy to get. You have to jump through hoops to get one, they're very difficult to get. Our locks keep a record of the locks use, however a K99 would not be picked for interrogation of the lock to see who came and went.

***What are you doing to prepare for winter?***

We keep a supply of ice melt and get our snow blowers ready to go. We make our sidewalks cleared as fast as we can when it snows. This is kind of unique with our management company, and guests love it! We will clear your car of snow and ice for each guest's car. We scrape all the windows. And, on a sold out night, everyone from the GM to the houseman cleans snow off our cars. ***You got to be kidding me...*** It's a pretty good feeling when that comment card says "it was all done." At first it was a pain, but now we just get it done. This property works like a team. If a sink or tub overflows a room, you might find the GM and myself mopping up the water and taking care of the problem. When it snows, everyone pitches in we all scrape off the snow on all the guest's cars. It's a big job, but guests really appreciate it and the crew comes together including the General manager to clean all the cars in the morning. Sometimes it's over 100 cars.

***Do you have staff meetings at your property?***

The GM, the assistant GM, the Executive Housekeeper and myself all get together on occasion, but we don't wait for a meeting to talk. When the need arises, the management team which consists of Glenn Koch (GM), Shari Sizemore (AGM), Deb Hall (Executive Housekeeping) and myself." Sometimes its over lunch and we talk about a problem or procedure, but we don't wait to have to have a meeting to resolve something and we don't let something fester or anything. We talk it out and resolve the issue and move on as a team.

***Who handles the budget?***

I speak directly to the GM if I need something. We try and take care of it, but a major expense like a rooftop AC unit requires certain steps to get things approved. I got to believe if you don't get what you wanted you didn't need it. And, if you need it, you will find a way to get it. I order all lights and bulbs, all repair parts and I keep track of repair parts.

***Broadband?***

The PBX is out of my league. Our hotel management company, Raymond Team, has a technical department. We call them and they walk us through it. The whole property is wireless.

***How about TVs and cable?***

We have 32 inch LG flat screens in each room. About the only call we get is for programming the property's TV. We use Time Warner for our cable.

***Tell us about your maintenance calls? What are the most common calls?***

Our No. 1 call is the guest can't work the thermostat or get the air conditioning to work. In our renovation, we placed the thermostat on the wall and some people get confused. Our No. 2 call is clogged toilets. We RPM every room four times a year. We turn on the TV, radio, lights, coffee maker, check the drapes, furniture. We have the RPM cart there and we fix it right then. We turn faucets on and off, look thru the peep-hole, and check and make sure the deadbolt is working.

The Executive Housekeeper checks daily and writes up a work order (3 pieces of paper - w/carbon). They fill it out and sign it and date it. After the repair is completed, we then file it to the room number and also attach it to a daily work order sheet. It creates a way to go back and check on something. Hampton offers a 100% guarantee to all our guests that they are satisfied with their stay. If a guarantee is honored a report goes to corporate. They would contact you and then, if it were me, I would go to my room file and work order file and let corporate know how we took

care of it. To RPM a room takes about 20 minutes - and we do this to each room four (4) times a year.

### *Do you have a workshop?*

I have a work desk and files in a maintenance shop. My desk doubles as a workbench sometimes. We have a room adjoining where we keep extra supplies such as toilet seats, coffee makers, hair dryers, exhaust fans, maybe we would keep replacement blower wheels in stock too. We keep plenty of batteries on hand; AA, 9 Volt, door lock batteries, etc. We also keep cordless drills, routers, sanders, and planers. And, if we need something, HD Supply or Grainger will have your order to you usually the next day or two. Some properties have a maintenance area that is about the size of a broom-closet. They did a great job here. I'm privileged in that respect. We have binders for everything. We track the service on PTACs - last summer we took out every PTAC and washed them, about 1/2 hour each. Everything has to go back in just right. The condensate line has to flow correctly. And, maybe it takes 45 minutes or longer, but it keeps us from getting calls in the middle of the night because we focus on doing it right the first time. We keep them clean. It's like throwing a blanket over top of it if you don't clean regularly. The unit can't get any air if the filter is all clogged up and dirty.

### *Didn't your property get an award for its appearance, guest satisfaction or something?*

We garnered a nice award from Hilton. We try and make them happy, our houseman, Executive Housekeeping, the GM and myself included. We all try to make them happy. We got the prestigious "Lighthouse" award from Hilton out of 1700 properties, we were ranked 26th out of all of them. If you are in the top 2 or 3% you get what is kindly referred to as the 'Connie' - for Conrad Hilton - it's his nickname. We are pushing for the Connie. To get that or maybe top 5 is a rare thing to get. But, some people do get it. We are excited about it. Twice a year we have a Hilton inspector come around - they rate you as either; outstanding, acceptable, or unacceptable. We have

17 or 18 straight outstanding. It doesn't take much to drop you from outstanding. Let's say there is some evidence from a previous guest's stay, say they open a draw and find a sock. You can get bumped for something like this. You're hoping the shoe doesn't fall on you. Inside you are anxious and then later that afternoon you get your score. It is all unannounced. You have to stay on top of it, other wise you would do a fire drill every time they announced they are coming. They don't tell you before hand they are coming, they just come in when they want. One year we got three unannounced inspections. If we ever got an Acceptable, I would feel like I failed, but we have great support from our management company and the owners who invest in keeping the property in top shape. This makes us proud of our hotel and keeps our guests happy. We get very few guest complaints and if we do get a complaint, we take care of it immediately. We are the unseen people at the hotel. No one sees us and that is ok with me, because that means all our hard work is giving them a good stay.

Our philosophy is, let's say a guest breaks the toilet seat and it usually takes one, maybe two days to ship me a new one. So corporate allows us to keep the small stuff like toilet seats that means a lot to the guest. The guest will call and ask, "Do I have to move," and we reply, "No we will fix it." And, 5 minutes later we are in and out and it's done. Whatever is broke we try and fix it ASAP. When a guest sees the housekeeper they know they are getting their room cleaned. If we have a repair and we know the guest is gone, we come in their room and take care of the problem. Then, when we are done, we leave a little card with a note saying we were here, fixed it, and they can relax and enjoy the candy bar we leave. We leave a repair knowing no one usually sees us. We are seldom seen as hotel workers, but that's ok with me because if they don't see us that means all our hard work is giving the guests a good night's stay.



