

ISSUE

28 Lodging Engineer

FALL 2017

1st Person



**Interview with
Kim Grange**

Featuring

*Fire Protection and Life Safety
Finding the Right Fleet of Utility Vehicles
Response to Hurricanes Harvey & Irma
Pests During Renovations
Bringing Hotel Wi-Fi Up to Speed*





1st Person with Venetian's Kim Grange

4 Lodging Engineer visited the Las Vegas Venetian this past summer and we have created one of our best interviews ever with Kim Grange, vice-president of engineering and facilities. Mr. Grange manages a staff of over 450 employees and more than 7,000 guestrooms and suites. Overseeing the many challenges of a Las Vegas Casino and Resort with a mixed use occupancy differs from most other hotel properties in many ways beyond sheer size. Read about their LEEDs and sustainability successes as well as the Venetian's canal that connects the many shops available to guests and the public.

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Fire Protection and Life Safety in the Hotel Industry

Byron L. Briese, P.E. introduces Coffman Engineering to Lodging Engineer in this first of a series of articles to come. Byron begins the series with a brief history of hotel fire fatalities through the development of regulations and building codes requirements that include both active and passive fire protection.



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Finding the Right Fleet of Vehicles to Support Your Facility

From their patented braking system to adaptability Cushman makes some of the world's best utility vehicles, personnel shuttles, and golf carts known to the hospitality industry. Selecting the right vehicle to meet the needs of your property is challenging with so many options available. This article discusses what to look for when purchasing a single vehicle to a full vehicle fleet.

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Pests During Hotel Renovations: Keep Uninvited Guests Out During Your Next Remodel

As sure as paying taxes, every hotel sooner or later renovates their property and guest rooms. From enhancing landscape lighting to a complete rooms remodel, both displaced existing hotel pests and new pests are seeking a point of entry into your hotel. Orkin provides an informative discussion on how to keep pests out during your hotel's next renovation.



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Bringing Hotel Wi-Fi Up to Speed with Guest Expectations

Hotel Internet Services discusses in-room access point technology providing a thorough description of hotel WiFi in the hospitality industry and explains what you will need to bring your property up to what is quickly becoming industry standards.

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Not All Heroes Wear Capes: Hospitality's Response to Hurricanes Harvey & Irma

High winds and torrential rains left a path of destruction behind impacting hotels and the safety of their guests and employees. Lodging Engineer reached out to a handful of hotel management companies, engineers and GMs in preparation of this article. The hurricanes' destruction left few unscathed revealing an unwelcomed thread of commonality among properties.



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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1ST PERSON INTERVIEW WITH

VENETIAN'S KIM GRANGE

by Amanda Strouse

Thank you very much for taking the time to be interviewed for our magazine. My editor asked me to interview someone in charge of the engineering staff at a prestigious Las Vegas hotel and casino, and I couldn't think of any hotel that's more esteemed or impressive than the Venetian. Let's begin by talking more about your professional history and how you became the Vice President of Engineering at the Venetian (as well as the Palazzo). You started out as an electrician and HVAC technician – how did you get hired to the first Las Vegas hotel you worked for?

Las Vegas is and has been for a long time a very large, small city. By that I mean, despite the ever-growing size of the city, there is and was a close-knit circle of professionals that have developed the maintenance industry here. In essence, everybody that's been here for any length of time knows somebody who knows somebody. I was fortunate enough to know somebody that told me of an opening at The Golden Nugget and put in a good word for me. The rest, as they say, is history. Through a referral from a friend I was able to go to work as an electrician.



Kim Grange
Vice President of
Engineering
Venetian / Palazzo
Hotels

How did you work your way up to Director of Facilities at the Golden Nugget and how long did it take?

I got my start at The Golden Nugget as an electrician in 1983, but I knew I wanted more, so I took advantage of opportunities to expand my knowledge base into different trades such as plumbing, and HVAC, as well as routine room calls, whenever they came along. I learned quickly that if you want to grow you need to do the things to make yourself promotable. I took both on-the-job leadership classes and technical training at the community college. I took it upon myself to learn how the department operated and through hard work I made myself prepared both mentally and physically -- ready to seize every opportunity to grow. First I became an assistant crew leader, then a crew leader, after that I was promoted to assistant chief engineer followed by chief engineer, and by 1997 I was promoted to facilities director.

How did your professional background prepare you for that important position?

It was with the support of those around me that I gained knowledge coupled with experience. With the guidance of mentors and advice from

“Your success as a leader is in many ways dependent upon those that you choose to surround yourself with.”

outside of the casino industry, I always looked at it with a desire to be a part of this fascinating industry.

You started working for the Venetian during its construction and then became its Director of Facilities once it opened. Tell us a little about what some of your major projects were before or as soon as the doors opened for guests?

Most people don't know that The Venetian's opening was challenging at best. This was definitely a complicated project – with millions of moving parts. Through no fault of our own, many of our rooms were not ready on opening day. At our soft opening on May 2, 1999, we only had 300 suites ready to occupy, and our shops and restaurants were not yet open.

We systematically got everything open, making sure that the life safety systems were fully functional, ensuring that the mechanical systems were up and running, working hard to make every available suite perfect for our first guests, but with the Herculean efforts of every team member here we pulled this building together and once we opened we knew that we were part of something special. It set the tone for how we approach each and every challenge that is put in front of us – we meet them head on with clarity and determination, knowing that we will not allow our team to fail.

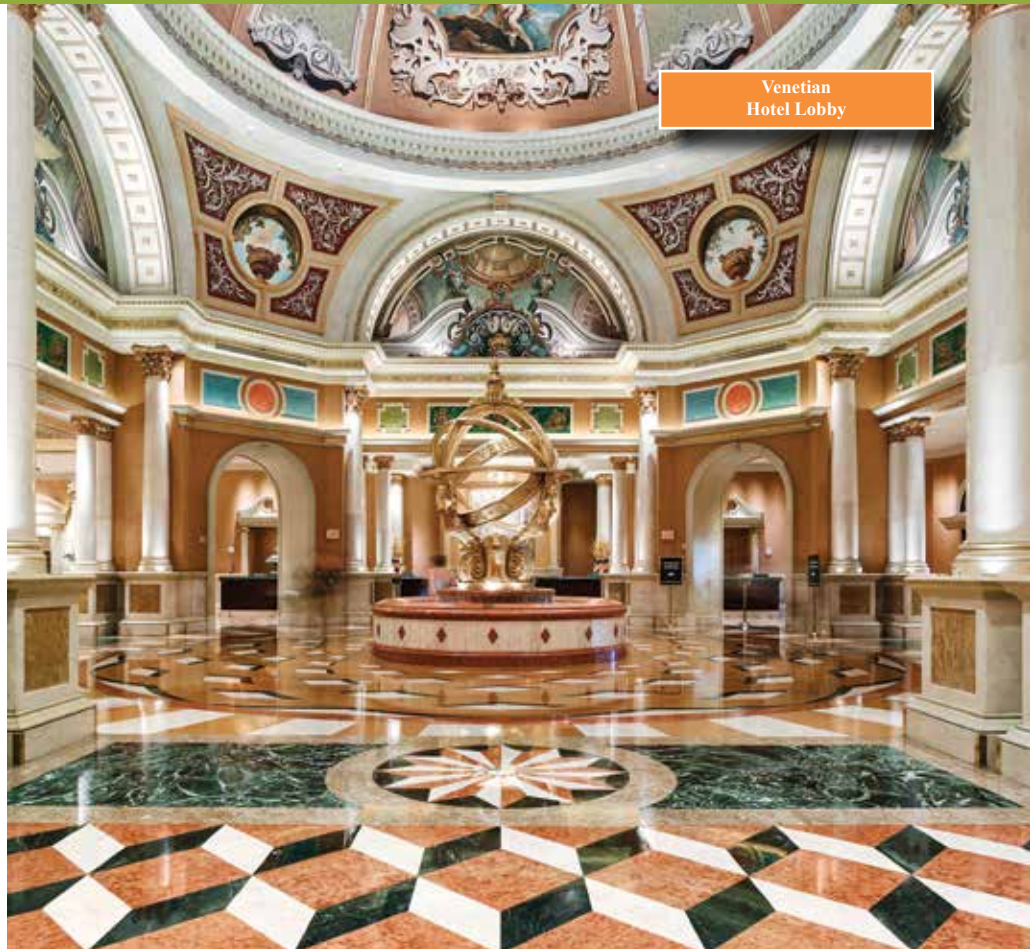
Did you have any concerns or challenges during the construction that taught you important lessons or provided you with useful insights?

Right from the first opening and through every opening we have had since, we learned that it is critical to have third-party inspections. Through the consistent QA inspections you can be assured that you are getting what was designed and what you paid to have built.

It is imperative to have clear and concise channels of communication with all parties involved in your projects no matter what they entail.

It is extremely helpful down the road for your team to learn the physical infrastructure and the base building systems during the construction phase. Things like how and where the various utilities are, how were the mechanical systems installed, as well as electrical distribution system.

We are constrained to some degree by budgets, but you must, whenever possible, avoid the trap of trying to save money and end up buying inferior products or skimp on quality, because more than likely this will become a maintenance problem down the road and an operational expense.



“It is imperative to have clear and concise channels of communication with all parties involved in your projects no matter what they entail.”

How many guest rooms does the Venetian have?

The Venetian has 3,014 suites, The Palazzo has 3,066 suites, and the Venezia tower has 1,013 suites, making the total number that my team has to maintain 7,094 suites of various sizes and complexity.

How is your current position, the VP of Engineering, different from your previous role as the Director of Facilities?

There is a vast complexity to this position that comes with the enhanced responsibility. It is my responsibility to look over the horizon and envision challenges that we will face years from now and develop strategies to meet those challenges. That includes long-term planning for future developments both here and abroad, not to mention developing growth opportunities for my team.

How long have you been in your current role and how many staff do you oversee?

I have been fortunate enough to have worked here at The Venetian and The Palazzo for more than 20 years. During that time, I have enjoyed the privilege to lead more than 1,000 team members as different responsibilities and departments were moved in and out of our division. Currently I have 450 team members under my direction.

With such a large staff, does everyone have very specific job roles? How are projects or tasks divvied up?

Yes, we do have leaders that have trade specific knowledge and experience. We have a dedicated group of managers that manage our projects which are divided up by the type such as construction, guest-impacted projects, and operational projects. Daily maintenance is addressed by specific trade shops or teams as part of our normal maintenance operations.

Venetian
Luxury Suite



How do you and your staff stay organized and ensure everything is done correctly and in a time-efficient manner?

It can be challenging at times to keep the wheels on the bus turning, but with our collective experiences we have developed processes and procedures that have us prepared to meet the challenges. We utilize specific maintenance-related software programs, specific operational SOPs, preventative maintenance standards, various statistical data and status reports combined with specific metrics to manage and measure our progress towards our goals. And last but not least, we maintain a clear and efficient line of communication throughout the entire process.

How does your team maintain large systems with many small components, such as sprinkler systems and video surveillance systems?

We have developed and utilized, both internally and externally, preventative maintenance programs, processes and protocols to closely monitor and respond to the various needs and demands of these critical systems. In addition, we encourage our team members to keep their edge sharp by learning new techniques and technologies, to push for new ideas that will ultimately allow us to do our jobs more effectively and efficiently.

