

Lighting Fit for the Queen

By: Josh Allen



The Queen's chamber scene, the author notes, "begged for low-profile LED strip lighting." He chose lumenfacade units from Lumenpulse.

The Lost Colony gets new outdoor-rated gear

In 1587, Sir Walter Raleigh, under the authority of Queen Elizabeth I, packed 115 brave men, women, and children into tiny ships to form the first permanent English settlement in the New World under the leadership of Governor John White. White returned to England for supplies, but the Anglo-Spanish War prohibited his return to the colony, located on modern-day Roanoke Island on North Carolina's Outer Banks. In 1590, White finally made the voyage to resupply the

colonists, but, upon landing on the island, no trace of them could be found. One word—"Croatoan"—was carved into a post at the fort. With storms on the rise, White was forced to return to England, and the fate of the colony was never discovered.

Fast-forward to 1937: Roanoke Island locals tapped Pulitzer Prize-winning author Paul Green, to create a "symphonic drama" celebrating 350 years of its history. Aside from four years during World War II, *The Lost*

Colony has played every summer at Fort Raleigh National Historic Site, becoming an institution on the North Carolina Coast and in the American theatre. In 2013, the production was awarded the Tony Honor for Excellence in Theatre.

When I first arrived at Waterside Theatre in 1991, I fell in love with *The Lost Colony*. I fell for the story, the place, and the locals who were so passionate about sharing this piece of forgotten history. For me, returning every year was a true rite of passage. I cut my teeth working summers on the Outer Banks, learning more about lighting and electricity in four months

Ingress Protection (IP) Rating Table

IP...	First digit: Ingress of solid objects	Second digit: Ingress of liquids
0	No protection	No protection
1	Protected against solid objects over 50mm e.g. hands, large tools.	Protected against vertically falling drops of water or condensation.
2	Protected against solid objects over 12.5mm e.g. hands, large tools.	Protected against falling drops of water, if the case is disposed up to 15° from vertical.
3	Protected against solid objects over 2.5mm e.g. wire, small tools.	Protected against sprays of water from any direction, even if the case is disposed up to 60° from vertical.
4	Protected against solid objects over 1.0mm e.g. wires.	Protected against splash water from any direction.
5	Limited protection against dust ingress. (no harmful deposit)	Protected against low pressure water jets from any direction. Limited ingress permitted.
6	Totally protected against dust ingress.	Protected against high pressure water jets from any direction. Limited ingress permitted.
7	N/A	Protected against short periods of immersion in water.
8	N/A	Protected against long, durable periods of immersion in water.
9k	N/A	Protected against close-range high pressure, high temperature spray downs.

The above table shows the range of protection available from differing IP ratings, which were especially meaningful as the author sought gear that could stand up to the elements.

than many production electricians learn in years. Chris Lau, now corporate director of entertainment for SeaWorld Parks, was the show's lighting designer, and his sense of storytelling through light was beautiful to behold. Working with Chris really helped shape the way I view light and shadow while working with the tools available.

Waterside Theatre is a 1,500-seat amphitheatre overlooking Roanoke Sound. While the sunsets that form its backdrop are unparalleled, the challenges of designing lighting in this space can be daunting. From my years in the early-to-mid '90s as the show's master electrician, and from serving on numerous year-round committees for the production over the past two decades, I knew this first-hand. William Ivey Long is the show's production designer, and, in recent seasons, Paul Gallo has served as lighting designer. When I received a call asking if I would be interested in designing the show this season, I knew I had big shoes to fill.

The theatre has two main lighting positions: front-of-house lighting towers flanking the theatre's cross-aisle and two vertical proscenium ladder positions, attached to the upstage sides of the half-circle structure that makes up the proscenium wall. Mounting positions are scattered about the theatre—in the woods, on

scenery docks, inside scenic elements, and in troughs, pits, and bushes to obscure fixtures from view. Historically, *The Lost Colony* has been lit with just about anything that would output some light. In the early '90s, the fixtures on the proscenium positions ranged from old Century Lighting ellipsoidals with step lenses to Times Square Lighting Fresnels and PC spots dating back to the 1950s, along with a stable of mixed aluminum and steel 1,000W PAR 64 cans. The 60'-tall front-of-house lighting towers were erected each summer using Upright aluminum scaffold and tensioned into place by eight guy-wires that required constant maintenance and attention. Atop these towers, Chris had a smorgasbord of fixtures in his arsenal: Century and Strand ellipsoidals, Altman PAR cans, and some beautiful old beam projectors that Nananne Porcher had put into the show back in the '70s. The lighting circuits featured white Romex home wire, and the connectors at fixture locations consisted of wire-nuts, because they were readily available on a small island off the coast of North Carolina.