## *WHY ARE HOTELS AND RESORTS WORLDWIDE USING PROTECT-A-BED PRODUCTS?*



### **Protect-A-Bed's Unique Value Proposition.**

- Maintains mattress cleanliness and overall hygiene
- Bed bug entry and exit proof
- Waterproof barrier prevents human elements penetrating the mattress
- Protects mattress warranty and extends the life of your mattress
- Minimizes housekeeping labor, water, and chemical costs
- Supports sustainability efforts



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# PROTECTING TODAY'S HIGH PERFORMANCE MATTRESSES

**James Bell**  
CEO

**Protect-A-Bed**

<http://www.protectabed.com/>

Traditionally hotel mattresses were a commodity acquired and maintained by housekeeping but, as hotels have provided expensive “high performance” mattresses, management is becoming increasingly aware of the importance of proper mattress maintenance and protection. This responsibility is falling on the shoulders of the hotel engineer, who is the first person called and tasked with replacing damaged or infested mattresses and getting the room back online as quickly as possible.

Hotel engineers are preventive maintenance specialists who understand the importance of providing proper care of mattresses. Proper mattress maintenance (PMM) can reduce or eliminate expensive and unnecessary replacements, lost room revenue, staff time, hygiene issues and pest control problems. Adding to the proper maintenance of hotel bedding is government regulations. Notoriety associated with bedbugs has contributed to various states and municipalities regulating hotels in an effort to ensure guests are provided a clean and environmentally healthy bed.



**Bedding Ordinances are on the Horizon.** One reason bedding ordinances are gaining ground is because bedbugs are becoming more and more resistant to chemicals and fumigation procedures. As a result of this evolution of resistance they are also becoming more prevalent in some areas of the country. Bedbugs are quite simply annoying little blood-sucking parasites. Fortunately, they do not carry any known disease to their host site, humans and our pets. And, for this reason, they still remain under the radar of governing bodies charged with enforcing public safety. However, they are still a nuisance and can ruin any guest's night sleep and their stay at your hotel.

Many states and local jurisdictions have adopted laws addressing bedbugs, however requirements can vary significantly among jurisdictions and states. According to the National Conference of State Legis-

latures, eight states have statutes addressing bed bugs in hotels; Alabama, California, Kansas, Minnesota, Nevada, Ohio, South Dakota and West Virginia. Some states maintain a policy of non-disclosure to the public by statute, thereby keeping the identity of the hotel from public scrutiny. In Kansas a simple guest complaint requires mandatory reporting to the regulatory authority having jurisdiction.

As bed bug statutes pick up momentum, an orchestrated grassroots effort could affect laws governing hotels in multiple states or it could go national with the help of our federal government. The EPA recently received comments on a draft strategy regarding the problem of bed bugs and the hotel industry was silent (which had this been more widely known may have still found the hotel industry silent). History finds the evolution of state and city ordinances more often passes along the most stringent requirements of its predecessor's and often the passing of legislation at the local level is predicated on the assumption that any supporting data has already been heard and flushed out by the jurisdiction before them.



*Guests' expectations for a healthy and clean sleeping environment are rising.*

## Best Practices

The industry has not established a standard or set of best practices for the eradication of bedbugs in hotels. This is usually left up to vendors that specialize in pest management. If the problem of bedbugs in hotel grows, it will undoubtedly receive more attention. Encapsulating mattresses may evolve from current vendor recommended best practices to mandatory jurisdictional requirements. Opponents of hotel mattress protection should recognize that the initial cost outlay for a protective mattress covering is easily outweighed by its many extended benefits including improved guest satisfaction. As hotel guests' expectations for a healthy and clean sleeping environment are rising, the cost of maintaining, replacing and protecting expensive mattresses is coming under greater scrutiny by hotel operators.

## Why Mattress Protection Makes Sense.

**Moisture Damages Mattresses.** Moisture is the major cause of mattress damage. Moisture penetrates the mattress' fibers over years and drastically reduces the life and performance of the mattress. Accidental spills, bodily fluids and even the moisture emitted during a guest's night of sleep can lead to a damp uncomfortable mattress. Moisture can shorten the life span of the mattress and void warranties too. Once a mattress becomes damp or stained the warranty is void and municipalities require the removal of stained mattresses.

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*“We do not apply chemicals on mattresses. We strongly recommend the use of mattress encasements because they are safe, save the mattress, provide immediate relief and prevent future infestation of a mattress.”*

*Godfrey Nalyanya PhD, Technical Services, Rentokil NA Pest Control.*

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**Pest Infestations Destroy Mattresses.** Any type of pest infestation of a mattress calls for immediate disposal, takes the guestroom and surrounding rooms off-line for days, and tarnishes the reputation of the hotel property. Whether it is fleas or bedbugs, any infestation causes a handful of challenges for the hotel engineer. On average, treatment of a typical mattress and box spring can require up to 45 minutes. By applying a mattress encasement to the bed when it is first brought online, a pest technician can later treat the bedding set in less than 15 minutes. James Bell, CEO Protect-A-Bed, says “Encasements offer hotels substantial benefits. Encasements provide a protective barrier from human contamination, bed bugs and allergens. By protecting their mattresses, hoteliers save cleaning and labor costs, lost room revenue due to recovery time, secure their mattress warranty and extend the life of their mattress by protecting their assets from human damage, stains and deterioration.” An initial investment **in bedding encasement can eliminate the expense of replacing an infested mattress down the road.**

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*“Since installing the encasements, we have not replaced one mattress at the hotel”*

*Holly Allgauer-Cir, Hilton Chicago Northbrook.*

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### **Mattress Encasements Are a Smart Investment.**

Today’s high performance mattress encasements utilize materials and fabrics designed to completely seal the mattress and extend its life up to three years beyond the typical 7-year warranty.

These fabrics breathe, feel like cloth, and are resistant to water penetration. Most importantly, mattress encasements enhance the guests’ experience while extending the life of the mattress.

Last January Holly Allgauer-Cir, the General Manager of the Hilton Chicago Northbrook, chose to proactively encase their property’s 390 mattresses with encasements. “It just made sense on so many levels,” said Holly, “with the number of guests we have and the frequent room turnover, wear and tear can happen quickly. It’s important to provide something that will keep our guests safe and healthy while protecting our mattress investments.”