What are some important or interesting lessons you have learned from working at a successful hotel from its inception to its present, decades later?

Your success as a leader is in many way dependent upon those that you choose to surround yourself with. The single best way to meet any and all

challenges is to assemble a team that works well together and supports each other, a team that has the capacity and will to anticipate your needs and the needs of their fellow team members, and a team where everyone feels like they matter and know their role. This team needs to feel like they are partners in the business and that everyone's role is equally important to the success of the company. Every team member needs to know that there is opportunity for growth and that we are all working toward the same goal. It's all about the team.

How is your role for the Venetian different from someone in a similar position for a small-town hotel?

Once you get past the idea that we are running a hotel there is very little else that is comparable. The sheer magnitude and size of this fully integrated mega-resort brings a whole new dimension to not only the daily activities but the long-term processes as well. In fact, we're closer to the operation of a small city – facing many of the same challenges that a small city faces on a daily basis.

In your opinion, what are the pros and cons of working for a hotel on the Las Vegas strip?

For me one of the greatest blessings of my life is having had the opportunity to work for two of the most iconic gaming operators in the world. I am forever grateful to Mr. [Sheldon] Adelson for his steadfast leadership and vision for this company. It was that vision that challenged me to grow far beyond what I ever could have hoped to have grown on my

own. To this day under his bold leadership this company continually sets the industry standard and because of this it pushes me to grow and achieve as well.

You've told me that the Venetian utilizes solar energy. Please talk about the solar power system you have in place to convert solar energy into electricity, as well as your water heating system.

We enjoy the benefits of solar energy from two main platforms – solar water heating and solar electrical generation.

Our solar electrical generation system is located on the top floor of our team member shared garage. This system contains three arrays 228 of photo-electric generation panels that cover the parking stalls on that level. Year to date this system has produced 123,000 kW of power which is utilized to light up the entire 16 story team member shared parking garage. To get an idea how much power that is, it is enough power to run 1,090 computers for a full year.

As I mentioned previously we also have a large solar water heater system that we utilize to heat water to a temperature of 140 degrees. This hot water supplies all the hot water to our casino, kitchens and bars. In addition, this system also supplies hot water to eight floors of The Palazzo guest tower. This system generates the equivalent amount of hot water that an 850 HP boiler would produce.

When did the hotel install these solar systems and was the main reason for lowered utility costs?

The installation of the solar energy generation systems began in 2007 and were completed in 2008 at the end of the construction phase of The Palazzo. These systems were integrated into our operating systems for the purpose of achieving not only a reduction in utility costs, but as a component of our total infrastructure to reach our LEEDS certification goals.

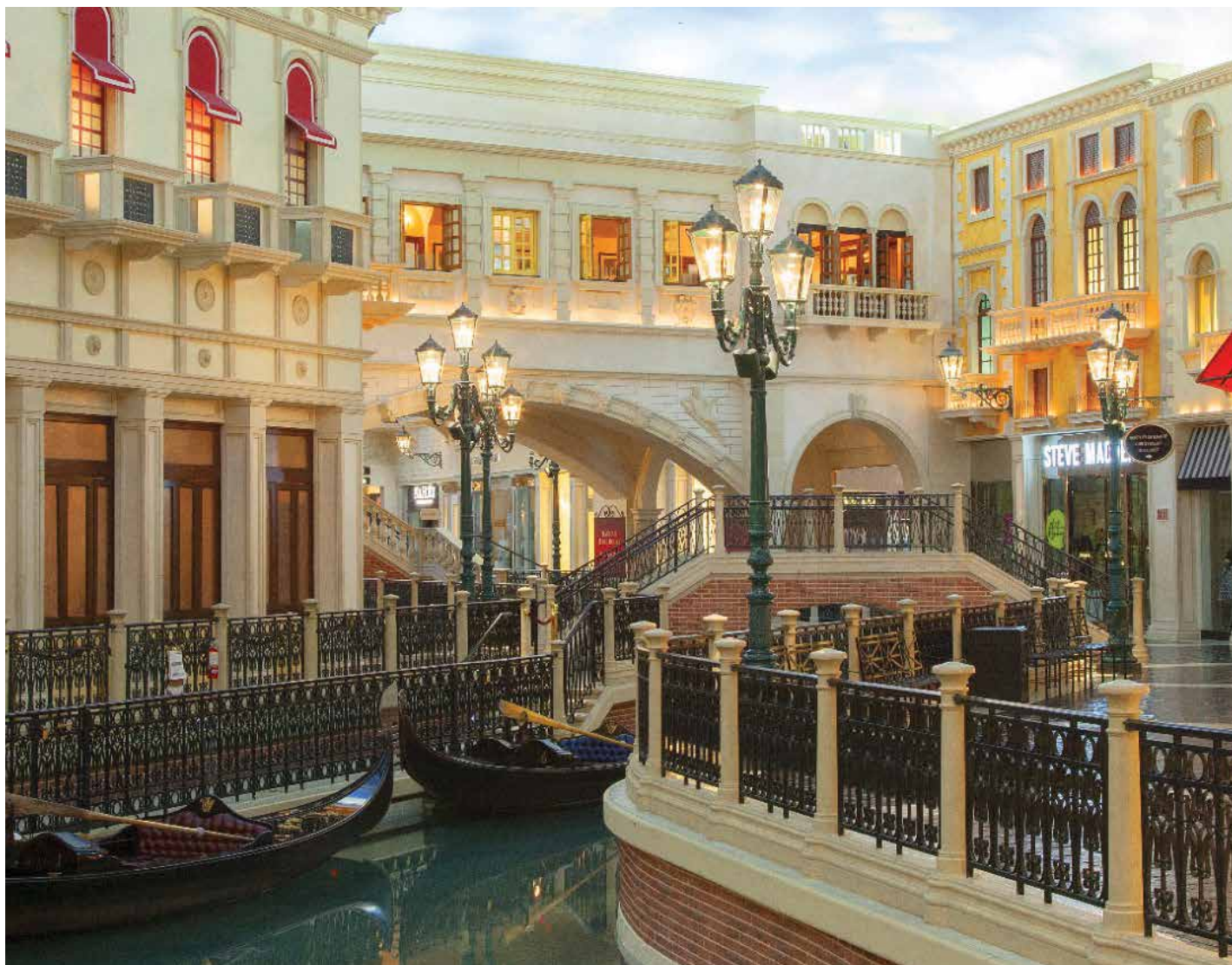
Were you an advocate for solar energy when your hotel first looked into solar?

Yes I was. It made perfect sense to take full advantage of the cost savings opportunities since the initial or upfront costs have decreased to the point that the rewards from expending the capital to acquire these systems is quickly recovered by the saving realized from their use.

I am a fan of any new energy saving ideas no matter how big or how small. We are continually looking for ways to expand, upgrade and or modernize our current systems, to take full advantage of the ever changing and forward looking technologies that will take us into the future.

What is it like having a man-made canal running through your hotel? What are some challenges you and your team has to deal with in regards to that?

Our indoor canal is not only indoor, but on the second floor as well. The casino and restaurants are under the canal. Because of the popularity of





“The very top priority for our staff is to ensure that we provide the best possible environment for our guests and team members.”

the indoor gondola experience, our window of opportunity to do maintenance on the canal is somewhat limited. One of the challenges that this presents is keeping the integrity of the water proofing intact. Building settling and movement along with the oars that the gondoliers use to propel and steer the gondolas through the canal sometime impact the sides of the canal potentially causing issues with the water seal of the canal. Fortunately we do have secondary containment of the canal and an aggressive maintenance program.

Do the Venetian’s canals use recycled water? How often are the canals or the water cleaned?

We have the only nuisance ground water recovery system on the Strip, consisting of a Nano water filtering system that has enabled The Palazzo to be 100 percent off the grid for irrigation. In addition to supplying all of the water for our irrigation we also use the Nano filtered water in our outside water fountains and displays. We are currently looking for ways to expand the use of our Nano filtered water possibly to include the outside canal in the future. Water quality testing and treatment is conducted every day to ensure that the water quality meets all locally mandated standards as well as our own high standards of water quality.

You’ve mentioned that you learned that a certain type of underground drain pipe doesn’t belong in Nevada. Can you talk about that and how you acquired that knowledge?

We learned through good old fashioned experience. Because my team and I have worked at many different hotels and casinos in Las Vegas, we rely on our collective experience to look at and solve the many challenges that we face. With that combined knowledge and experience we learned that direct burial of cast iron pipe in this region is a bad idea.

Are cast iron drain pipes still being installed in new Las Vegas buildings? Why or why not?

Yes, but here at The Venetian, we do not. Our standard now is to use, depending upon application, a product called green pipe, stainless steel or an approved under-ground PVC pipe. Green pipe is cast iron pipe coated both inside and outside of the pipe with an epoxy coating there by protecting the cast iron pipe from the elements that corrode and erode the unprotected cast iron pipe. The stainless steel pipe is used for our grease lines and in sensitive areas where a potential leak could cause significant loss of revenue or have a negative guest impact. In most burial installations we now will utilize an approved PVC system.

Did the Venetian initially have cast iron drain pipes? If so, what changes or renovations have you made to prevent those pipes from eroding or breaking?

When we opened The Venetian, cast iron pipe was used extensively throughout the property. Over the years, we have been systematically replac-

ing where we can the cast iron pipe with green pipe and stainless steel pipe while utilizing different pipe lining or coating systems where it was not in our best interest to dig up large areas to replace the old cast iron pipe that was buried in the ground.

Let's switch gears to financials, because you're obviously dealing with a much much larger budget than our average readers. Can you say what your approximate yearly facilities budget is and what types of projects does the majority of your facilities budget go to?

The facilities budget is complex and covers the full spectrum of activities that one would expect for one of the world's largest integrated facilities. As with most operations comparable to ours, the

budget is split between capital and operational budgets. The majority of the capital budget is set aside for projects such as suite renovations, guest facing improvements to include FF&E and heart of house infrastructure improvements such as M.E.P. (Mechanical, Electrical, Plumbing) upgrades. The majority of the operational budget goes to utilities such as gas, electrical, trash removal, sewer and water. In addition, the operational budget also covers payroll, routine maintenance, supplies, responding to guest calls and normal operational costs that support 225,000 square feet of casino space, 1.8 million square feet of meeting room and convention space, and a combined 18 million square feet for the entire campus, plus or minus a few square feet.



What is the most expensive piece of the Venetian's property to maintain?

When you drill down to what is the most single expensive component of the property to maintain the answer might surprise you. Elevator and escalators are the most single component to maintain. Believe it or not, we have a total of 215 elevators, 65 escalators and 9 moving walkways on our campus. All of which require a lot of maintenance due to the sheer volume of people that utilize this equipment.

“These solar systems were integrated into our operating systems for the purpose of achieving not only a reduction in utility costs, but as a component of our total infrastructure to reach our LEEDS certification goals.”

What makes the elevators and escalators the most difficult to maintain? What kind of system do you have in place or what technology does your team use to ease the burden of maintaining them?

