

# Case Study

**PHILIPS**



## Case Study: Pedestrian Bridge Lighting

**LUXEON-Based Color-Changing Fixtures Put on a Show in Arkansas**

Every night, the massive pedestrian bridge that straddles the Arkansas River between sister cities Little Rock and North Little Rock puts on a light show that can be seen from half a mile away. Pre-programmed to play different symphonies of color according to the season and other variables, the lighting effects have turned the Big Dam Bridge into a work of art—thanks to solid-state lighting technology.

The project utilizes 185 off-the-shelf Light Wave LX fixtures from Illumivision Incorporated ([www.illumivision.com](http://www.illumivision.com)), a Canadian manufacturer of high-performance solid-state lighting products. Each Light Wave LX unit incorporates 36 red, green and blue LUXEON LEDs from Philips Lumileds ([www.philipslumileds.com](http://www.philipslumileds.com)), selected for their industry-leading brightness, performance, longevity, color consistency and energy efficiency.

With LUXEON LEDs under the hood, Illumivision's luminaires slashed power consumption and associated costs for the bridge project by more than 60% compared with metal halide lighting, yielding estimated energy costs of just \$1.35 versus \$3.74 per hour. LUXEON's long life and color-changing abilities also minimized maintenance concerns and enabled automated light displays not attainable with alternative lighting solutions.

In addition, the small size and weight of the fixtures, made possible in part by the small LED form factor, helped alleviate U.S. Army Corps of Engineers concerns about removing the fixtures when needed and damaging the concrete structure to which they would be attached.

"We built our Light Wave LX fixtures with LUXEON LEDs because there was no other solid-state light source on the market that could compete with the light output. The importance of delivering that level of illumination and long-distance throw is illustrated by the use of these luminaires in the Big Dam Bridge," said Illumivision engineer Jonathan Labbee. "The ability to light a project of this scale with LED fixtures is remarkable."

"The Illumivision blew the metal halide away on intensity. Everyone said, 'The LEDs are brighter, use less energy and have a longer lamp life: it's a no-brainer.' "

- Derek Pogany

Regional Sales Manager, Illumivision

**LUMILEDS**  
LIGHT FROM SILICON VALLEY



## Rainbow on the River

Known as the Big Dam Bridge because it sits directly on top of Little Rock's 40-year-old Murray Lock and Dam, the Pulaski County Pedestrian and Bicycle Bridge opened in 2006 to provide a safe river crossing for walkers and bikers. At more than three-quarters of a mile long, it is the world's biggest bridge built specifically for recreational use and the only route across the river by foot or bike with no vehicle traffic.

In 2003, months before construction began, John Rogers of Little Rock-based John Rogers Design ([www.jrdportfolio.com](http://www.jrdportfolio.com)) was approached about the possibility of lighting the finished \$12.8 million bridge to encourage nighttime recreational use as well as create an after-dark attraction for the community at large.

Rogers' initial concept was to bathe the bridge in blue using 1000W metal halide fixtures with blue dichroic filters. Then he met Derek Pogany, Illumivision's Western Regional Sales Manager. "Derek told me I could get plenty of light, but with longer lamp life and more efficient power usage from their LED luminaires," Rogers recalled. "That made me start to think about LEDs as an alternative for the first time."

Illumivision was then transitioning from xenon lighting to an LED-only product line, drawn in part by ongoing advances in the light output of LUXEON power LEDs. Pogany agreed to help Rogers demonstrate his blue lighting concept with Illumivision's newest solid-state fixture. But Pogany knew the product brought an even better option to the table: automated color-changing effects.

With energy-efficient LUXEON LEDs under the hood, Illumivision's luminaires slashed power consumption and associated costs for the bridge project by more than 60% compared with metal halide lighting.

## RGB with LUXEON

The RGB Light Wave LX fixture that Illumivision recommended for the project is designed specifically for outdoor lighting projects requiring large wall-washing and long throw capabilities. It incorporates 12 green, 12 blue and 12 red LUXEON LEDs and is capable of producing 16.7 million colors.



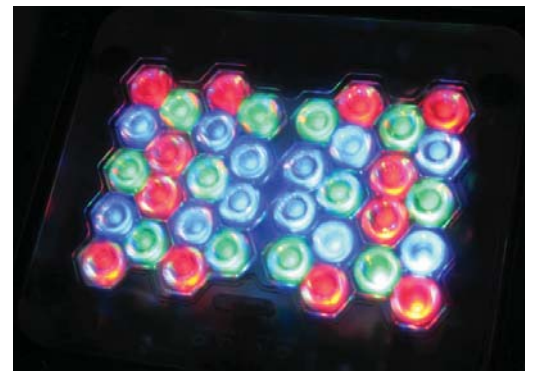
With LUXEON's luminous output, the 36-LED clusters in the Light Wave LX units produce intense, saturated colors that cannot be achieved efficiently by filtering conventional white light sources. Philips Lumileds' stringent color controls and tight tolerance ensure color consistency from lamp to lamp. Moreover, the fixture can deliver computerized light shows of infinite variety without the need for colored gels or filters, manual program changes, or high-maintenance mechanical motors that would be necessary with a metal halide solution.

The use of LUXEON technology in the Illumivision luminaire also yields a variety of size, environmental and maintenance benefits that proved to be critical in gaining approval from the multiple public bodies involved.

## 64% Energy Savings

First, the Light Wave LX consumes just 91W of electricity compared to 450W for a color-changing metal halide flood, in part because of the innate efficiency of LEDs and in part because of the energy wasted with color filters and ballasts in a metal halide installation. While more LED fixtures were required to light the bridge, the overall project uses an estimated 16.9 kW of electricity per hour instead of 46.8 kW for metal halide. At eight hours a day, 365 days a year, that translates to roughly \$3,950 instead of \$10,930—a savings of 64%, or almost \$7,000 per year.