As many hoteliers are discovering – the first time a mattress is protected from a human accident the encasement has paid for itself. Allgauer-Cir readily agrees, “Since installing the encasements, we have not replaced one mattress at the hotel.” pointing out it costs \$300 to replace a mattress, “the savings we’ve experienced so far have been great and we expect it to continue.” If your property is considering purchasing mattresses it is a good time to consider protecting your investment.

Encasements offer hotels substantial benefits. Encasements provide a protective barrier from human contamination, bed bugs and allergens. By protecting their mattresses, hoteliers save cleaning and labor costs, lost room revenue due to recovery time, secure their mattress warranty and extend the life of their mattress by protecting their assets from human damage, stains and deterioration.



# CRITICAL ISSUES IN HOTEL ELECTRIC VEHICLE CHARGING STATIONS

**John Kalb**  
**EV Charging Pros**

<http://www.evchargingpros.com>

After years of preparation, the electric vehicle industry is gathering real momentum. From multiple vehicle models for consumers to choose from to the growth of publically available charging stations, it is clear that the electric vehicle market is at the beginning of a significant growth curve. The Electric Vehicle Drive Association reports that over 69,000 plug in vehicles (both hybrids and all electric) have been sold in the United States in 2013, up from 52,000 for the entire 2012 model year. Since 2008 over 150,000 highway-capable plug-in electric cars have been sold in the US through October 2013.

## Infrastructure Standards Are Available

With a worldwide plug standard (SAE J1772) now in place for both charging devices and cars, EVSE (the industry term for a “charging station”) is now being deployed commercially around the world. EVSE stands for Electric Vehicle Supply Equipment.

A major industry organization, Pike Research, projects that by 2015 close to 200,000 charging stations will be installed on commercial properties and in public spaces across the country—a more than tenfold increase from today. The Department of Energy states that as December 1, 2013 there are 19,413 electric fueling stations in the US.

Hotels have been installing electric fueling stations at an accelerated pace. By the end of 2012,

more than 50 Marriott properties offered EV Charging Stations with that number continuing to grow in 2013. Marriott now lists the properties with dedicated electric vehicle charging stations section on their website.

## The Decision Process

Hotels are becoming aware of the competitive advantage they receive when they install and operate an EVSE in a competitive marketplace. The idea of adding a charging station to differentiate your property can be attractive if it attracts guests. It seems simple, install a charging station and guests will search out your property and stay at your hotel for an overnight charge. If you strike now, you set yourself apart from the competition, maximizing the benefits to your company both today and over time.

Yet the challenge in deploying EVSE infrastructure is not as simple as selecting a vendor, purchasing equipment and letting guests charge as necessary. Questions you will have to answer in the beginning are how many stations, where do you place them, do you charge guests for the service, which type of chargers to purchase or lease, and which promotional networks to join. You will also have to consider questions regarding installation, marking and promoting the stations, managing the availability of the stations, valet charging, capturing user experiences, codes and regulations, interfacing with PMS (Property Manage-





*“Fairmont Hotel Electric Vehicle Charging Station”*

ment System) and determining if outsourcing the entire program is the best way to go.

The decision about why and how to install charging stations is always organization and site specific. Any decision requires an understanding of a complex set of information required to effectively deploy and operate EV charging stations. This is a decision that is at once both strategic and tactical. The strategic aspects should be well considered by the CEO, senior

marketing executives, and/or director of sustainability. In too many companies, however, EVSE is seen as a short-term tactical decision, and so determined largely by facilities and operations managers, with a focus on price and technology issues rather than overall strategy. Once a company realizes that no one is addressing the bigger strategic questions, this can lead to stalled projects.

Businesses must first choose from three major competing charging and operational models, each touted by its proponents as “The Way”:

- In the owner-operator model, a business (the hotel) runs the EVSE, offering free charging services to tenants or customers and accruing profits through higher occupancy, increased foot traffic, and/or customer loyalty.
- In the networked service model, a business (the hotel) determines what to charge end users, splitting the income with an EVSE vendor that operates the networked-based transactional back-end.
- In the leasing model, the company outsources all EVSE installation and operations to an outside contractor, which leases the space for a set fee. The contractor handles everything from deployment and maintenance to pricing and advertising.

Other information is just as critical in the decision making process. Pursuing the EVSE opportunity means assembling a team of decision makers from across the company. Together, such a cross-functional team can research and evaluate multiple vendors and business models and then craft a comprehensive deployment plan.



*Car receiving electrical charge*



*Parking lot with multiple charging stations*

### **Major issues for consideration:**

Are we installing a single charger or scalable infrastructure for multiple chargers over time? This goes to the heart of the existing power availability of a property, as the industry standard Level 2 charger requires a single dedicated 240v circuit and a 40a breaker for each charging station. Scalable infrastructure may require additional transformers and power panels. Power availability and load calculations are critical because the National Electric Code (NEC) Article 625 states that charging stations are continuous devices, meaning that for permitting considerations the stations are always drawing load.

Where to locate the charging stations? Frequently the “best” location is visible to the public and adds to a property’s curb appeal though often a long distance from the power room. The cost of installing a charging station is directly related to the length of the run of conduit and trenching, concrete and landscaping requirements.

### **Why ADA Compliant?**

There is also the issue of accessibility to be considered. While charging stations are technically considered “alternative fueling stations” and are not covered by current ADA regulations, most cities require that the first station deployed be “accessible” to the ADA specification.

### **Three Levels of Charging Stations.**

Modern charging equipment consists of the vehicle’s standard connector and receptacle based on the standard developed by the Society of Automotive Engineers (SAE J1772) International. Any vehicle with this plug receptacle should be able to use any J1772-compliant Level 1 or Level 2 EVSE. All major vehicle and charging system manufacturers support this standard in the U.S. This standard also eliminates drivers’ concerns about whether their vehicle is compatible with our nation’s infrastructure.

**Level 1** or AC Level 1 EVSE provides charging through a 120 volt AC plug and requires electrical installation per the National Electrical Code. Most Level 1, if not all, will come with an AC Level 1 EVSE cord set so that no additional charging equipment is required. On one end of the cord is a standard, three-prong household plug (NEMA 5-15 connector). On the other end is a J1772 standard connector (see the Connectors and Plugs section below) which plugs into the vehicle.

