

An ocean between us

With its state-of-the-art water management system, California's The Resort at Pelican Hill is dedicated to the preservation of its most valuable asset — the Pacific Ocean.

BY CHRIS LEWIS



For nearly 150 years, the Irvine Company, a real estate development corporation, has designed hundreds of buildings and communities with environmental stewardship in mind.

Continuing its mission of land stewardship through sound master planning, the Irvine Company selected 504 acres of Pacific coastal land, including 80 acres of protected habitat, to fulfill its long-term vision of establishing The Resort at Pelican Hill, the company's first golf resort.

Located in Newport Beach, Calif., one hour north of San Diego, the property featured a gorgeous, natural seaside setting, complete with picturesque views of the Pacific Ocean, an ideal site for a golf resort. The Irvine Company envisioned two 18-hole championship courses with unprecedented ocean views from most, if not all, holes. Tom Fazio was called in to create the two layouts: the 6,945-yard, par-71 Ocean North Course and the 6,580-yard par-70 Ocean South Course. The Ocean South Course opened in 1991, followed by the Ocean North two years later.

Each course went virtually unchanged for more than 10 years. But, in 2005, the Irvine Company brought Fazio back to update both courses. For the next two years, the courses were closed for remodeling.

"The changes were subtle, but meaningful, improving the playability of both

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Pelican Hill's herculean efforts to keep water out of the Pacific Ocean begins here (above center.) (Left and right) The Resort's five cisterns catch water and feed the irrigation lakes. Water from the nearby villas are also caught and kept on the course. Up to 1.25 million gallons of water can be stored in the cisterns.

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courses, while also enhancing the drama of the views," says Steve Friedlander, vice president, golf for Pelican Hill Golf Club.

Fazio and his team re-turfed all fairways and tees with Tifway II hybrid formula, resulting in a more consistent texture and playing surface. They also re-contoured each fairway to improve both courses' drainage systems; adjusted bunkers to enhance the courses' aesthetics; sand-capped high-traffic areas to create better turf quality; and rebuilt all tees with an entirely new sand base.

But the most noteworthy change of all was the installation of a state-of-the-art water management system.

Preserving the Pacific

To reconstruct Pelican Hill's tee boxes, Fazio's team had to repair and rebuild some cart paths — a stage of the remodeling process that the Irvine Company's Environmental Affairs professionals feared would negatively impact the resort's surrounding natural environment. The environmental experts believed the creation of new asphalt and concrete could potentially alter the resort's rainwater runoff patterns, ultimately damaging the nearby Pacific coastline's government-protected Area of Special Biological Significance (ASBS). In response, the company's environmental authorities created the resort's first water management system.

With consultation from Orange County Coastkeeper, a non-profit organization committed to preserving and restoring Orange County's waterways, the Irvine Company's Environmental Affairs team developed five underground rainwater runoff collection cisterns. Located throughout Pelican Hill, the cisterns can hold up to 1.25 million gallons of rainwater at a time.

"Every time we have a rainstorm, the cisterns capture the first

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“AS PELICAN HILL’S MOST VALUABLE ASSET, THE PACIFIC OCEAN IS REVERED AS A NON-RENEWABLE RESOURCE. THIS REALITY DRIVES US.”

Steve Thomas

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1.2 inches of rain runoff from impervious surfaces, like asphalt and concrete, and then pump that water to the Ocean North and Ocean South Courses’ lakes,” says Steve Thomas, director of golf course maintenance for Pelican Hill Golf Club. “In this way, runoff containing oil, grease and other contaminants does not reach the Pacific Ocean.”

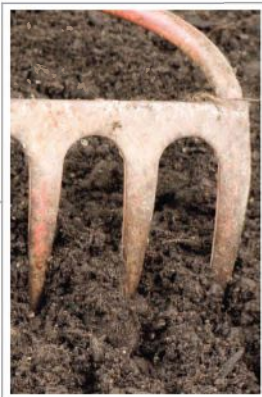
The water management system’s reliability has been verified on several occasions since 2007, even after a record rainstorm.

“While finalizing the system, the design team analyzed

weather data from the last 100 years and sized the cisterns accordingly,” Thomas adds. “As proof of its accuracy, the system captured and stored all rainwater resulting from a record 11-plus inches of rain in December 2010.”

Along with the five underground cisterns, the Environmental Affairs team also created two bioretention basins, which were built into the Ocean South Course’s 10th and 15th holes.

Developed to treat runoff from the Ocean South Course’s maintenance facility, the basins function as soil and plant-based



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filtration devices, thereby removing pollutants through an array of physical, chemical and biological treatment processes.

“Bioretention specifically removes storm water pollutants from sand bed, ponding areas, organic or mulch layers and plants through processes like adsorption, filtration, plant uptake, decomposition and sedimentation,” says Thomas.