Because most of our elevators and escalators are in operation 24/7, combined with the high volume of guests that use them, they experience a lot of wear and tear. This condition normally shortens the overall life of the equipment. Most properties have scheduled down time each day as business demands allow them to be turned off. To combat this we have a proven preventative maintenance program combined with a fast response teams that are on property most of the time.

You have an astounding number of elevators and escalators in that hotel! When one breaks to the point of not operating, is it top-priority for your staff to fix it, or do guests find other ways to get around and your staff conducts repairs at a convenient time?

Because our mission is to ensure that our guests have an unmatched guest experience while they are here with us, we ensure that when one of our guest elevators is out of service for whatever reason, it receives immediate attention so that the guest impact is minimal. We have trained elevator technicians on property every day and on call 24 / 7, 365 days a year. In addition, all of our hotel towers have multiple elevators within each elevator

an escalator goes down so we keep a close eye on them to ensure that they all are operational and when one does go down we respond quickly and efficiently to get them back up and running. Fortunately we have elevators and stairs near each of our escalators, thus providing our guests an alternative while the escalators are being repaired.

What repair services would be considered top-priority for your engineering and facilities staff?

The very top priority for our staff is to ensure that we provide the best possible environment for our guests and team members. What that means is we are forever monitoring and proactively maintaining this facility to run at peak efficiency, provide a safe and clean environment that exceeds both our internal and external guest's expectations. Each part of the team performing their tasks to the best of their ability, all working together as a cohesive unit to achieve the same goal every day which means we are constantly refreshing the physical condition of the property so that we achieve our excellence levels and standards.

Is your hotel's electricity or water bills higher and what does the Venetian do to minimize wasted electricity/water?

Electricity costs are our highest of the basic utility costs followed by sanitation (sewer and trash), gas and water in that order. Because of our green initiatives and commitment to being eco-friendly, we make a conscious effort to reduce our consumption in all areas of

“The Venetian established a new paradigm by creating the first fully integrated mega-resort in Las Vegas.”

our utilities. We have an aggressive program to maintain our LEEDS certificates by continually looking for new products and processes that will deliver the sustainability goals of the corporation. Over the last five years we have made significant progress by reducing our utility consumption and increasing our recycling.

Over the last five year period we have realized a 28 percent decrease in our utility costs as a direct result of our combined conservation, LEEDS and sustainability efforts. Our electrical consumption was decreased by 25 percent, heating and cooking energy consumption was reduced by 16 percent. Our green initiatives produced “Waste to Landfill” that highlights a diversion rate increase from 43 percent to almost 56 percent with a waste to land fill of 32 percent over the same five year period.

What are the LEED rating levels for the Venetian and Palazzo?

The Palazzo is LEED Certified Silver for New Construction. The Sands Expo and Venetian Congress Center and Meeting Rooms are Certified Gold.

What parts of the hotel use the most electricity?

By far the largest single component of our facility that consumes the greatest amount of electricity is our central plant or HVAC systems. We have a huge infrastructure of chillers and pumps that produce and distributes 33,500 tons of chill water to every part of the building to provide conditioned air to every corner of the facility.

Does the Venetian use RFID door lock technology? If so – why did your hotel switch and do you like them over swipe cards?

Yes we do. In fact we are in the middle of an extensive retrofit of our entire property. The enhanced flexibility and reporting capabilities of these systems help create a much safer and secure environment for our team members and guests.

It seems like cleaning and other mundane tasks for average hotels are a big hassle for Las Vegas hotels. How often are the floors/carpet inside the Venetian cleaned? And when is it possible to do that?

Unfortunately, for years Las Vegas has had the reputation of being a collection of dimly-lit casinos that hustled you through with cheap food and cheap booze. But for most casinos here today, nothing could be further from the truth.



The Venetian established a new paradigm by creating the first fully integrated mega-resort in Las Vegas. From the very beginning here at The Venetian and The Palazzo, we have set the highest standards of cleanliness in all areas of our campus. We take great pride in our surroundings as we embrace the challenge of keeping The Venetian and The Palazzo impeccably neat and clean. All carpeted areas are vacuumed at least once a day and more frequent in high traffic areas and where necessary. We continually shampoo different areas of the facility on a daily basis. The marble and stone areas are mopped daily and waxed or sealed on a systematic routine. The majority of the deep cleaning in the casino and convention space is done in the wee hours of the morning and during the day in the hotel towers. Even during busy weekend days, the cleaning never stops. There is an invisible army of dedicated team members tirelessly working to ensure that this property looks and feels fresh and the best that it possibly can.

What is a renovation or upgrade that the Venetian doesn't have, but is one that you believe would greatly benefit the hotel?



The Venetian and The Palazzo is continually in the process of renovation. We persistently seek to keep this facility fresh and new for our guests. It is our mission to ensure that our guests always feel not only safe and secure but awed by the physical beauty of the property.

Is there a renovation or construction project the Venetian has undergone that you want to talk about?

We are nearing the end of our suite renovation project in The Palazzo tower. As you know here at The Venetian and The Palazzo every room is a suite and due to the high occupancy rates that we enjoy it is necessary to routinely renovate our suite products so that our guests get the experience they dreamed of. Each renovation brings new colors and textures as well as the leading technology to our suites all designed to enhance our guests stay.

What is the most important lesson that working at the Venetian has taught you?

It is my belief that the single most important thing that I have learned in my 20 plus years here is this one simple truth: you can have the most awe-inspiring breathtaking, beautiful building with the most luxurious amenities and surroundings, but the one thing that makes your guests want to come back is the level of guest service. If you're not in this

business to provide exceptional guest service to each and every guest, day in and day out, you're in the wrong business. The guests want to have fun and feel special, and they want to feel that they got more than what they paid for and it's our responsibility to not only meet but exceed those expectations.

Do you have any funny on-the-job stories or lessons learned that you'd like to share?

One of the many challenges that we faced when opening The Venetian was what color we wanted the water in the canals to be. It was our desire to make the total experience match the feel of being in Venice. It is safe to say that we went through a multitude of different colors and color densities before hitting upon the current solution.

In our effort to keep up on cutting edge technology we had the opportunity to try a new product on the indoor canal that if it worked as described would save us a lot of money in maintenance costs. So we agreed to try the product. The morning after we applied the product, the entire canal had turned a horrible green and we had to scramble to get the canal back to its original color prior to opening the gondola rides that morning. It wasn't funny at the time, but is humorous when I think about it now.

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Fire Protection and Life Safety in the Hotel Industry

by Byron L. Briese, P.E.



Grenfell Tower London, UK June 2017

Recent tragic residential fire incidents point to the need for building owners, managers and operators to have effective fire safety programs in-place. For hotel operations, Engineering Departments play a crucial role in the safe operation of buildings; a significant responsibility is to insure proper fire safety measures are provided and maintained.

“Several decades ago, the American hotel industry learned hard and in many ways similar lessons of the Grenfell Tower incident.”

The fire incident in mid-June at London’s Grenfell Tower followed a month later by the Marco Polo Condominium fire in Honolulu resulted in significant life loss and injuries. Each incident delivered hard lessons to those concerned with operating any style of residential facility including hotels.

Grenfell Towers is a landmark incident as a small fire in a high-rise residential building, apparently originating with a household appliance, led to significant involvement of combustible exterior cladding. The fire claimed an estimated 80 victims with still more injured.

The public outcry in the aftermath of the fire has raised questions regarding the competency of those involved with a recent renovation of the building. The effectiveness of building management and the role of government officials particularly regarding the emergency response to the fire have been placed in question.





Fatal Hotel Fire 1996

AMERICAN HOTEL INDUSTRY - LESSONS OF THE 1970s AND 1980s

Several decades ago, the American hotel industry learned hard and in many ways similar lessons of the Grenfell Tower incident. Numerous devastating, high lifeloss lodging fires occurred in the 1970s and 1980s. These included well-known fire incidents at the MGM Grand Hotel in Las Vegas, NV (1980, 85 fatalities) and Dupont Plaza Hotel in San Juan, PR (1986, 97 fatalities). Other, less-known fire incidents occurred in Tucson, AZ at the Pioneer Hotel (1970, 28 fatalities) and the Stouffers Inn in Westchester, NY (1980, 26 fatalities).

In those decades, following similar patterns of previous years, fatal fire incidents occurred regularly in US hotels and motels. The current edition of the National Fire Protection Association's (NFPA) Fire Protection Handbook provides a summary table listing seventeen hotel fire incidents in those decades claiming ten or more lives. In these incidents over 400 individuals lost their lives. Other tragic hotel fires, claiming smaller numbers of casualties, occurred all too often.

The early 1980s incidents coincided with an expansion of news coverage (the "24/7 news-cycle"). As a result, the informed and increasingly mobile traveling public became concerned for their safety in hotels and motels.



Aftermath of Fatal Hotel Fire 1996

THE RESPONSE

Building and Fire Officials along with the Lodging industry acted. Many codes were found deficient with respect to requirements for the protection of hotel occupants.

While there was not always unanimous agreement with the solutions, by 1988 NFPA's Life Safety Code (NFPA 101) contained mandatory automatic sprinkler requirements for hotels.

By 1990, the model codes used to form most state and municipal fire and building codes also included mandatory sprinkler requirements for hotels. Importantly, mandatory life safety retrofit requirements were enacted in many large jurisdictions and hotelier's brand standards began to reflect updated, important fire-safety provisions.

Engaging the buying power of the Federal Government to push needed upgrades in hotels, Congress passed the Hotel and Motel Fire Safety Act of 1990. The Act required federal agencies to ensure that a significant portion of their employees traveling on official business stayed in sprinkler protected lodging facilities.

Table 20.3.1 NFPA Handbook, 20th Edition, National Fire Protection Association, 2008

APPLICATION OF TECHNOLOGY

The fire incidents of the early 1980s coincided with general technology and computational advances provided from Silicon Valley. Difficult, time-consuming or previously impractical calculations could now be completed in short order. These were coupled to a number of key developments that assisted in providing solutions.

- Technical quantification of fire phenomena advanced markedly resulting in modeling capability that could predict fire growth and activation of mitigating measures such as an automatic sprinkler. The physical shrinking and cost reduction in computer power allowed these advances to be applied by fire protection practitioners.
- Fire detection technology advanced rapidly starting in the 1970s providing useful, relatively low cost, fire warning capability that could be applied to new as well as existing hotels.
- The development of affordable microprocessors yielded results in the fire alarm controls arena with the development of new fire alarm control equipment and software. This permitted sophisticated control of life safety functions and reliable interfaces to other building systems such as elevators and HVAC equipment.
- Advances were also made in the understanding of the response of automatic sprinklers to fires. Previously, designers had a limited array of sprinklers to apply as solutions and most were focused on property protection. Over time, sprinklers were developed to react early in a fire incident to achieve lifesafety goals.
- Studies of fire incidents, including several of the hotel fires listed above, yielded insight into behavioral patterns of individuals during a building emergency. These understandings have led to improved criteria for building exit needs.

The list is not exhaustive; other factors and developments occurred (and continue to evolve) that have influenced the design and operation of modern hotels. From passive features such as fire walls and doors to protective systems including automatic sprinkler and fire alarm systems; the life safety features of a typical hotel in the US today bears little resemblance to a property of decades ago.