AC Level 1 is typically used for charging when there is only a 120 V outlet available or when the vehicles are going to be parked for a stretch of time, such as overnight parking at airports and hotels. Based on the charging capabilities of most vehicles today, AC Level 1 charging adds about 5 miles of range per hour of charging time.

**Level 2** equipment uses the same connector on the vehicle that Level 1 equipment uses and seems to be the preferred choice of many drivers who use public charging stations.

Level 2 charging uses 240 V or 208 V electrical service for commercial and residential applica-

tions. Level 2 EVSE requires installation of a dedicated circuit of 20 to 80 amps, depending on the EVSE requirements. Level 2 charging is offered by almost all equipment vendors and frequently is integrated with charging network software, which allows site hosts to set access policies, transaction or session fees as well as collect and reconcile payment by drivers. A discussion of network features will be in the next article. Based on the charging capabilities of most vehicles today Level 2 charging adds about 20 miles of range per hour of charging time. Link to more info at:

[www.afdc.energy.gov/electrical\\_charging](http://www.afdc.energy.gov/electrical_charging)

**DC Fast Charging (DCFC)** equipment, typically requires typically 480 V AC input. These chargers enable rapid charging along heavy traffic corridors and at public stations. There is a lot of focus in the industry at creating a network of DCFC along highways to service the needs of drives requiring a fast charge for a fee. Not all vehicles can use DCFC due to the requirement to have a completely different plug than the J1772. In the future resolving plug compatibility will be a key to the evolution of the EV industry.



*The standard J1772 receptacle can receive charge from Level 1 or Level 2 equipment.*



*An electric car charging station for underground garage.*

## Charging Time

How long does it take to charge a vehicle? Each car using a charging station will require a different time to charge. Charging a vehicle is actually dependent on three intersecting concerns,

1. How much power is the charging station receiving (110v/15a or 240v/40a),
2. What is the capability of the on-board vehicle charger to draw that energy and convert it to use by the battery (usually 3.3 kWh or 6.6 kWh) and ,
3. What is the size and state of charge of the battery (15kWh up to 30 kWh 10% to 100% required). A good rule of thumb is that a vehicle using a standard Level II charging station will be able to put up to 20 miles of range in the battery in an hour.

### Charging Times per Level

(from completely empty to completely full):

1. Level 1: Standard charge time: 12-16 hours
2. Level 2: Standard charge time 4-8 hours
3. Level 3: Standard charge is less than 30 minutes (also known as fast-charge)

Hotels have a unique opportunity to differentiate their property both for short-term uses (such as meetings and events) and with increasing daily occupancy rates for overnight guests. Planning, designing and deploying charging EVSE infrastructure may seem complex but, it is no more complex than any other capital improvement project. And, unlike other amenities a property might invest in, offering electric vehicle charging can create a clear marketing benefit to an attractive demographic looking for locations to visit on a regular basis.