Reducing runoff

The Ocean South Course also features a low-flow diversion system, known as the Pelican Point Lift Station. Finalized in 2007, the system captures dry season runoff from the Ocean South Course, the Pacific Coast Highway and two nearby neighborhoods prior to pumping it to the Orange County Sanitation District’s sewer system for treatment.

Consequently, the runoff no longer flows into the Pacific Ocean at Crystal Cove State Park, an ASBS adjacent to the Ocean South Course that has been designated by the State Water Resources Control Board.

“The runoff is water and debris generated from residents washing their cars in the street, over-watering residential landscaping and washing off sidewalks and driveways,” Friedlander states. “Before the installation of the low-flow diversion system, the runoff reached the ocean year-round, not just during the rainy season as it should. With this system, the runoff is only allowed to flow to the ocean during the rainy season, as it was naturally intended to do.”

As the final component of its water management system, the environmental affairs team also installed manufactured filters and fabrics, known as catch basin inserts. To remove larger debris and sediments that the bioretention basins and low-flow diversion system are unable to eradicate, the catch basin inserts are either placed in or in front of drop inlets located throughout the Ocean North and Ocean South Courses.

“At Pelican Hill,” Thomas says, “they are used entirely as final polishing and organic debris catching devices.”

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Two bioretention basins were built on the course in order to filter water. Though they're located on golf holes, golfers wouldn't notice, as they're now hidden with trees.



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Sustainability

Pelican Hill has done more than protect the Pacific. Prior to the re-opening of the courses, Pelican Hill replaced five acres of ornamental landscaping with native, protected coastal sage scrub (CSS) habitat, adding over 16 acres of CSS altogether. As a home to threatened species like gnatcatchers and other rare wildlife, the

CSS has improved the resort's surrounding natural environment.

Staff members also decided to replace Pelican Hill's trash hauler with a new recycling and cardboard bailing program. Featuring five recycle bins and eight trash bins, the program has significantly reduced the resort's waste since its inception in 2007.

In addition, the resort's staff members are focused on conserving energy by rotating golf cart charging, shutting down Pelican Hill's central laundry facility and unoccupied guest rooms during low occupancy periods, and installing LED lighting to reduce electricity use.

Because of these measures, *Golf Magazine* added the resort to its Eco-friendly Green Hall of Fame in March 2012. It was one of only three resorts to be awarded that year.

Advancing stewardship

In some ways, Pelican Hill's water management system is similar to other resorts' sustainability methods. But Thomas believes the course most sets itself apart from others in one way: how they manage water.

"We converted the course fairways to 100-percent bermuda-grass, eliminated the practice of overseeding and added more than 35 acres of low-maintenance turf in the rough areas," he reports. "We also issue a digital moisture meter to every irrigator on property, so they can micro-manage the turf areas in their section and be sure not to ever overwater."

Friedlander believes other resorts and properties can adopt Pelican Hill's water management system by incorporating some of its best practices into their own systems.

"I'd recommend other resorts to manually monitor irrigation, convert fairway turf and install catch basins," he says. "Pelican Hill also has improved its environmental stewardship by eliminating overseeding and using biofiltration filters, two other practices that resorts can adopt."

Through these practices, staff members have worked tirelessly to maintain the quality of the resort's natural surroundings for future generations.

"As Pelican Hill's most valuable asset, the Pacific Ocean is revered as a non-renewable resource," says Thomas. "This reality drives us to passionately pursue practices and design standards that industry experts consider a leading example of sustainable coastal golf course design for the future." ©

Chris Lewis, a Michigan-based golf writer, previously profiled White Pine National for *Golfdom* in January 2013.



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Prepping golf car batteries for the summer season

BY VICKI HALL

 With the golf season now in full swing, it's time to assess the condition of the golf cars that had been in seasonal storage, or simply service those that “played through” the entire year.

First, it's always important to fully charge batteries before putting them back into service. Charging is one of the most important yet most misunderstood components of deep-cycle battery maintenance. Batteries must be fully charged to maximize capacity and life. Without proper charging, deep-cycle batteries will not provide the performance, reliability or the manufacturer's rated life cycle.

It's important to remember that not only do batteries discharge during use, they also self-discharge when

in storage, especially in hotter climates where they will discharge more quickly. Therefore, fully recharging your batteries after every use, and periodically while in storage, is key to their successful operation and longevity.

Before beginning any charging procedures, always refer to your battery manufacturer's charging specifications to confirm the proper techniques for your particular golf car batteries. Start by checking that the electrolyte

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CHARGED UP

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levels in flooded battery cells are acceptable. If the water level is below the plates, you should add enough distilled water so it is just above the surface of the plates, but no more. Remember, this is the only time you should add water before charging. Also, flooded batteries operating in a hot climate may require more frequent watering, so it's best to check batteries regularly to determine how often they will require battery watering.