"The Hotel and Motel Fire Safety Act of 1990 required federal agencies to ensure that a significant portion of their employees traveling on official business stayed in sprinkler protected lodging facilities."



"The life safety features of a typical hotel in the US today bears little resemblance to a property of decades ago."

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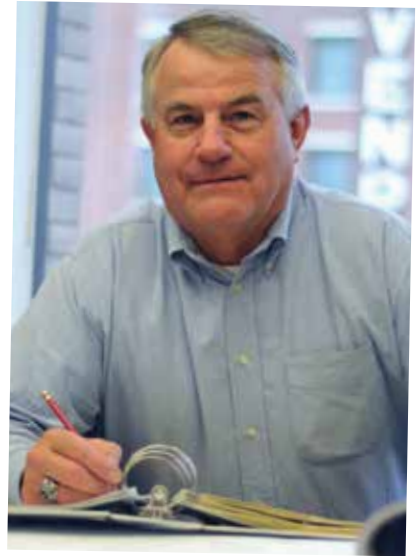
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Maintaining the Gains

When faced with the equivalent of many Grenfell Towers; the lodging industry answered the call. Investments of time and treasure were made to advance the cause of effective fire protection in hotels. A role for the Hotel Engineer is to maintain hotels in an effective posture to respond to an incident and adequately protect guests and hotel workers.

To assist the Engineer with these challenges, this article kicks-off a series of articles by experts on particular protective systems and related fire protection subjects. The series has several goals:

- 1. To present the rationale for the various protective systems and equipment that you find in your hotel. We will endeavor to show how these various constituent parts added together form a reliable, protective package. The concept of “reliability” is important and will be covered in the series.*
- 2. Present an understanding that protective systems react to a fire incident; they are no substitute for sound fire prevention. The fire that does not start is the “best” fire.*
- 3. To show that reliance on a single protective system or building feature is not sound. Simply put, the fire protection features found in a modern hotel offer “defense in depth” for building occupants and their state of readiness is vital.*
- 4. Fire protection systems must be ready to effectively function on a 24/7 basis. Inspection, testing and maintenance of these systems, and related fire protection features, are daily functions for all Hotel Engineers. Your leadership and example in this area will have an impact on other staff members. Accepting mediocre life safety is not a prudent way to operate a hotel.*



Byron L. Briese, P.E.

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W

hen hotel and lodging executives and engineers set out to research a new vehicle fleet, golf cars often are the first to come to mind. And while these vehicles are functional, they may not be as versatile to help staff meet their daily demands. A fleet should be comprised of personnel shuttles, utility vehicles, golf cars (if your resort has a golf course) and food and beverage cars to maximize productivity. With so many options and vehicle types on the market, selecting the right vehicle to support the task can be a challenge.

Finding a rugged, versatile and dependable vehicle fleet used to keep Dave Minser up at night. Dave is the head engineer responsible

“The dependability and durability of fleet vehicles is paramount to making your resort work.”

for keeping the prestigious Auberge du Soleil resort running without problems. The resort relies on a fleet of mixed powertrain options to cover a wider variety of applications. His fleet of utility vehicles and guest transport vehicles keeps operations moving seamlessly on the 33-acre resort, located in hilly Napa Valley.

“The dependability and durability of fleet vehicles is paramount to making your resort work,” said Minser the Director of Engineering at Auberge du Soleil.

Vehicle brands are moving away from the “one-size-fits-all” model and encouraging users to customize their fleet. Doing so empowers everyone to meet the day’s demands from the front of the house to the back of the house – delivering exceptional service and a world-class experience to guests. It takes careful thought and consideration to invest in the right equipment to help service teams deliver an unforgettable guest experience. Before submitting an order for a vehicle fleet, here are a few considerations to keep in mind.

The Auberge du Soleil is nestled in an olive grove on the slopes of Rutherford Hill in Napa Valley



Vehicles that feature the innovative IntelliBrake™ System are more efficient, easier to use and provide better value.

POWER

An important factor to consider in selecting any fleet is the powertrain. Today, manufacturers are rolling out a selection of diesel, gas and electric models – all of which deliver high performance in their own way.

It's a misnomer that electric vehicles don't offer serious power and range. There are electric vehicles on the market that offer 48-volt and 72-volt powertrain options, providing vehicle ranges in excess of 50+ miles on a single charge. With load capacities ranging from 800 to 1,200 pounds and the ability to tow as much as 1,500 pounds, these energy-efficient vehicles ensure you can get the job done quickly and quietly. Beyond quiet and clean operation, electric vehicles may also offer some unexpected advantages. For instance, the 72V AC electric Cushman® Haul-

er® PRO utility vehicle can be equipped with the patented IntelliBrake™ system. IntelliBrake encompasses two technologies: a motor brake that automatically slows the vehicle when traveling up or down steep grades and a parking brake that automatically engages when the vehicle stops. This system also delivers full-time regenerative braking, redirecting energy back into the vehicle's batteries whenever the brakes are applied, recharging the batteries during use and further extending the vehicle's energy efficiency and range.

With load capacities up to 1,600 pounds and the capability to tow up to 2,000 pounds, and 4-wheel drive capability, medium- and heavy-duty diesel and gas-powered vehicles can allow a crew to haul more cargo and tow heavier loads, while traversing tougher terrains. They also offer the benefit of being able to refuel on the go in locations that offer limited opportunities to charge an electric vehicle.



"The vehicle fleet runs from sun up to sun down without issue. Dependability is key for smooth operations." - Auberge du Soleil



Rain enclosure kits ensure guests will be dry and comfortable during special events.

SOLUTIONS FOR GUEST SERVICES

Personal transportation vehicles (PTVs) offer a variety of options for transporting guests and gear. Some feature two seats and a deep cargo bed, while others include a convertible rear seat, which gives the driver the option to carry two extra people or fold it down for cargo space. For larger groups of guests, consider vehicles that offer seating for six to eight.

If you will be transporting guests sunrise to sunset, rain or shine, invest in accessories. Upgrading PTVs with items such as lights, Bluetooth® speakers, loading handles or optional weather accessories like a windshield, sun top or a rain enclosure kit, will enhance the traveling experience for guests.

At Auberge du Soleil, bellmen depend on transportation vehicles to safely transport guests and their luggage. Guests' possessions are conveniently loaded on the cargo deck and passengers comfortably ride from the guest reception building to their guest room located nearby on a private level of the hotel.

“Our guest services fleet provides safe and efficient transport for people and products throughout the property,” said Minser. “Because of our hillside location we have many stairs leading to various locations from the restaurant, to the guest rooms to the spa. These vehicles allow us to extend an added level of convenience and service for our guests so we can easily take them from point A to point B at a moment’s notice.”

“Our engineers carry all their tools on UTVs to take care of service calls,” Minser said. “We use them to move furniture when we have events down in the lower areas of the property.”



LANDSCAPING

Grounds crews rely on the versatility and carrying capacity that utility vehicles, or UTVs, offer to get the job done.

New UTVs come with extensive accessory options to help workers transport trimmers, edgers, leaf blowers, hoses and bags of fertilizer – all while towing a mower or other large equipment. Many resorts are choosing higher-capacity cargo beds and adding options such as hydraulic power beds to make hauling mulch or dirt easier and safer. And, unlike a truck, UTVs are more nimble and lighter weight, enabling operators to move heavy loads to a variety of places with less damage to the grounds that they work hard to maintain.



Evaluate the versatility of any utility vehicle to make sure it meets all of the carrying needs of a resort.

Functionality on many new utility vehicles can be enhanced with the addition of accessories such as:

- Bed Dividers
- Brush Guard
- Cargo Mesh Netting
- Improved Surface Tires
- L-Track Aluminum Bed System
- Rearview Mirror
- Weather Enclosure
- Brake and Tail Lights
- Canopy Storage Net
- Ladder/Hoop Rack

***“Our engineers carry all their tools on UTV’s to take care of service calls,” Minser said.
“We use them to move furniture when we have events down in the lower areas of the property.”***

HOSPITALITY

Hospitality crews depend on the deep cargo bed storage that their UTV fleet offers to deliver clean towels, sheets, extra pillows, blankets or the occasional rollout bed to guests. Supporting late-night room service orders is no worry for the food service team at Auberge du Soleil. They elected to add a customized insulated van box onto the back of their UTV enabling them to deliver hot meals promptly.

DINING SERVICES

Food and beverage cars are an excellent way to extend merchandising efforts to guests. These types of vehicles can be customized with deep storage drawers perfect for delivering cold or hot beverages. Another popular option are vertical shelf spaces for onsite impulse purchases of hats, sweat-shirts, bags of chips or other snacks. Some food and beverage vehicles even offer modules to include a keg – making this an ideal vehicle to deliver services during any special event at your site.



An insulated van box and cargo storage boxes can be added to a UTV to increase versatility ensuring the vehicle helps get the job done.

“Interactions will be higher, and your customer service times are going to be better – all of that really adds up when you have the fleet available to do the job you need to do. And to be able to customize them for each department is very important too,” Minser said.

It is also helpful to talk with someone who can answer your questions and help guide you to the right vehicle.

INVESTIGATING SERVICE SUPPORT

There is more to consider beyond the versatility of the vehicle. Be sure to evaluate the OEM’s warranty and aftermarket support. Some manufacturers offer skilled tech support teams to provide onsite vehicle maintenance.

TAKE TIME TO RESEARCH DEALERS BECAUSE THERE ARE MANY FACTORS TO CONSIDER SUCH AS:

Does the dealer offer mobile services or service on-site at the dealership only?

What type of financing or leasing options do they offer?

Do they have a buyback program?

If you need the assistance of a specific vehicle, such as a UTV for only a short time, ask if there is a rental opportunity available through your dealer that would better suit your needs.

By investing in the right fleet to fulfill your needs, Minser says your guests won’t forget you.

CHECK LIST:

When selecting the right vehicle for your resort’s needs, ask yourself:

WHAT IS IT BEING USED FOR?

- ✓ Carrying lots of guests – personnel transport vehicles.
- ✓ Hauling heavy loads of dirt, mulch, tables and other equipment.
- ✓ Transporting beverages and food out onto the property.

• ARE THERE ANY UNIQUE CHALLENGES THAT YOU NEED THE VEHICLE TO HELP WITH?

• HOW MANY PEOPLE WILL RIDE IN THE VEHICLE?

• WHAT IS THE BUDGET?

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Pests During Hotel Renovations

Keep Uninvited Guests Out During Your Next Remodel



by **GLEN RAMSEY, B.C.E.**
TECHNICAL SERVICES
DIRECTOR, ORKIN, LLC

While inspecting your hotel, you begin noticing chipped paint and ragged upholstery, and you realize it's time for an upgrade. A renovation is sure to boost your property's value and enhance your guest experience, but can be a complex process - and one aspect to remember to plan for is pest management.

Without a plan, pest management can fall behind during renovations because your hotel's normal sanitation, maintenance and treatment routines are disrupted. Plus, construction sites are alluring to cockroaches, rodents, flies and other pests due to pools of standing water, piles of construction materials and leftover lunches from construction workers.

The type of pests that appear during construction depends largely on where your property is located, seasonal conditions and type of renovations. But no matter which pests check in to your hotel, they can be detrimental to your reputation and bottom line. And when your hotel is under construction, you're already vulnerable to more negative online reviews.