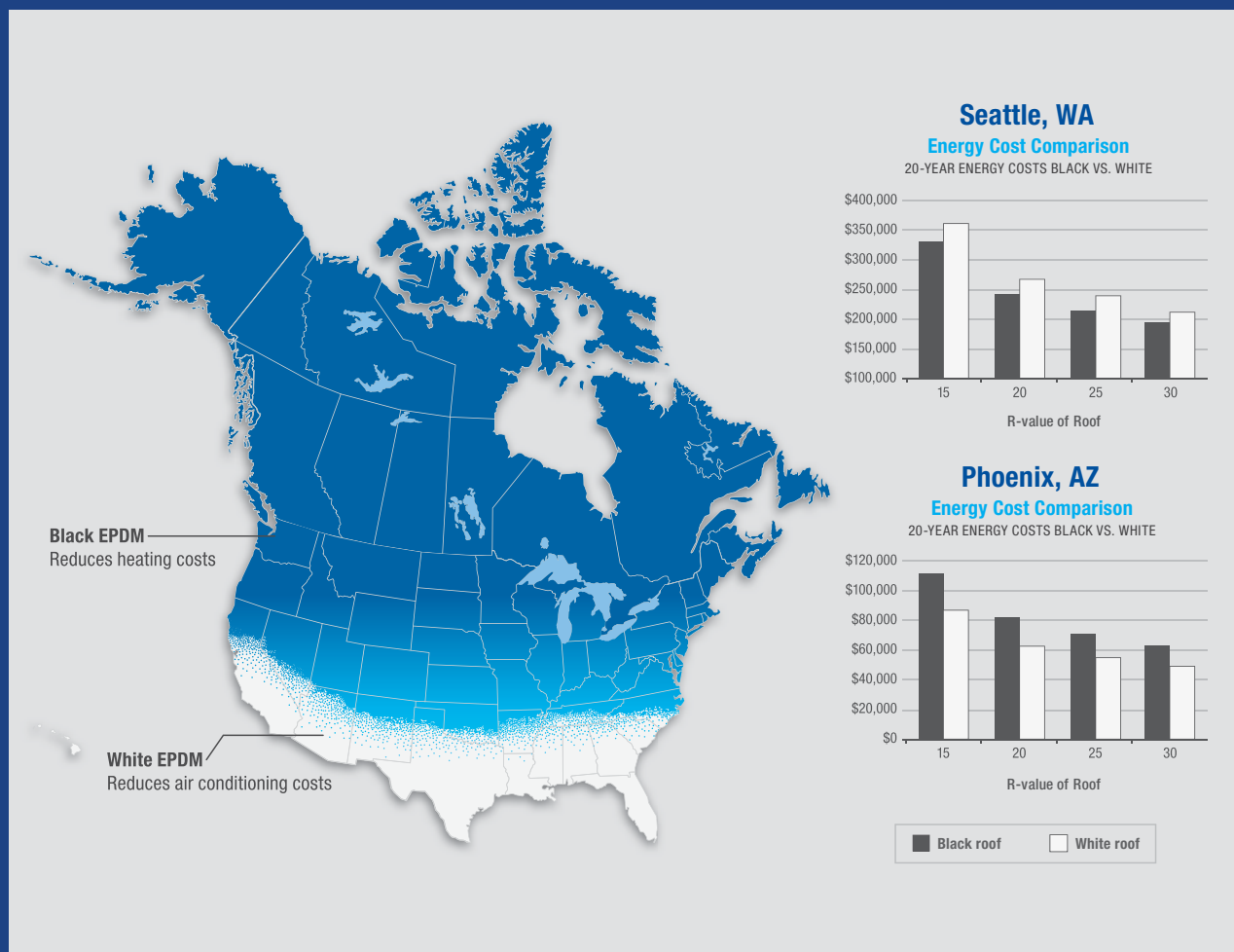
## A Growing Market

The electric vehicle movement is rapidly becoming a reality. Canada now has a “Green Highway” of charging stations conveniently located across the country enabling EV owners to drive from the Atlantic to the Pacific Ocean without “range anxiety”. In the U.S., states are taking the initiative; North Carolina is developing their own “Green Highways” with charging stations at rest areas and exits along its highways, New York’s Governor Cuomo announced Charge NY, a new \$50 million initiative to promote EVs by installing 3,000 public charging stations by 2018 to service 40,000 EVs which is expected to grow to one million by 2025 and Illinois is offering a 50% rebate to hotels to encourage installation of EVSE in 2013. (<http://www.afdc.energy.gov>)

As the demand for EVSE grows, hotels are busy investigating how to link the EVSE to room reservations and yes, charge an additional fee. This ensures the EV guest is guaranteed a space and charger for their stay and the EVSE becomes a profit center. The increase in EV’s is leading hotels, communities and rental car agencies into partnerships to ensure the EV driver has access to a charging station during their stay.

These and many other considerations will be addressed in future issues of **Lodging Engineer** magazine. Visit our website Resource Center for more information at <http://www.nahle.org>.

*John Kalb of EV Charging Pros guides commercial property owners and managers through the EV charging process—from strategy to tactical deployment and operation. His team has deployed over 300 charging stations since 2010. John Kalb can be reached at [johnk@evcharging-pros.com](mailto:johnk@evcharging-pros.com) or (415) 209-6585.*



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# REDUCING HOTEL HVAC MAINTENANCE COSTS WITH ULTRAVIOLET LAMPS

**by Mike Walrath**

**Sales engineer — commercial products**

**Fresh-Aire UV**

Many hotel maintenance staffs are spending large amounts of money annually cleaning mold and other biological growths attracted to the cool, dark and moist environments of air conditioning coils in PTACs, fan coil room units, rooftop package systems and other HVAC equipment. If not eliminated, the HVAC system's supply fan could aid in the spread of airborne mold spores potentially affecting guests' respiratory comfort and health. Ice machine chutes are also subject to a microbial 'slime' coating that indirectly exposes hotel guests to potential biological contaminant ingestion.

Cleaning these coils can be costly. In some cases, thousands of dollars in labor and chemicals, depending on how many units and whether the work is performed in-house or by outside contractors. Besides cleaning costs, mold and other biological films on coils restrict heat transfer that affects air conditioning efficiency.

Each of these issues can be completely eliminated with ultraviolet (UV) light systems installed near the evaporator coil and drain pan. The UV light sterilizes the surfaces it contacts keep them mold free.

## How UVGI Works

UV light is grouped into three segments--A, B and C, which range in frequency between 90 to 400 nanometers. They all occur naturally in sunlight.

- UV-A (320-400 nanometers) is used for black lights and tanning beds.
- UV-B (280-320nm) causes sunburn.
- UV-C (200-280nm) is the most intense range. Because it's filtered out by the earth's atmosphere, microorganisms have never been exposed to it and have no defense against it. Ultraviolet germicidal irradiation (UVGI) technology uses UV-C to scramble microorganisms' DNA so they can't reproduce.

UVGI is effective against bacteria, mold, viruses, and allergens. UVGI lamps are typically positioned downstream facing the coils in air conditioning systems. Although effectiveness depends on exposure time and microorganism type, all viruses, bacteria, mold and other microbes are destroyed by UVGI light.

## Hotels Currently Using UV

While some hotel engineers haven't embraced UVGI technology yet, there are many that have. John Melvin, chief engineer, Marriott's Hutchinson Island Florida Resort has installed a variety of UV light systems with great success. "The UV lights have cut back the routine maintenance in half that has to be done to air conditioning coils and ice machines," Melvin said. "The maintenance now (after applying UV) is basically cleaning dust off of the coils as the UV light doesn't allow microbial growth to form. It has also been great in maintaining a pleasant atmosphere (indoor air quality) without any outside odors."

Reba Management, Hilton Head Island, S.C., which manages several Hilton Head area resorts such as Coral Reef Resort, Island Links Resort and Port O'Call Shipyard Plantation installed 110 UV light systems consisting of one lamp (bulb) on each side of HVAC system evaporator coils. According to Robert Lehman, assistant director engineering, "In comparison to no UV light, the systems with installed UV lights remained much

cleaner and reduced any mold, mildew or odor potential in the units."

There are hundreds of hotels using UVGI as a prevention to mold and mildew development in HVAC units and ice machines. The technology is growing exponentially as progressive consulting engineers are specifying HVAC systems with UV lamps to keep maintenance costs low, improve indoor air quality and ensure optimum heat transfer and energy efficiency in new hotel construction.

## Types of UV Systems and Installation

UV light systems can be installed easily by a qualified in-house maintenance staff or by a local contractor. Better UVGI manufacturers offer customer support to staff on installation or can recommend qualified contractors.

PTACs, fancoils and mini-split type air conditioners offer a unique challenge because they are so tightly packed with components. Fortunately, some manufacturers offer a tight-fit kit or UV light systems designed specifically for mini-split evaporator cases. Both system types can be installed in less



*A tubular rack system is quick and easy to install*



*UVGI is effective for microbial disinfection of interior wall surfaces, coils and the supply airstream of air handlers*

than an hour and typically cost well below \$200 per unit. The lamps themselves don't require labor-intensive fasteners, but instead are installed with an industrial adhesive below the coil and above the drain pan. The UV power supply is wired into the HVAC unit's 220 or 230V power supply.