The evolution of fixtures and wiring methods for the production was ongoing...and so was the Outer Banks weather. To say that the environment is harsh and unkind to the equipment is an understatement. Salt-sea air, daily

thunderstorms, and baking sun would perpetually be the undoing of performance lighting fixtures and wiring. There was always something to repair, something to replace. I recall C-clamps breaking in half upon tightening. I also punched a finger through the rusted shell of what was once a solid steel PAR can. Each season, donations have allowed *The Lost Colony* to bid farewell to those fixtures in the worst shape, replacing them with new gear, but tight budgets and a lack of available options bought units, not rated for outdoor use, which would eventually rust through, corrode, and become unusable. When I agreed to design the show this season, I saw it as an opportunity to call on manufacturers of performance lighting equipment designed for exterior use.

While I knew that I would continue using standard tungsten-based Source Four fixtures for my ellipsoidals, a number of fixtures with LED sources presented themselves as viable options. I wanted to easily change color to achieve various looks to reinforce a sense of time and location; I also wanted to generate subtle effects that the show lacked, given the existing stable of gear. Simple, clean, and realistic lighting was my goal for each scripted location. To achieve this, LEDs were an obvious choice, but they had to meet certain criteria: One,



Allen's rig was designed to easily create a variety of time-of-day looks, including this nighttime battle scene.

a fixture had to possess a feature set allowing for smooth dimming, without stepping, flicker, or pulse. It also needed to fade to and from black without popping on or off at the low end of the dimming curve. Output had to be punchy, colors had to look really great, and light had to be delivered without chromatic aberration, blending seamlessly with tungsten and other LED sources. Perhaps most important, it had to be completely sealed from the elements. This dictated fixtures with an IP65 rating or better.

My first call was to ETC. I've been specifying the company's LED fixtures for interior projects and productions since it took on the Selador brand, and I absolutely love Selador's seven-color engine. ETC has a few models in its IP66-rated Desire Series, and I was sure I could use one of them to do the heavy lifting for sidelighting at my proscenium ladder positions. After much discussion with ETC, and with the help of my associate designer, Andrew Fisher, we employed 36

D40XTI fixtures for this purpose. Because the D40XTI has remote data electronics, we designed and built custom NEMA 4X hinged boxes, and glanded and connectorized them to house the data input cards. This meant that if anything were to require repair or replacement, swapping out either the fixture or electronics became a quicker, easier task in a more centralized and accessible mounting location. We also felt that having fixtures completely sealed at the rear of the fixture housing—as opposed to those using panel-mount connectors—offered the best protection from ingress. In addition, the heavy-duty molded NEMA 4X boxes offered a protected location to mount our wireless receivers, supplied by RC4 Wireless. The existing data runs to the proscenium locations were questionable at best, and data packets were intermittent. The tiny RC4 Wireless gear came through for us at 900MHz, and the signal did not suffer at all from being enclosed, even with extended trans-

mission distances and structural obstacles that prohibited line-of-sight operation. In all, the ETC D40XTIs performed exactly as I had expected them to, affording me the ability to choose my palette, shifting from dawn to midday sun to pointed changes in action as the storyline progressed. The end of the season showed no signs of wear on the powder-coated housing, and the units were rock-solid throughout the 75-performance run.

Another IP66 fixture manufacturer that has been on my radar for a couple of years is SGM. I've specified a number of installations that utilize the company's P-2 and P-5 fixtures to wash interior and exterior facades, ceilings, and experiential or attraction applications. For *The Lost Colony*, however, it was the G-Spot moving head fixture that got my attention. I wanted to bring some new, dynamic technology to the show, but, until recently, there was no good way to use moving lights in a long-term installation outdoor setting. Shrouds and inflatable housings were available but were designed for more temporary uses; we needed something that could stand up to the elements in this punishing environment with little to no maintenance, over a four-month run. I decided to put the G-Spot through its paces. We had originally hoped to have four units on the production but ultimately used only two, acquiring them through SGM and the Virginia-based manufacturer's rep, AKT3. While there are no live-move cues per se, the G-Spots provided focus and pops of color, texture, and effects reinforcement. I was amazed at the amount of light emitting from their LED engines; their ability to combat the intense, shallow light of nightly sunsets on the horizon; and how they assisted the other elements of my plot. Responsive and quick, they handled intricate effects ranging from fireworks and explosions in battle to simple, subtler ideas mimicking dappled trees and foliage light movement. They finished

the season without a single issue, and still looked new when they were wiped down to go into their flight cases at strike. Over the summer, SGM released an IP66 permanent installation version of this fixture, the G-Spot POI, with a five-year warranty, and has developed other IP65-rated Art-Net/DMX distribution gear. I'm excited to see what happens next with the product line!