So, before starting your renovation project, take a minute to review these tips on how to keep pests away from your hotel - and ultimately away from TripAdvisor as well.

before renovation

To start, meet with your licensed pest management professional to walk through construction plans and some preventive steps during construction. Consider the following tips:

- Aim to begin construction during the driest season of the year. This will decrease the chance of pests nesting in wet building materials.
- Before you start construction, clean up areas of your property that often go unnoticed and do preventive maintenance there.
- Evaluate pest activity before construction to identify how to best eliminate existing pest populations.
- Put in place pest monitoring systems to determine which pests are located around your property and how large of a population lives there.

■ After furniture is removed and rooms are emptied out, this is a perfect time to do deeper treatments - such as using a fertility disrupting product on walls or rugs - to reduce pest populations before construction and to eliminate potential infestations in the long-run.

■ Be aware of a neighboring property undergoing construction, as disrupted pests might run to your property seeking new shelter. Always monitor the property line to prevent new infestations.

■ If you plan to lay a concrete foundation in high termite pressure areas, be sure to coordinate a pre-treatment for termites beforehand.



"Install LED lights outside your building instead of mercury vapor or florescent lights since pests are attracted less to LED bulbs."



during renovation

It's no doubt that construction brings a lot of change to your environment. There are new people, new workers and new tools that can appeal to unwanted guests. Take these steps to minimize pest disturbances:

- Standing water is a haven for mosquitoes and moist areas can attract termites. Be sure to properly grade your property to prevent puddles from forming around your foundation.
- Install LED lights outside your building instead of mercury vapor or florescent lights since pests are attracted less to LED bulbs.
- Strategically place bait stations around your property to help prevent rodents from reaching your hotel.
- Use non-cellulose building supplies to decrease your chance of termites and apply a preventive termite treatment to new structures. Ask your pest management professional for treatment recommendations.
- Keep your construction site as clean as you can - food droppings and drinks provide a yummy, all-inclusive buffet for pests.
- Cover up all building materials at the end of each day to protect them from the elements. Remember that wet building materials are perfect homes for many pests.
- Watch out for fire ant hills after heavy rains. Wet conditions can easily increase ant numbers at the ground surface and can become a hazard.

after renovation

Congratulations! You've made it through a long process and have a beautiful property to show for it. Now you're ready to start over with a regular pest management routine. But before checking in guests, have a pest management professional assess your property and create a new plan. Keep the following suggestions in mind:

- Work with your pest management professional to update your Integrated Pest Management program. He or she will know which pests are in your area and which new ones to watch for. IPM is a process that emphasizes non-chemical techniques to keep pests out, with chemical solutions only implemented as a last resort.
- Use an HVAC professional to create a positive airflow in the building. When doors open, air should push flying insects out and not suck them into the building.
- Ensure new landscape plants stay trimmed away from the building as they can encourage excessive moisture and hide pest activity, as well as serve as a foot-bridge for pests to access the building.
- Avoid planting fruit-bearing trees and flowering plants near your hotel, as they can attract flies, yellow jackets, rodents and other pests.

One experience with an insect or rodent is enough to disgust guests and encourage scathing online reviews. But by planning ahead and following these recommended sanitation procedures

for renovations, they will help you keep pests at bay during construction and keep guests coming back for more of your hospitality.

Glen Ramsey is Technical Services Director for Orkin. He is a board-certified entomologist and provides technical support and guidance across all Rollins brands in the areas of training and education, operations, and marketing. For more information, email gramsey1@rollins.com or visit www.orkincommercial.com.

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Bringing Hotel Wi-Fi Up to Speed with Guest Expectations:

How in-room access point technology is proving that a fast and seamless online experience is not just about bandwidth.

Reprint of White Paper
by
Hotel Internet Services
Gary Patrick, CEO



**Hotel
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Bringing Hotel Wi-Fi Up to Speed with Guest Expectations:

How in-room access point technology is proving that a fast and seamless online experience is not just about bandwidth.

Ask hotel guests today what is most important when it comes to hotel amenities, and more often than not you will find that the presence of guest Wi-Fi ranks highly among responses. Since the enormous surge of personal mobile devices, more than 64 percent of Americans now claim ownership of a smartphone¹, and mainstream consumers increasingly view connectivity as more of a lifestyle than a mere type of technology.² For the average traveler, such an outlook continues to hold equally true, with surveys such as one undertaken by Hyatt Place Hotels demonstrating that 59 percent of guests considered complimentary Wi-Fi to be most important among amenity needs.³ But more than simply providing guests with internet accessibility, hoteliers are also learning the critical necessity of offering high quality service. Research performed by Research+Data for instance, indicated that 80 percent of economy travelers garnered a favorable opinion of a property when free Wi-Fi could be offered at guaranteed speeds.⁴ Additional research gathered via TripAdvisor further proved that while the presence of Wi-Fi is most important to today's guests, a poor connectivity experience played the largest factor in diminishing five star reviews.⁵ Hospitality professionals around the world, as a result, are understandably prioritizing the need to enhance their networks, with 45 percent of hotels indicating a preference to focus spending on improving bandwidth.⁶



However, despite the longstanding and widespread belief that more bandwidth automatically equals a seamless online guest experience, the reality of a hotel's internet connectivity woes often comes down to the issue of Wi-Fi signal strength. Since becoming a common service offered by hotels, Wi-Fi signals have traditionally been transmitted to guestrooms via the use of hallway access points (APs); boxes connected to a property's network with the task of streaming data back and forth for numerous rooms, sometimes on multiple floors. When first implemented by the industry, such a solution not only proved

practical due to the cost-effectiveness of having a single access point working to serve multiple guests, but it also served as an adequate means of providing internet access to guests predominantly using laptop computers at the time. However, as guest preferences shifted more to toward traveling with mobile devices, such as tablets and smartphones, weaker, shorter and fewer Wi-Fi antennas used by such platforms meant that signals being transmitted over longer distances became

80% of economy travelers
garnered a favorable
opinion of a property
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- 1 <http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/>
- 2 http://www.huffingtonpost.com/daniel-newman/mobile-is-a-lifestyle-not_b_7151508.html
- 3 <http://www.refinery29.com/2015/04/85427/secret-travel-behavior-hyatt-survey>
- 4 <http://www.hotelnewsresource.com/article90435.html>
- 5 <https://www.revinate.com/blog/2014/01/why-wi-fi-is-keeping-hotels-from-receiving-5-star-reviews/>
- 6 <http://hospitalitytechnology.edgl.com/news/6-Mega-Trends-in-Hotel-Technology105033>

increasingly prone to interference and weak reception strength. While seemingly a complex issue for hotels to overcome, hospitality professionals are discovering that by simply making the switch to in-room APs, today's guests are able to finally receive a more intimate Wi-Fi experience that is capable of fully addressing the most demanding of connectivity needs.

Dispelling the in-room access point myths

Not necessarily a new technology, in-room access points have received been a topic of consternation for hoteliers in the past. Often, a property's reasoning for deciding against the use of in-room APs lay with the simple fact that they could be either tampered with or stolen by guests. Yet with the release of newer models, such concerns have largely been addressed. Once having to frequently dispatch staff to reconnect APs inadvertently unplugged by guests, hotels using modern in-room APs are able to benefit from platforms that receive electrical power from the same cable used to transmit data. Issues such as rebooting or troubleshooting can additionally be accomplished remotely without disturbing guests. Mounted directly onto existing data jack wall plates with reinforced security brackets, more recent versions are also very unlikely to be lost to theft, if even noticed at all due to their considerably small size.



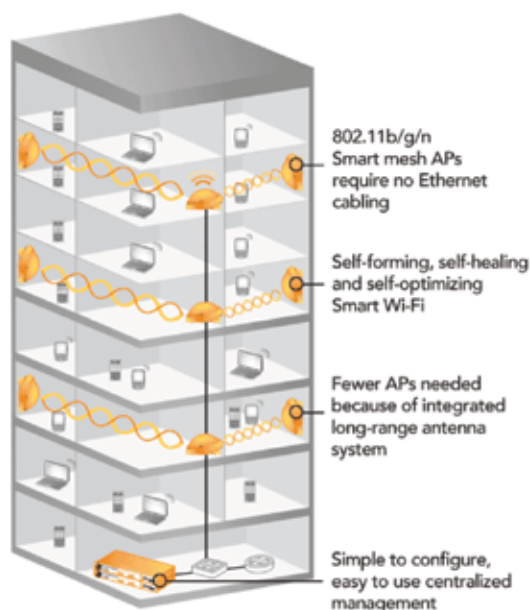
With expense understandably playing a role in hotelier decisions on AP type, the fact of having to purchase more units as opposed to just one that could cover multiple areas, also certainly made hallway APs appear to be the better choice for guest Wi-Fi. However, not every guestroom requires its own AP when opting to choose the in-room route. For the more budget conscious, an in-room AP can potentially cover three to six guestrooms and still provide users with a high quality online experience. While some will argue that installing in-room APs nonetheless necessitates buying more units, hoteliers should consider the fact that hallways APs are typically sold at a significantly higher price individually; all the while offering far lower quality of service.

Lastly, those with a greater concern about overall cost may also point to the fact that many existing properties lack the necessary Ethernet wiring, due to being constructed before the rise of Wi-Fi. Fortunately for such hotels, alternative infrastructure technology, such as utilizing existing telephone lines, can achieve the same enhanced result. With today's hotel reputations increasingly hinging on the ability to provide a first-rate guest Wi-Fi experience, the need to maintain an internet infrastructure capable of accommodating devices that demand ever greater speeds is critical to ensuring continued bookings. By investing in suitable equipment from the start, hoteliers are far less likely to be in a position where they need to make costly upgrades on a regular basis, just to keep up with minimal expectations.



When comparing in-room vs. hallway APs, there simply is no comparison

With newer Wi-Fi standards being issued by the IEEE, the case for implementing in-room access points has only grown stronger. Initially launched with a capability of 11 megabits per second (mbps), successive standards have seen speeds increase significantly to where today, gigabits



per second (Gbps) has become the latest answer to accommodating demands for uninterrupted internet use; be it for downloading ever larger files or streaming content seamlessly. However, for hotels to be even capable of offering such speeds, guest devices must have access to an intimate connection with property APs; one that is close in proximity and with minimal interference from other APs or devices located throughout the premises. As previously mentioned, the vast majority of smartphones and tablets simply cannot communicate with hallway APs in this manner in order to achieve a satisfactory connection, much less obtain faster speeds. Consequently, In-room APs are able to provide an optimal solution where interference is at a minimal due to fewer devices communicating with the same unit, alongside substantially reduced distances that data has to travel over.

As hallway APs are often designed to send strong signals out in order to reach as many rooms as possible, hotel guest devices can typically suffer from incessant interference from APs located on other floors, leading to far slower performance and dropped connections. By being located within guestrooms, in-room APs alternatively are able to use hotel walls and other infrastructure to circumvent the issue. By also using a signal strength that is considerably weaker, in-room APs are able to offset the problem of interference even further, vastly improving speeds and ultimately ensuring guest satisfaction.