Ice machines, which are subject to inspection in many states, are equally prone to microbial fouling. They too, can benefit from UVGI technology. Mold typically develops on the dark, damp chute environment, which is often in contact with humid air from the spray area, especially when the dispenser door is accessed or left open. The result is a slimy discolored microbial substance that can stick to ice as it descends from the chute.

Commercial kitchen ice machines are the most vulnerable because baking introduces airborne mold spores, and room temperatures are warmer while floor pressure washing and dishwashers create a high humidity atmosphere. This combination of spores, temperature, and humidity is conducive to mold growth. All ice machines can benefit from a UVGI system, however units in kitchens and outdoors in humid climates are the most prone to mold build-ups. Prices for an ice machine UV system range from less than \$200 for basic guest units up to \$800 for larger commercial units. They are easily installed by qualified in-house maintenance staff.

Another important UVGI use is in rooftop or mechanical room air handlers. Most commercial facility maintenance departments are capable of UVGI retrofits on existing air handlers. Those commercial UVGI systems typically cost between \$1,000 to \$4,000 in equipment costs per air handler or rooftop unit, depending on the coil size and lamp quantity needed for proper coverage. Installation labor generally requires two to six hours per unit.

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*“Generally, high quality UVGI systems are maintenance-free, with the exception of routine lamp replacement.”*

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Choosing the right UVGI system will add minimal additional maintenance workload to a facility's staff. Like most products, UV lamps come in good, better and best classifications. Generally, high quality UVGI systems are maintenance-free, with the exception of routine lamp replacement. A good manufacturer will typically send a factory technician to train the hotel maintenance department and supervise UVGI installations, especially if the retrofit project involves multiple units.

### **Asset Preservation Thru Improved Efficiencies**

More and more it is the responsibility of the hotel engineer to initiate new technologies that can either preserve the property's building-system assets or increase energy savings through an improvement in operating efficiency. UV light systems offer the unique opportunity to do both. UV Lights can present a better environment for guests and reduce operational costs for the facility. As UV light systems are gaining acceptance as a proven method of killing mold on air conditioning and ice machine coils, these same UV light systems also reduce maintenance, improve HVAC coil heat transfer, and can potentially pay for themselves in as little as six to 12 months.

*Mike Walrath is a 14-year HVAC industry veteran and the sales engineer for the commercial products division of Fresh-Aire UV, an international manufacturer of UV systems. Fresh-Air UV is a division of Triatomic Environmental Inc., Jupiter, Florida. <http://www.freshaireuv.com>*

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## NEW CODE REQUIREMENTS FOR CO ALARMS IN HOTELS ARE RISK-BASED

**Thomas G. Daly MSc. CSP**

**The Hospitality Security Consulting Group, LLC**



The International Code Council (ICC) voted this past October to substantially modify provisions in its 2015 editions of the International Building Code (IBC) and International Fire Code (IFC) involving requirements for carbon monoxide (CO) alarms for hotels, among other occupancies.

In the second of two required votes, the ICC membership approved recommendations from its Fire Code Action Committee (FCAC) to focus the requirements for CO alarms in hotels to only those locations where fuel fire appliances are installed or where a hotel has a connected unventilated garage. The membership voted 77-20 to approve the proposal with minor editorial and formatting changes as specified in Public Comment #1 to proposal F-360-13.

The Hospitality Security Consulting Group, LLC (HSCG) represented the American Hotel & Lodging Association as part of the ICC's CO Alarm Task Group assigned to revise these requirements. HSCG was the leading proponent for matching the technology to the hazard only in those locations where an actual potential for CO exposure exists. Thomas G. Daly Principal of the Hospitality Security Consulting Group, LLC said in a statement, "while the incidence of

carbon monoxide exposure is extremely rare in hotels, we now have matched the code requirements with the technology in the correct locations to preclude such unlikely events."

This action by the ICC is a significant departure from the 2012 IBC and IFC which requires CO alarms in all guest rooms or a CO detection system throughout all 'common areas', an undefined term in the code, despite the lack of fuel-fired appliances in typical hotel guest rooms.

If your state or local regulators are in the process of adopting either the 2012 IBC or IFC or both, you should make them aware of these now approved changes to these codes relative to the requirements for carbon monoxide (CO) alarms for hotels and urge them to adopt instead this now approved 2015 code language. California has already delayed implementation of this requirement for existing hotels until January 1, 2016 and will consider changing its current regulations to reflect this new IBC & IFC language, now final.

As of September 2013 Wyoming, South Carolina, Washington, Mississippi and Utah have adopted the 2012 IFC impacting existing hotels but those states plus Maryland, Vermont, Mis-

souri, Rhode Island, Missouri and South Dakota have adopted the 2012 IBC affecting newly constructed hotels and other states including Nevada are considering adopting both codes.

The proposed 2015 code changes largely follow existing Massachusetts and New Jersey regulations for CO alarms in hotels which have been in place for a decade or more without any reported CO related fatalities in hotels so equipped.

Boiling down the proposed changes in the 2015 IBC and IFC they will require a CO alarm or detector within any room in a hotel which contains a fuel-fired appliance and in some ancillary spaces, but nowhere else. For most hotels that would mean a CO alarm or detector would be needed in a mechanical equipment room with a gas-fired boiler, a pool heater room with a gas-fired heater, kitchens with gas-fired stoves and emergency generator rooms with diesel fired generators. Should a hotel have a wood or gas-fired fireplace in the lobby a CO alarm or detector would be needed there as well.

Even providing CO alarms in all of those cited locations would cost less than \$1,000, a far cry from the current code requirements for CO alarms in all guest rooms where there are no fuel-fired appliances typically.

State hotel associations have an excellent opportunity now to save their members thousands of dollars in unnecessary expenditures for CO alarms no longer required, but will have to be proactive with state regulators to make that happen.

**Thomas G. Daly, M.A., MSc, CSP** is a Principal and Managing Member of [The Hospitality Security Consulting Group, LLC](http://TheHospitalitySecurityConsultingGroup.com). He is a former member of the NFPA Committee on Carbon Monoxide and previously served as Vice President Loss Prevention for Hilton Hotels Corporation. He is a certified safety professional and holds a master's degree in safety from the University of Southern California.



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# THE ORIGINAL SUSTAINABLE ROOF

**Ronald L. Goodman**

Carlisle SynTec Systems, Carlisle, Pa.