There are two dozen or so locations in the surrounding woods and tree canopy, permanent structures in the stage area, as well as large moving scenic pieces and props that are wired for lighting. Two locations—three-sided New World cabins and a large rotating scenic unit that opens to reveal an ornate Queen's chamber scene—begged for low-profile LED strip lighting. I'd used strip fixtures by Lumenpulse on multiple projects and decided they would fit these applications really well. The lumenfacade fixture, from Lumenpulse, is an RGBW unit that dims well and is built like a tank. Its dual-chamber design allows for replacement of components, rather than the entire fixture. I knew from a recent installation in Florida that these IP66 strips would stand up to even the toughest physical challenges, as Lumenpulse also offers a corrosion-resistance option. That said, I prescribed 16' (8' top and bottom) in the scenery unit window, and another 8' tucked into the downstage ceiling of each onstage cabin. The external CBX data boxes, or "C-boxes," manufactured by Lumenpulse are built to take abuse, and they house DMX cards that can split data to up to six outputs. They were the only fixtures inside the cabins, and their output was unmatched. Programmed at low levels, with control density by the foot, we achieved some wonderful effects that produced a realistic feel of candlelight and lantern flicker in specific locations inside the cabins. The Queen's scenery window units also performed extremely well, allowing for



dusky sunset looks that changed subtly throughout the scene.

Peppering the natural tree canopy from low-mounted positions, I utilized approximately 30 Chroma-Q Color One 100 fixtures from AC Lighting. At one point, Native Americans are attacked by English colonists, and, in collaboration with the sound designer, Michael Rasbury, we devised a heat lightning effect for director Ira David Wood. The Color One 100s allowed for individual control and punchy color that really helped us put a pin in the scene. In addition, there were certain opportunities for backlighting at the side stages where tree cover allowed for the concealment of these fixtures. Perhaps one of my favorite looks is in the Queen's chamber scene, where a distraught Governor White stares at a large globe, faced with the realization that his colony will be lost. A Color One 100 was the last unit remaining on in this multi-part cue, fading beautifully to black in a deep straw hue that allowed the audience a glimpse into his thoughts and helping to suggest his feeling of internal despair. Upon exiting the theatre, Color One 100s

were also tucked into the forest floor along the pathways, creating a spectral experience with moody shadows of colored light as patrons "walked with the ghosts" to their vehicles.

Other manufacturers contributing to the lighting plot were Gantom, TMB, SSRC, LumenRadio, RC4 Wireless, and The Light Source. Gantom's line of tiny, IP65 rated Precision DMX fixtures helped create wonderful DMX-controlled prop-fire effects, also lighting other details where no other fixture could physically fit. Their built-in effects engines made programming a thrill, and they are solidly built fixtures that pack a real punch. SSRC provided circuit and DMX cabling with Neutrik X-HD outdoor-rated connectors, as well as the custom Nema 4X and aluminum circuit boxes we required. I've always found SSRC to be great to work with for custom devices with very little lead time, and the company really came through for us. I had some concerns with older installed/existing network switches not functioning properly, so we acquired a new Gigabit Ethernet switch from TMB to route show data; it's a nice product

THE LOST COLONY 2016

(79th Production Season)

Manteo, NC

Producer: Roanoke Island Historical Association

CEO: Bill Coleman

Associate Producer: Lance Culpepper

Associate Lighting Design: Andrew Fisher

Assistant Lighting Designer/Programmer:

Noah Trimner

Master Electrician: Brian Elliott

2nd Electrician: Bri Weintraub

Production Designer: William Ivey Long III

Associate Production Designer: Brian Mear



Custom data boxes for ETC D40XTI fixtures.

offering a lot of patching flexibility. LumenRadio also provided some 2.4GHz transmitters that worked in conjunction with the RC4 Wireless DMXios around the theatre, rounding out our wirelessly deployed data. The

RC4 gear is almost inherently intrusion-resistant, due to the design of the enclosures, and I was blown away by the quality of the data packets and transmission we were getting in a location that was riddled with marine

radio interference, among other things. While the plan was always to hard-wire any data location that was show critical, in the end, about 80% of the data we were moving was handled by the RC4 equipment.

In an effort to keep fixtures locked down in high winds and to avoid rust, the crew changed out a large number of rusted steel clamps to Mega Clamps from The Light Source. Small changes like these will have a long-term impact on the show, and I plan to implement them annually, to help bring all components up to a standard of acceptability for outdoor use.

I plan to return to design *The Lost Colony* in 2017, the 80th production season of this wonderful show. The sun will bake, and the stormy salt-sea winds will blow, but at least I'll be returning knowing that, as an industry, manufacturers are beginning to realize that productions in the great outdoors should also be able to make use of new lighting technologies. My hat goes off to these manufacturers for the time and money spent on research and development that make having intelligent lighting a reality in outdoor production. 📶

Josh Allen is a principal consultant with Theatre Consultants Collaborative, Inc. (TCC), and is a founding partner and lighting designer with 3LR Design, a firm specializing in experiential, production, attraction, and special project architectural lighting design. When he is not illuminating the world, he can be found in coffee shops, in the woods, or on the water. He is a member of ASTC and USA 829, and lives with his family in Raleigh, North Carolina. www.theatrecc.com.