In-room APs: not just for guest use

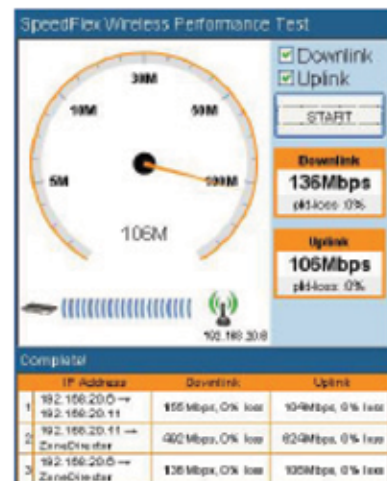
Perhaps one of the biggest game changers to have impacted hospitality has been the arrival of the Internet of Things (IoT). From wireless door locks, to mini bars, to security and staff communication systems, today's hotels are leveraging the advantages of connectivity to reach a level of efficiency that the industry has never seen before. By combining such solutions to run on one network, hoteliers are not only able to be more cost effective, they are able to gain a host of additional benefits from platforms able to communicate and share data with one another. Yet as with guest internet connectivity, the ability to



successfully maintain a connected network depends on a strong Wi-Fi signal throughout a property. Taking advantage of the same in-room AP network used by guests, hoteliers can ensure that their systems are able to draw from a consistent and reliable internet source. By working with a reputable solutions provider, hoteliers can maximize their network's in-room AP capability to ensure that guest satisfaction is not diminished by unreliable systems, yet without diminishing the quality and speed of guestroom Wi-Fi.

When installing an in-room AP network, who you work with makes a difference

As with virtually any online-based solution, the ability to implement an effective in-room AP network can significantly depend on the provider that is selected. Many companies for example are known to install dual band in-room APs, however fail to recommend or ensure that dual band coverage on both frequencies is fully in place. This all too common occurrence can unfortunately be disastrous for a property's Wi-Fi service. As guest devices often tend to automatically connect to the slower 2.4 GHz signal due to its ability to provide wider area coverage, the presence of a faster 5 GHz signal will mean that such devices will naturally attempt to connect to the better alternative as soon as it is detected. If a 5 GHz frequency is poorly implemented, guest devices that have been programmed to favor that band will often connect at 5 GHz despite there being far greater latency at that moment than on 2.4 GHz, resulting in browsing that will be painfully slow and streaming that will be choppy or pixelated. Poor 5 GHz coverage can also cause guest devices to flop between 5 GHz and 2.4 GHz connections as they teeter on the edge of a 5 GHz coverage zone, resulting in frequent connection drops. An issue created solely by the inexperienced or the careless, such circumstances can easily be avoided by hoteliers who take the time to conduct research on their service provider options. In working with a knowledgeable and reputable provider, properties can be assured of their ability to put a network in place that can maintain guest satisfaction, is cost effective and capable of addressing long term needs without frequently requiring major upgrades.



For more information on cost effective high speed Wi-Fi services for the hospitality industry, please visit www.hotelwifi.com.



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Not All Heroes Wear Capes:

Hospitality's Response to Hurricanes Harvey & Irma

by Amanda Strouse

Toward the end of the summer, the Atlantic Ocean gave birth to a string of tropical storms that eventually made their treacherous way toward the United States. Fueled by the warm waters and desecrating the islands that lay in their path, it was widely known that these hurricanes were forces to be reckoned with.

September became the most active month on record for Atlantic hurricanes. For the first time in more than 10 years, four angry Atlantic hurricanes were going to make landfall on the U.S., three of them being Category 4. September morphed into a month filled with havoc and hope. A month that many will never forget. However, the strength of the storms could not overshadow the strength of the communities and their leaders.

As you read on, you'll learn that this isn't a story about devastation. This is a story about perseverance, safety, compassion, lessons learned and guests' gratitude toward the hotels that kept them safe.

Hurricanes are nothing new for hotels operating on the east coast, the Gulf and the Caribbean. From Louisiana to Puerto Rico, all the way up past New

York, these places are visited often by hurricanes. But with these dangerous storms gaining speed and power like never before, it's important to learn how to prepare for a potentially catastrophic natural disaster before it's too late. And the best way to do so is to listen to others who have already been through it.

That's why we talked with hotel property management companies and hotels that were impacted by September's hurricanes, to learn about their preparation methods, their challenges and how they bounced back.

The Building of a Tropical Storm

All hurricanes start as a storm and then build in magnitude. To become a hurricane, the storm must have wind speeds of at least 74 mph. But even though these strong winds can move boats or tear off roofs, the most dangerous part of a hurricane is the water. Approximately 90 percent of all deaths from hurricanes are caused by flooding from rain or storm surges. The type of destruction a hurricane perpetrates upon landfall is dependent on several things, including its trajectory, wind strength, storm surge, the temperature of the water, wind shear, geographic barriers and the coastline's shape.

As Hurricane Harvey brought southeast Texas serious flooding issues, Hurricane Irma caused more wind-related damage as a result of its aggressive gusts that peaked at 185 mph. Both caused power outages, clean water shortages, sewer problems, road closures and challenges for everyone living or working in their path.

Before the powerful storms whirled their way toward the states, the forecasts put nationwide hotel management companies on high alert, helping their hotels prepare immediately. Supplies were purchased, food was stored, equipment was readied, plans were mulled over.

For those who have dealt with other hurricanes in their professional careers, they agreed that this year's hurricanes were the worst they've ever experienced.

Harvey's Impact

At the time, Hurricane Harvey was the strongest, most destructive hurricane to make landfall on the contiguous U.S. in 12 years (since Hurricane Wilma in 2005) and is also the wettest tropical cyclone that has ever been recorded in the U.S. It dumped more than three feet of rain, pushed



winds up to 130 mph, left large cities without water or electricity for days and took the lives of at least 88 Texans.

Hundreds of thousands of homes and businesses were damaged, with more than 17,000 people rescued after the hurricane and leaving more than 30,000 victims displaced. Houston, Texas, being 627 square miles, with more than 2 million people, is also home to more than 80,000 hotel rooms¹. All hotels in the Houston area and nearby counties undoubtedly prepared for Harvey the best they could, then bunkered down and waited for it to strike.

Gregg Forde, the Executive Vice President of Island Hospitality, is in charge of overseeing hotel operations for the company's 160+ properties. Island Hospitality has nearly 20 hotels that were impacted by the recent hurricanes, including six hotels in Houston. Forde said, "This past hurricane season had the largest impact on our company."

While most of Island Hospitality's Houston hotels experienced minor damage from trees, roof tiles and debris, one hotel experienced unpredictable flooding. "The bayou nearby broke, so we had an underground garage that flooded 10 feet deep in the parking lot," Forde said. "We had associate and guest vehicles that were damaged due to that flooding."





Wind was also a perpetrator of Harvey's damage, pushing rain water through air conditioning vents, ripping off roof tiles and crashing debris into windows.

Josh Murphree, Senior Engineering Manager for LBA Hospitality, provides direction, support and advice to the management company's regional engineering managers and property-level engineers. LBA Hospitality has several hotels in the Houston area and unfortunately had one-fourth of its portfolio affected by the recent hurricanes.

"Harvey stalled in the Gulf, dumping 36 inches of rain in 36 hours," Murphree said. "While there was fairly significant water intrusion [in the hotels] around PTAC sleeves and such, there was no flooding. Courtyard Houston was under a sewer advisory and was instructed not to shower or flush toilets for a couple of days. I don't envy anyone staying there during the storm! Hilton Garden Inn Lafayette sustained a good deal of water intrusion, as well. All the affected properties remained open during Harvey and were full, due to the number of displaced local residents. We really were fortunate during Harvey. I flew to Houston the following week to visit the Fairfield Inn, and as I rode from the airport to the hotel, there were homes, businesses and other hotels that had unsurmountable debris piled up by the street ... and this was one or two blocks from the Fairfield Inn."

Irma's Impact

Hurricane Irma formed almost two weeks after Harvey and quickly became stronger and more catastrophic than Harvey. In Florida, nearly 6.4 million people were told to evacuate, 6.5 million people were left without electricity and more than 200,000 people were in shelters. Irma took the lives of 72 people in Florida and at least 117 people in total. It was initially called the most powerful storm ever recorded in the Atlantic, because it maintained 185 mph winds for at least 24 hours, and it remains on the list as one of the most intense Atlantic hurricanes ever.

While wind was mostly the root of Irma's damage, water damage was also common. Unfortunately, water damage to guest rooms means they are out of commission until they're restored – a situation that many hotels found themselves in.



Dennis Parker, OTO Development's Regional Director of Operations for the Southeast, oversees operations of all OTO's owned and managed properties in Florida, North Carolina and South Carolina. He's worked as a GM or a regional manager in America's southeast for the past 20 years, so he's used to dealing with hurricanes.

"Luckily, our hotels did not experience flooding from the storm surge during Irma, like what happened during hurricane Katrina," Parker said. "The primary impact from Irma that we are dealing with is roof and building damage from high winds. We are also dealing with remediation issues from water damage to the hotels. For example, Residence Inn Port St Lucie had roof damage from high winds and water penetration. Rooms had to be dried out by a licensed remediation company before they could be rented again. Hyatt Place Fort Lauderdale still has 50 rooms out of service as they're being dried out, drywall and carpet replaced and remediation done before these can be put back into inventory. Our Springhill Suites is dealing with the same issues. They had 32 rooms out of service for over two weeks."

Plamen Dimov, Regional Director of Engineering for White Lodging Services, is in charge of providing engineering support for 35 hotels in different states. Five of its properties in southern Florida were affected by Hurricane Irma.

"One property had nearly 30 flooded rooms and a flooded elevator shaft," Dimov said. "Another three properties didn't have power for four days, which caused high humidity through the hotels. There was one property that only had four flooded rooms and lost a few roof tiles. We had multiple rooms flooded due to water intrusion from the air conditioning exterior vent. Almost all hotels experienced severe landscaping damage and parking lot floods. Many trees and parking lights were on the ground and city sewers were not able to keep up with the water."

Island Hospitality has 10 hotels in Florida that were impacted by Hurricane Irma, as well as one in Georgia that was evacuated because it was anticipated serious flooding.

"In Naples, we had roof tiles that started flying off of the [building's] roof next to us and damaged windows," Forde said. "We have a hotel near the ocean in Fort Lauderdale and they had some flooding that started to occur, but they had their engineer out there with a water pump, so that kept the hotel dry. One of our Orlando hotels got damage from rain, as opposed to flooding like in Houston. We had two hotels in Florida that lost power for more than a week, so those were the hardest hit, in regards to just the facility itself. There was some window damage and roof damage. Leaks were caused in some of the more rainy areas like Orlando."

Murphree, who has worked for LBA Hospitality for six years, never underestimated Hurricane Irma.

“As we watched Irma building in the Atlantic, we knew this was going to be a bad one,” Murphree said. “As large as LBA’s footprint is, regardless of which [forecasting] model ended up being right, we were going to get broadsided by this thing.” LBA Hospitality has four properties that were in mandatory evacuation zones in Florida and Georgia. Their hotels mostly experienced wind damage, water and loss of electricity.