In addition to being functional and economical, ballasted EPDM roof systems are one of the most sustainable and environmentally friendly commercial roof systems available. One reason for this is the long service lives of these roofs. EPDM roofs have also been documented to outperform other roof systems when it comes to global warming potential, acid rain impact and smog impact. The system's life cycle assessment of environmental impacts and the benefits of stormwater management all clearly contribute to EPDM claim of sustainability.

## What is ballasted EPDM?

A ballasted EPDM roof system has its components held in place by river-washed stones or pavers. Ballasted roofs are loose-laid, meaning roofing materials, including the insulation and roof membrane, are not fastened to one another or to the roof deck. Adjoining EPDM sheets are spliced together, and the membrane and insulation are held down with a minimum of 10 pounds of ballast per square foot. This system has been popular because of its low life cycle cost and quick, economical installation, which is one of the fastest and most cost-effective ways to achieve a weatherproof building envelope. When the system first was introduced, 45-mil-thick EPDM was common. More recently, there has been a trend to using more puncture-resistant 60-mil- and 90-mil-thick EPDM membranes.



*Loose-laid stones ballast EPDM roof system*

## Studies Demonstrate Sustainability

In addition to being functional and economical, ballasted EPDM roof systems are one of the most sustainable and environmentally friendly commercial roof systems. One reason for this is the long service lives of these roofs. Empirical evidence consistently demonstrates EPDM membranes used in ballasted systems often outperform their expected lengths of service.

## ERA Study

A 2003 study commissioned by the EPDM Roofing Association (ERA) selected 33 EPDM membranes, aged between 16 and 26 years, from in-service roofs in nine states. The samples included 10 ballasted EPDM roofs, and the study found that of these, the membranes' ten-



sile strength, tear resistance and ultimate elongation were relatively unchanged, even after 23 years of service.

The study also compared the “Global Warming Potential” of four roof systems based upon the unit of effect per square meter (roughly the area of 10 one-foot square floor tiles) of installed membrane. Three of the four roof systems were 60 mils thick, and one was 140 mils. All of the roofs were fully adhered except for the sustainable EPDM roof system that is held in place by ballast material. I doubt you will find too many ballasted roofs in high wind areas, but other than that, ballasted EPDM roofs compare quite favorably to other roof systems.

In terms of measuring these roofs in regards to their Global Warming Potential, the study used kilograms of carbon dioxide per square meter of membrane. The EPDM roof had an effect of 28.3 grams per square meter of installed product. SBS was more than twice that at 81.8 kg. The study looked at TPO roofs using 60 mil of reinforced white TPO membrane versus 60 mil of non-re-

a little better than TPO’s 30.9 kg/m<sup>2</sup>. (Source: theGreenTeam Inc.)

EPDM membranes also have high resistance to thermal shock, weathering, abrasion and ozone and flexibility in low temperatures. Given the potential long life of EPDM roofs, researchers wanted to see what happened when you accelerate the global warming and zap their roofs with high-power UV light. Right now our earth’s atmosphere blocks out UV-C light. This segment of UV light is the most intense and it is a bit too much for sun-tanning. The UV-C light has been successfully used in hotels to kill mold and mildew by scrambling their DNA so they can’t reproduce. It is called UVGI for Ultraviolet germicidal irradiation. And, so if our earth’s atmosphere continues to deteriorate due to global warming, why not utilize a test and see how they will perform. And, they did. EPDM roofs exposed to an accelerated ultraviolet resistance testing method, were found to continue to perform without cracking or crazing, surpassing all other single-ply membranes by two to three times.

**Figure 1: Impacts of Low-Slope Roofing Systems**

| <b>System</b> | <b>Membrane</b>             | <b>Attachment</b> | <b>Global warming potential (GWP)<br/>Kg CO<sup>2</sup></b> |
|---------------|-----------------------------|-------------------|---|
| EPDM          | 60-mil Non-reinforced Black | Ballasted         | 28.3  |
| TPO           | 60-mil Reinforced White     | Fully Adhered     | 30.9  |
| PVC           | 60-mil Reinforced White     | Fully Adhered     | 73.1  |
| SBS           | 140-mil Unsurfaced          | Fully Adhered     | 81.8  |

*Unit of impact per square meter of installed membrane. (Source: theGreenTeam, Inc.)*

inforced black EPDM membrane. The TPO was fully adhered and the EPDM was ballasted. Interestingly both of these roofs are excellent choices of sustainable roofs as the EPDM squeaked out

### **theGreenTeam Inc. Study**

A recent life cycle assessment (LCA) shows EPDM’s long-term environmental impact is

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*Since rainwater harvesting systems such as those typically used for hotel roofs are not connected to municipal water supplies, it's likely that monthly utility bills will decrease substantially further passing on savings to hotel owners. We have found that the incorporation of rain water collection and distribution as part of a responsible roof design or landscape design for a property can help ease the burden on municipal and regional water resources." - Russ Horner of [Water Management Inc](#)*

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much less than other alternatives. An LCA examines the environmental aspects and potential effects of a product, process or service. The EPDM LCA was commissioned by ERA and performed by theGreenTeam Inc., a strategic environmental consulting firm based in Tulsa, Okla. The LCA, using the Environmental Protection Agency's (EPA's) Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts model, took into account all inputs associated with the manufacture and installation of assorted commercial roof systems, including EPDM, PVC, SBS polymer-modified bitumen and TPO. Ballasted systems are cost-effective because of the minimal amount of components and quick, simple installation process. There is significantly less material, labor and energy used to install a ballasted system than other commercial roof systems.

No fasteners or bonding adhesives are used in a ballasted system's field. As a result, no volatile organic compounds are emitted into the atmosphere and building occupants are not disrupted by bothersome odors. Furthermore, because no fasteners are used for a ballasted assembly, thermal bridging is not an issue. It is estimated that between 3 and 8 percent of insulation's R-value is lost when mechanical fasteners are used in a roof's field.

When the LCA was completed, theGreenTeam's data was submitted to the Athena Sus-

tainable Materials Institute to be entered into its EcoCalculator, the industry standard for LCA data relating to construction materials. It showed EPDM roof systems have less of an environmental impact than PVC, SBS polymer-modified bitumen and TPO roof systems. For a standard low-slope commercial roof over R-20 insulation and a steel deck, the EcoCalculator determined EPDM presents the least global warming potential, acid rain impact and smog impact.