Ensure your battery connections are tight and the vents are completely inserted into the battery. Loose connections can result in possible sparks, which can ignite the hydrogen inside the battery if the vents are not completely seated.

Be sure there is adequate ventilation at the location where you'll be charging batteries.

Since batteries "gas" while charging, good ventilation is very important to avoid gas buildup. Also, never charge a frozen battery and avoid charging in temperatures over 120 degrees F.

In addition, never interrupt a charge cycle unless you are doing "opportunity charging." Opportunity charging can be used to extend vehicle range when needed and is a short charge given to the batteries in between uses. However, this does not take the place of a daily complete recharge.

When charging flooded batteries, there are several techniques you should follow to ensure success. First, deep-cycle flooded batteries do not have a memory, so it is not necessary to fully discharge the battery after every use.

Deep-cycle flooded batteries must be overcharged to avoid stratification of the electrolyte, which can result in the buildup of sulfates on the battery plates. This should occur with every charge cycle and is normally controlled by the charger. This buildup of sulfates can severely impact battery performance. Stratification occurs when the heavier, denser electrolyte sinks to the bottom of the battery cell

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“CHARGING OF AGM OR GEL BATTERIES SHOULD BE DONE AT LOWER VOLTAGES TO AVOID EXCESSIVE GASSING AND BATTERY DRY-OUT.”

and collects on the battery plates, causing premature failure of the battery. Trojan also recommends that batteries be equalized every 30 days. Equalization is a prolonged charge cycle that will provide additional mixing and is normally programmed into a charger.

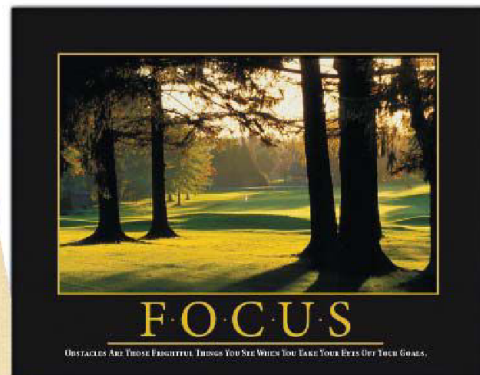
While the use of AGM and gel batteries is less common in electric golf cars, you should be aware that these technologies require different charging parameters. If you do use AGM or gel batteries, it's important that you never use a charger designed for flooded batteries to charge AGM or gel batteries since these battery technologies are very sensitive to the charging process. Charging of AGM or gel batteries should be done at lower voltages to avoid excessive gassing and battery dry-out. Also, it's very important that you never equalize AGM or gel batteries.

So how long should batteries be charged? The amount of time it takes to charge your batteries depends on how deeply the batteries have been discharged. Batteries that have been deeply discharged will require longer charging time and those with a shallower discharge will take less time. Typically, batteries discharged at

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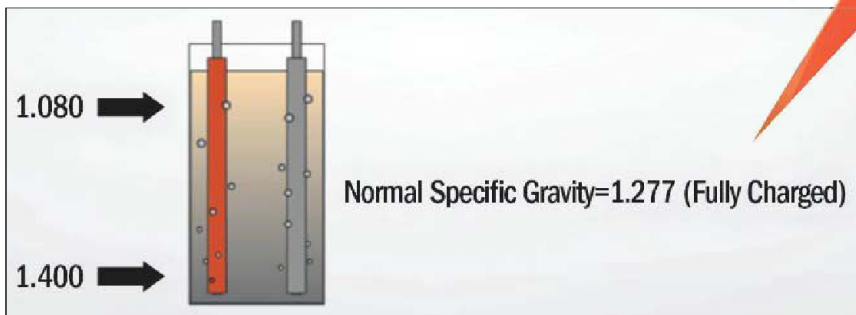
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CHARGED UP



Stratification occurs when denser electrolyte sinks to the bottom of the battery, harming the battery's plates.

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50 percent depth of discharge will take six to eight hours to fully recharge. For safety reasons, overall charge time should be limited to 16 hours. Most chargers are programmed with this time limit as a safety feature.

In addition, batteries that are cold before beginning the charging cycle will take longer to charge, while batteries that are warm will take less time. This is not based on ambient temperature, but rather on the temperature of the electrolyte. Batteries that are very warm can deliver greater than 100 percent of the rated capacity, but operating a battery at higher temperatures also will decrease overall battery life.

The importance of adhering to regular battery maintenance and charging schedules cannot be stressed enough. Too often batteries are taken for granted with expectations that they will work anytime, anywhere regardless of whether or not they have been properly maintained throughout their lifecycles. Remember that a battery is only as good as the service it receives, so it is critical that regular maintenance practices be adhered to in order to achieve the highest-rated performance and lifecycle from your batteries.

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on a variety of battery technologies and maintenance practices.

Vicki Hall is director of quality assurance and technical services for Trojan Battery Company.

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