“Holiday Inn Savannah suffered minor wind damage and water intrusion, but was able to open up as soon as the storm passed,” Murphree said. “Hampton Inn New Smyrna did not flood, but they did sustain a considerable amount of water intrusion and wind damage. Homewood Cape Canaveral lost power and water. They opened back up with power and water came shortly after, but a boil alert was in effect for several days. There was minimal damage. Hampton Inn Fort Lauderdale was closed for several days before opening their doors again and sustained some damage. We had nine properties lose power for several days while still remaining open, three properties lost landline phone service and one property was without internet and cellular service. We had eight properties that had varying degrees of water intrusion and required the utilization of a water remediation company.”

Common Hotel Preparation Protocol:

- Daily calls with the hotel’s management company
- Have the standby and portable generators ready, and make sure they are tested and fueled
- Store as many flashlights, glow sticks, batteries, water, food, supplies and first aid kit materials as is feasible
- Bring inside all garbage containers, pool furniture, grills and other outdoor items
- Drain pools and spas
- Test emergency lighting
- Protect entry doors with sand bags
- Have sump pumps ready on the first floor
- Install hurricane shutters and cover all exposed areas
- Turn off large equipment at the breaker when a power outage is anticipated
- Move hotel staff and their families into the hotel

Challenges Experienced

After the hurricanes hit, the hotels’ biggest challenges went hand-in-hand with the damage sustained.

“The flooding was probably the most dangerous [challenge] for us, in Houston,” Forde said. “Our engineer out there was fantastic. We weren’t sure when the water levels would stop. If the water would come into the lobby, the ground floor level would be impacted. We had to shut down the elevator shaft, so they were without an elevator.”

Everyone else selected power outages as their greatest challenge.

“A major challenge was the lack of ability to run common space air conditioning, which is usually not provided during the installation of the back-up generator during construction,” Dimov said. “Many of the hotels’ permanent generators were able to run emergency lights, all elevators and vital kitchen equipment, but no provisions were made for common space air conditioning.

“Another challenge is the lack of automatic transfer switches. Our owners were ready to deploy power generating equipment to carry most of the buildings, but the absence of a transfer switch would have made them useless. Hotels are never built with provisions for a large portable generator that would carry entire building because no one ever expects to be with no power for more than a few hours. A stand by transfer switch would be a nice feature to have, but the need for one has to be established before funds are spent. South Florida building interiors can suffer tremendously [when] exposed to the elements without climate control.”

Murphree said LBA Hospitality had some hotels that operated for a stunning five to seven days without electricity. How were they able to do that? Preparation.

These well-established management companies knew that the safest way to enter hurricane season is to stay as many steps ahead as possible.

How to Prepare for a Hurricane

“A hurricane preparedness plan must exist and hotel leadership should thoroughly go through it a month before beginning of [hurricane] season. The hotel’s executive team should each have specific tasks they are personally responsible for clearly delineated in the hurricane plan. Go through the check list and ensure par levels are met. Always test generators once a month and replace needed parts immediately. Do not procrastinate.”

“We started having a daily conference call four days prior to landfall with all properties in or near the potential track area,” Murphree said. “The intent was not to see who had ‘not done their homework,’ but to ask the question, ‘Is there anyone who feels like they aren’t prepared and needs help in getting that way?’ Fortunately, all were well-stocked and ready to hunker down. We, (LBA), send out a reminder to all properties the first day of the official hurricane season as a reminder and give them a list of emergency supply items.”

Albert Santos, the Chief Engineer for the Courtyard by Marriott Medical Center in Houston, had to protect his hotel from the oncoming storm. He shared some of his preparation methods with us.

“Some of the things I did to be prepared for the hurricane was to make sure that the generator was full of diesel fuel,” said Santos. “Remove all furniture from pool and surrounding area if it had a potential of flying off and causing damage. Lower the water level in the pool. Another thing is to have a hurricane emergency supply container with extension cords, duct tape, light sticks, flash lights, batteries, bottled water, etc., and make sure these items are kept on an elevated floor. Also, if you know that the first floor may possibly flood, you should have the breakers to all floor and wall receptacles turned off.”

Preparing For A Hurricane:

- ✓ Make sure the generator is full of diesel fuel,
- ✓ Remove all furniture from pool and surrounding area that has a potential of flying off and causing damage,
- ✓ Lower the water level in the pool,
- ✓ Provide a hurricane emergency supply container with;
 - extension cords,
 - duct tape,
 - light sticks,
 - flash lights,
 - batteries,
 - bottled water, and
 - Make sure these items are kept on an elevated floor,
- ✓ If you know that the first floor may possibly flood, you should have the breakers to all floor and wall receptacles turned off.”

Keeping Guests Safe

Your first priority is the safety and well-being of the hotel’s guests and staff. But how can you ensure guest safety when a hurricane is fast approaching?

“For the guests, it’s really about communicating where the safe places are to be if a storm is to hit,” Forde said. “And our associates do safety checks, so in the places where they lost power, we had monitoring patrol to walk the floors to make sure our guests were as safe as possible. In the Fort Lauderdale location that lost power and still had guests, on the second day, they couldn’t give us an estimate of when power would come back, so we made a decision to evacuate the hotel with the remaining guests. We also have a number of locations nearby, so we made sure all [guests] found locations. In the end, it was a good decision, because we didn’t have power for another five days. It wouldn’t be practical, safe or enjoyable for guests. Then we switched to hiring a security firm to help monitor the hotel in the evening and night hours.”

White Lodging Services’ also detailed some excellent advice on how to keep guests safe and secure.

“We printed guest and staff in-house lists and knew where everyone is,” Dimov said. “The phone system was powered up by generators so we could communicate with every room. Hotels with non-impact windows advised guests to move further inside the room, away from the windows or go in the bathroom. During hurricane hours, no one was allowed to go outside, all side entrance doors were blocked by sand and the main door was only operable by front desk staff.”

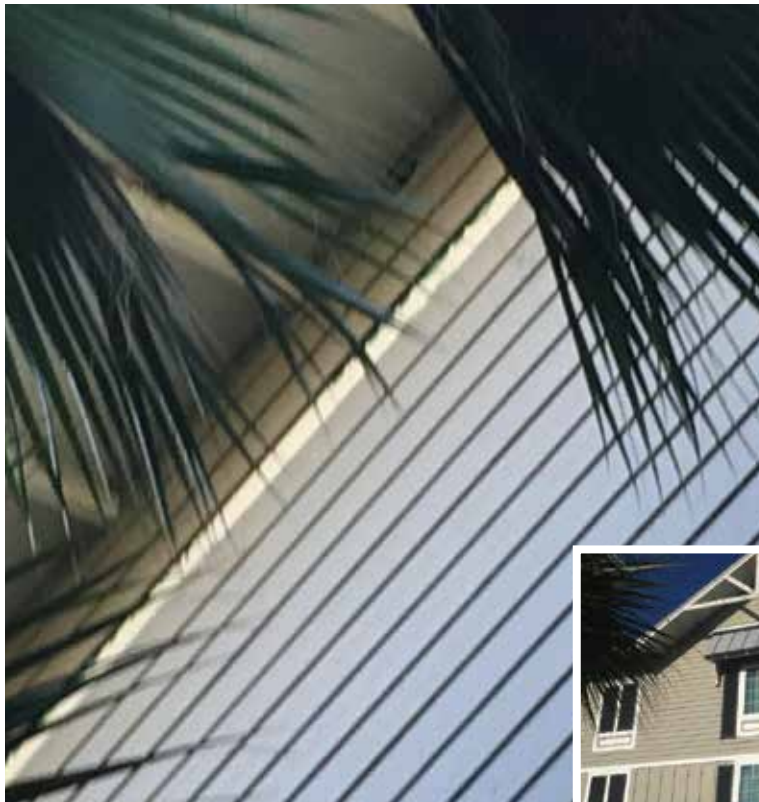
Keeping Staff Safe

It’s common practice for hotels to serve as a safe haven for staff and their families during natural disasters. All of the management companies I talked with said that their hotels gave their staff the option to stay in their hotels during the hurricanes.

“We made the hotel available to employees and their families, so they did not have to worry about traveling back and forth,” Parker said. “Many feel much safer in the hotel than their homes. We had a communication board in the lobby of each hotel, where we could communicate key pieces of information and provide storm updates multiple times a day.”

Auxiliary Power

While many hotels have standby generators or some sort of auxiliary power source, they will not power everything that a hotel needs to operate, especially not if the power is out for days.



"Every single hotel had two portable generators if they did not have a standby, permanent one," Dimov said. "For those with standby generators, do not ever let gas tank drop under 2/3 of being full. Have a good working relationship with your gas supplier and put yourself on the order list the minute you see hurricane on the news."

Some hotels had auxiliary power sources available solely for communication purposes.

"Deep cycle marine batteries and power inverters were purchased by a couple of properties to keep mobile devices charged," Murphree said. "We knew that sustained power loss was a real possibility for many properties and we wanted to be able to stay in communication with each other."

Stocking Up on Food and Supplies

A crucial component to preparing for a hurricane is stocking up on a ton of non-perishable food, water and dry goods.



Forde explained how Island Hospitality's hotels maxed out fridge space, storage space and even put dry food or supplies in offices before the hurricanes made land-fall. The other management companies interviewed said their hotels had very similar procedures. But Houston hotels faced particular challenges since so many roads were unavailable due to flooding and debris, making it impossible for some hotels to get new supplies or food for a week.

"We had one GM that went to a food distribution center that opened in Houston and went and waited in line and got food for three hotels in Houston that had food levels that were low," Forde said. "She was fantastic, it was her first week on the job, believe it or not. But soon after that, routes started getting back on. Food and water were available, but by no means were we serving the full menu yet. Guests were very understanding. It was the preparation that our teams did before that that made this possible."

Guest Levels and Gratitude

A lot of hotels experienced increased guest levels during and after the storm, as a result of evacuations. People also checked into hotels with the expectation that they would be safer and wouldn't have to suffer through power outages, which isn't a good assumption, since not all hotels have generators.

But despite how the hurricanes affected the hotels, their guests were incredibly thankful for their hospitality and safety efforts.

"We got so many letters from guests," Forde said.

Parker said that OTO Development's hotels also had several guests who called or wrote letters to commend the staff's efforts.

By housing their guests and implementing safety protocol, these hotels literally protected their guests' lives. Not all heroes wear capes.



Julio Arrebato - Chief Engineer, White Lodging Services

Cleanup

The goal after a natural disaster strikes is to get the hotels back to normal operations and restore amenities as quickly as possible. Even for the hotels that weren't as heavily damaged, many had to deal with shredded landscapes, downed trees, flooded parking lots, breached roofs, wet carpet and soaked guestroom walls.

"I think it is important to note the environmental caution that must be shown when so much moisture gets into a hotel," Parker said. "We require that a certified remediation company dries out the hotel and oversees whatever reconstruction has to take place. Water extraction, drywall removal, carpet replacement, a lot of landscaping clean up, roof repairs and a lot of equipment had to be replaced because of surges." Then there's the exterior cleanup that needs to be accomplished.

"Cutting of trees, clearing roads, removing piles of debris from sewer drains, collecting fallen roof tile pieces and gutters, cleaning pools, power washing walk ways, dehumidifying rooms and corridors, replacing carpets and fixing walls and ceilings," Dimov listed.