### **Oak Ridge National Laboratory Study**

Oak Ridge National Laboratory (ORNL), Oak Ridge, Tenn., has certified ballasted roof systems meet cool roof criteria and help reduce air conditioning costs. ORNL's study "Evaluating the Energy Performance of Ballasted Roof Systems" demonstrates that ballast protects a membrane and provides thermal mass to help reduce rooftop temperatures. Ballast also delays heat flow into buildings, resulting in air conditioning savings comparable to those realized by using reflective membranes. ORNL measured peak temperatures for various ballasted assemblies in addition to black and white membranes, and the ballasted systems performed similarly to more traditional cool roofs that use reflective membranes.

Ballast keeps membrane surface temperatures in the 90° F to 103° F range, similar to highly reflective roof membranes' temperatures, without the concerns of condensation, reflected heat or

glare that can affect rooftop HVAC equipment or nearby windows.

### **Stormwater management**

Stormwater management is a growing concern among building owners, particularly in large cities where stormwater and sewer systems are combined and sometimes unable to handle heavy rainfalls. In many U.S. communities, a substantial rainstorm can overwhelm the combined system, causing raw sewage to be discharged into area waterways.

In these settings, traditional ballasted systems can be modified to absorb and retain stormwater. The modification is achieved by adding more drainage components, specifically drainage board or moisture-retention mats. This alteration to a traditional ballasted assembly can allow the system to retain as much as 70 percent of the water from a 24-hour rain event, providing significant relief to city sewer systems. However, it can add weight to the roof system.

When fully saturated, a stormwater retention system can add between 2 to 3 pounds per square foot. Modifying a ballasted roof system offers owners and developers a cost-effective alternative to expensive collection basins and associated land requirements.

### **Energy benefits**

Traditionally, a cool roof has been defined as one that uses a light-colored, reflective membrane or coating. In some large cities, government officials have implemented legislation that requires all new commercial buildings to have white roofs. As a result, many people ignore the value of a ballasted system as a cool roof alternative. However, because ballasted assemblies provide many of the same energy benefits as

a reflective roof, they are recognized as a cool roof alternative by ASHRAE Inc., California Energy Commission's Title 24 and the Municipal Code of Chicago for the Building Industry.

Ballasted EPDM roofs can offer building owners the best of both worlds. In addition to helping keep buildings cool, they can mitigate the heating cost disadvantage of using a reflective membrane in northern climates where heating costs typically are five times that of cooling costs. Regardless of climate, ballast acts as an additional insulation layer, which helps minimize solar heat gain during summer and heat loss during winter. Additionally, after a couple of years of weathering, certain ballast and paver systems feature lower peak temperatures than white membrane systems. This is because reflective membranes lose their reflectivity as they are exposed to pollutants.

### **Recycling EPDM**

The benefits of a ballasted roof assembly don't cease when a ballasted EPDM roof has reached the end of its useful service life. Often, when a ballasted system needs to be replaced, it is supplanted with another ballasted system. Ballasted roof systems are some of the easiest to retrofit because existing components, including the ballast and insulation, often can be reused in a new roof. This high degree of sustainability benefits the environment and helps reduce material and labor costs.

Additionally, because of liability issues, building owners often completely tear off an existing roof system for retrofit projects. However, this is not always necessary with ballasted roofs. Thermography can be used to ascertain whether moisture has entered existing insulation, which is a deciding factor when determining whether it can be reused.

If it's determined a roof system requires a complete replacement, disposal costs can be extraordinarily high. For larger projects, expenses can reach into the hundreds of thousands of dollars. EPA states 40 percent of total landfill waste comes from construction and demolition debris, and one quarter of that debris is composed of roofing materials.

The components of a non-reinforced EPDM ballasted roof system are recyclable or reusable. When the time comes to replace an old ballasted roof, the EPDM membrane is easily removed and the insulation often can be reused because the system uses no fasteners or adhesives. The ballast usually can be reused or repurposed, and the EPDM membrane can be recycled or repurposed as a slip-sheet between the new EPDM membrane and old ballast.

### **Making the Right Choice**

The ballast used to hold down the EPDM system offers excellent fire protection; Class A fire resistance is possible without the need for a gypsum cover board or the addition of fire-retardant raw materials to the EPDM rubber.

Similar to any roof system, ballasted roofs have limitations and are not ideal for every building. The ballast material is heavy and will add between 10 and 25 pounds per square foot to a building's load. Ballasted systems demand roof structures that can support the extra weight. Ballasted systems are not ideal for every hotel such as tall hotel buildings or hotels in hurricane-prone regions where ballast can become flying debris in tornado or hurricane events. Check with your architect before selecting a ballasted EPDM roof to make certain your roof can support the additional load.

Finding leaks requires expertise and experience, and ballast makes a visual inspection difficult. The use of 60-mil- or 90-mil-thick EPDM membranes with factory-applied seam tape is an effective design enhancement to minimize the chance of leaks. When analyzing 30 years' worth of warranty claim data from Carlisle, Pa.-based Carlisle SynTec Systems' warranty department, it has been noted ballasted EPDM roofs have the lowest warranty claim rates per square foot based on the infrequency of problems and system design.

### **Feeling Good About Green**

Ballasted EPDM roofs were first introduced as a cost effective alternative to other roofing systems available on the market. They were chosen over other roof systems because of a variety of reason including their durability and energy savings. Ballasted EPDM roofs were green and sustainable long before the focus on environmentally efficient and sustainable design in buildings and roofs. Research now clearly demonstrates ballasted EPDM roof systems to be one of the most eco-friendly commercial roof systems on the market. So when you consider all the factors that lead up to a decision to install a ballasted EPDM roof system, you can feel good about its economic value, proven track record and most of all, you can feel good about your contribution to a healthier planet.

*Ronald L. Goodman is marketing manager for EPDM and FleeceBACK Systems for [Carlisle SynTecSystems](#), Carlisle, Pa.*

*Excerpts from this article can be found in the National Roofing Contractors Association's trade publication, Professional Roofing November 2013.*

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