Internal Relief Efforts

The hurricanes affected much more than just the hotels – they affected the personal lives of the hotel staff. So, these management companies swiftly swung into action to take care of their own. All four of the management companies interviewed have their own internal programs to help the hotel staff who were impacted by the hurricanes.

"We put a program together after Hurricane Harvey, and it continued with Hurricane Irma, where our management company identified associates, through myself going out and visiting and the GMs of the hotels, that experienced personal losses," Forde said. "We had a company program where we gave those associates money that they used however they needed, like insurance deductibles or for items they lost. In addition to that, we had about five associates that had major losses, like home losses, so our company had a fundraising effort where those funds are being raised directly for those associates and 100 percent to them for their needs."

Parker said OTO Development has an internal relief fund where employees can donate money via payroll deduction to help hotel staff whose homes were impacted by the storm.

"The LBA CARES program has raised north of \$13,500 dollars for the assistance of staff members at affected properties that have suffered devastating losses due to flooding," Murphree said. "One of the things I love most about LBA is its genuine concern for the community and for its associates. So many folks were affected by these hurricanes and while FEMA is doing all they can, there are just so many people needing help that FEMA often isn't able to provide much needed assistance until weeks after the event. That's why programs like LBA CARES are so important. We can help affected associates within days, not weeks."

Dimov said White Lodging Services also has a relief fund to provide financial assistance to staff members who need it. The company's hotels also helped staff by providing free transportation, food and water to their houses.

In Hindsight: What Did You Wish You Knew?

The silver lining in natural disasters is that they can provide opportune moments to learn valuable lessons to better equip and assist hotels in the future.

Almost everyone agreed that they wished they knew where the hurricanes were going. But that's an obvious answer. Below are some of the more unique hindsight responses.

"I wish we knew exactly what pieces of equipment were going to be powered by standby generators," Dimov said. "We had a pretty good general idea, but especially in the kitchens, we were guessing. I wish we knew that 20 gallons per property of fuel was not even close to being enough fuel for a storm of this magnitude."

As a chief engineer, Santos had a ton of due diligence to conduct for his hotel before the hurricane made landfall.

"One of the things I would do differently in the future is to make sure the garage is closed off and move all cars to a higher level," said Santos. "Turn all breakers off and make sure that nothing is stored in the garage level."

Forde explained that even though preparation is essential, something unimaginable may still take you by surprise.

"The bayou has never broken before, so there was no thought that that was a possibility," he said. "If we would have known, we would have made sure there weren't any cars down there and maybe had a pump down there, ready. But you don't know what you don't know."

Final Advice for Dealing with Natural Disasters

If luck is what happens when preparation meets opportunity – you want to be lucky all the time. Thus, preparation is key, with a main focus on safety.

"Safety first; stay tuned to the local crisis management directions and follow their orders," Parker said. "If the leadership stays engaged and visible, normally you come out of these things closer with your team and make a lot of good relationships with the guests. Have a plan that you share with everyone. Use a central area of the lobby to communicate, and stay visible for the guests and the employees. If power goes out, run a fire watch and turn off the breakers for all of your major mechanicals. Also, make sure you have fail-safe keys and that they are tested before the storm."

Murphree highlighted the importance of preparation, especially when it comes to generators.

"Be prepared at all times," he said. "Store shelves go bare quickly and delivery trucks don't drive into the eye of a storm. You can never have too much water! Properties without generators or generators that power back of house items should make guests aware upon check-in that they don't have a generator. Most folks outside the hospitality industry make the false assumption that all hotels have generators. If [your] property has a backup generator, find out what it powers. It may only power an elevator or a server room. Don't think that because you have a generator that you'll have adequate power throughout the building. If properties don't have backup generators, purchase a marine or car battery along with a power inverter and a charger to keep the battery full at all times. Stay in touch with your associates and your regional support team. Communicate any needs or concerns with your support team. If you're in need of supplies and can't purchase them, reach out to sister properties. Often times, a property will have enough supplies to share with you."

Are You Equipped to Handle a Hurricane?

Natural disasters: they're unpredictable, unnerving and destructive. But, the more time and resources you invest in adequate preparation, the more likely your hotel will be safe and the guests will be comfortable.

All hotels are susceptible to natural disasters or power blackouts. If your hotel doesn't have a standard natural disaster plan or power outage protocol, now is the perfect time to begin the conversation with management. Find room in the budget to purchase key items, such as flash lights for every room and generators. Take note of the nearby topography and figure out if the hotel's property is at risk for flooding. If your hotel is in a hurricane-prone area or tornado alley, invest in storm-resistant windows, shutters and doors.

You'll never say to yourself: "Darn it, I prepared too well."

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<https://www.linkedin.com/in/amandastrouse>*

¹ <https://www.visithoustontexas.com/about-houston/facts-and-figures/>

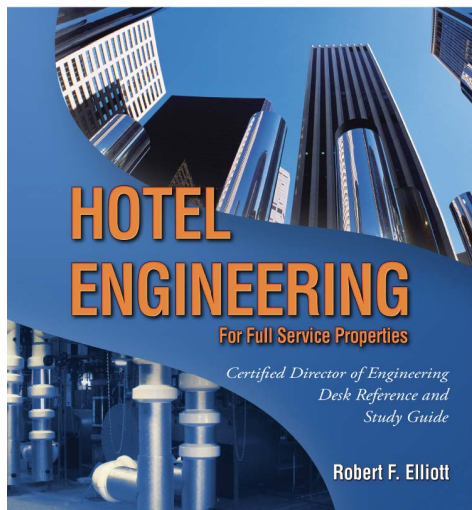
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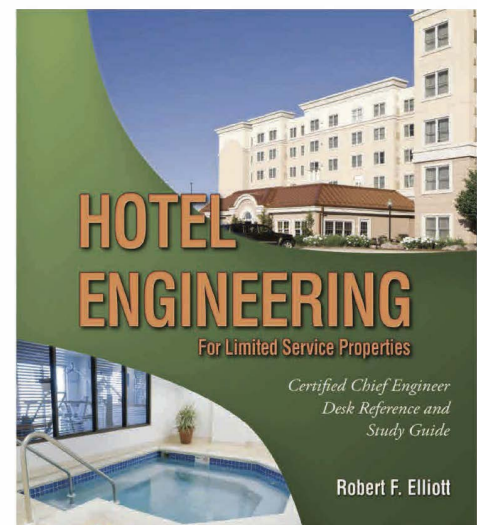


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Certified Director of Engineering

The (CDOE) is designed for full-service property engineers and their department heads or second(s) in command. The study guide also doubles as a future desk reference. The study guide contains 31 chapters – 437 pages.

<ul style="list-style-type: none">• INTRODUCTION• PRIORITIZE TASKS / TIME MANAGEMENT• PROJECT MANAGEMENT• ENVIRONMENTAL HEALTH & SAFETY• EMERGENCY RESPONSE PLANNING• MAINTENANCE OF THE HOTEL• REPORT & LETTER WRITING• RECORD KEEPING• BUDGETING• SUSTAINABLE OPERATIONS• CONTRACTING FOR SERVICES• BUSINESS ETHICS• PROPERTY ACQUISITION/ DISPOSITION• RISK MANAGEMENT• BUSINESS CONTINUITY	<ul style="list-style-type: none">• ELECTRICAL• LIGHTING• FIRE & LIFE SAFETY• PLUMBING• HVAC• VERTICAL TRANSPORT• SECURITY SYSTEMS• ENERGY MANAGEMENT• BUILDING MANAGEMENT SYSTEM	<ul style="list-style-type: none">• BUILDING DESIGN & CONSTRUCTION• PARKING STRUCTURES• SWIMMING POOLS & SPAS• INTEGRATED PEST MANAGEMENT• BUILDING COMMISSIONING• WASTE MANAGEMENT
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Program Attributes

Transferable: By focusing on the principles of management, building engineering systems, and the hotel building and its property grounds, we created a curriculum that is easily transferable across different hotel brands and property types.

Informed Decision Making: When hotel engineers become better informed, their decision making process improves and they in turn tend to lead others, especially their own staff, to a higher quality standard. This new level of professionalism is best reflected in your property's appearance, staff productivity and efficiency and increasing the useful life of your property's building systems and equipment.

Hotel Centric: Both our Certified Director of Engineering (CDOE) and our Certified Chief Engineer (CCE) programs are written exclusively for hotels and lodging properties. From the heart-of-the-house to the property's perimeter access, NAHLE's certification programs are all about hotels and the unique environment of mixed-use occupancies.

Self-Paced Study: Our programs are designed for engineers to study at their property and learn at their own speed. An experienced engineer should complete our full service (CDOE) program in about 40 hours typically stretched out over a few months. While the limited-service (CCE) program averages about 20 hours of study. Our curriculums are both based upon the engineer remaining on property and studying on the job.

Online Registration & Technical Support: Both NAHLE and AHLEI register candidates via online shopping carts. NAHLE also processes requests to invoice properties and registers candidates by email or phone. Payment may be using credit cards using our secure payment processor, Stripe. An electronic receipt is generated and emailed to the property or candidate. NAHLE also provides technical support by phone and email.

Reporting: Nahle has online software available should you want to track study hours for limited-service candidates. NAHLE also provides monthly progress for hotel management companies tracking multiple properties.

Multiple Property Roll-Out: Our programs are designed for management companies to enroll multiple engineers in the program at the same time and have all candidates working toward their certification concurrently.

Online Exams: Candidates are designated as a certified chief engineer or director of engineering upon the successful completion of multiple sectional tests administered online. The CDOE program has two tests and the CCE has three tests. Each sectional test is comprised of numerous multiple-choice test questions drawn from the Study Guide's individual chapters. A minimum passing score of 70% is required. Applicants may repeat Sectional tests.

Track Study Time: CCE (select-service) applicants may track their study time on NAHLE's website by accessing their own unique membership login. Hours of study may be entered for each calendar day in increments of 15 minutes and notes may also be typed in for future reference. A survey of hours of study is required with each CCE Sectional exam.

Certificate of Completion: Upon successful completion of the course, NAHLE issues an electronic certificate suitable for high quality color printing. The certificate designates the candidate as successfully completing the core competencies of either the Certified Chief Engineer or Certified Director of Engineering.

All Program Candidates Provided One Year Free NAHLE Membership: Free job postings on NAHLE's website for your hotel plus a warranty management module with automated emails notifying candidates of impending expiration dates.



Asset Management Begins at the Property

The National Association of Hotel & Lodging Engineers (NAHLE) partners with the American Hotel & Lodging Educational Institute (AHLEI) to provide two self-paced online professional development and training programs for hotel engineers and maintenance professionals.

- **Certified Director of Engineering**
Full Service Properties
- **Certified Chief Engineer**
Select Service Properties

Our programs are exclusively hotel centric. By focusing on the principles of management, building engineering systems, the building and its grounds, we've created a curriculum that is easily transferable across different hotel brands and property types. From the heart-of-the-house to the property's perimeter access, our certification programs are designed to create a uniform environment of informed decision making. Our management reports track the progress of multiple candidates and our most popular program, the Certified Chief Engineer, has online software allowing select service employees to track their hours of study while on the job.

Contact us today:

703.922.7105 or Certification@nahle.org

www.nahle.org.