"We needed an environmentally friendly solution to get the blessing of the Army Corps of Engineers because the fixtures are attached to their lock and dam, and they are the controlling entity," Rogers noted. "If we had proposed metal halide, it could have killed the deal."





Second, the LUXEON LEDs give the lamps a life expectancy of at least 50,000 hours compared to only 10,000 to 15,000 hours for a metal halide solution. Given the number of fixtures and the challenges of changing them in the Big Dam Bridge's outdoor environment, this dramatically reduces both replacement costs and maintenance requirements.

The use of LUXEON light sources also shrinks the fixture size and weight compared to metal halide alternatives. Even with 36 LUXEON emitters per unit, Illumivision's Light Wave LX fixtures measure just 5.4" x 7" x 9.4" and weigh only 7.71 pounds. This sleek profile helped convince the Corps of Engineers that the fixtures would not structurally compromise the lock and dam and could be easily removed in the event of high river levels and logjams.

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- Jonathan Labbee  
Illumivision Engineer

### Seeing Is Believing

At the time the Big Dam lighting project was on the drawing board, solid-state lighting was just emerging as a viable alternative to conventional light bulbs. As a result, Illumivision, John Rogers Design, and electrical design consultants Garver Engineers ([www.garverengineers.com](http://www.garverengineers.com)) faced skepticism about the ability of LEDs to light an area as much as 90 feet high (from the water to the top of the bridge) and 1300 feet long (the bridge span over the water).

The design team laid those fears to rest in two tests presented to Corps of Engineers personnel as well as local government officials in 2004 and 2005. The first one, showing Rogers' original blue lighting concept at a railroad bridge in Little Rock, offered side-by-side comparisons of the blue light cast by the Illumivision fixture and a 1000W metal halide lamp with a deep blue dichroic filter. "The Illumivision blew the metal halide away on intensity," Illumivision's Pogany recalled. "Everyone said, 'The LEDs are brighter, use less energy and have a longer lamp life: it's a no-brainer.' "

By the time of the second test, several of the piers that would be supporting the Big Dam Bridge had been built, the team had switched to a color-changing strategy, and several prototype designs had been programmed with a DMX controller. Pulaski County Judge F.G. 'Buddy' Villines, the originator of the bridge project and the key decision maker, viewed the color show from a car hundreds of yards away. Minutes later, the county road and bridge department got Villines' approval to put the project out for bid.

### Project Wins Two Awards

Arkansas' Big Dam Bridge has captured two prestigious awards for its innovative use of color-changing lighting.

The project received a 2007 International Illumination Design Award (IIDA) Award of Merit for outdoor lighting design from the Illumination Engineering Society of North America (IESNA), competing with submissions from around the globe.

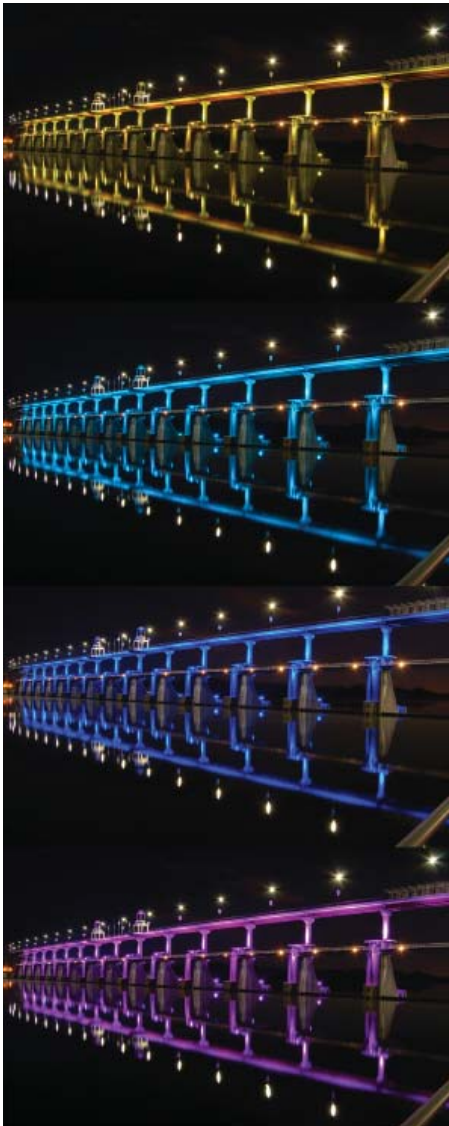
In addition, Garver Engineers, the Arkansas firm responsible for the project's electrical design, calculations and systems integration, received an Engineering Excellence award from the American Council of Engineering Companies of Arkansas in the Building/Technology Systems category for its work on lighting the Big Dam Bridge.



### Little Rock's Big Show

Today, the Big Dam Bridge comes alive with color ranging from seasonal and holiday displays to special designs like one that mimics moonlight dancing on the water. It can change from red and green for Christmas, to pink and white for the Susan G. Komen Race for the Cure, to red and white when the Arkansas Razorbacks are in town. Potential variations in speed, hue intensity, color sequence and color combinations are endless.

The light shows are wirelessly controlled from a panel in an equipment rack that sits 300 feet off shore using a Pharos LPC1 DMX controller ([www.pharoscontrols.com](http://www.pharoscontrols.com)), a Wireless Solutions transmitter ([www.wirelessdmx.com](http://www.wirelessdmx.com)), and 3" antennas erected on each pier. The system's built-in astronomical clock runs the lighting sequences automatically, enabling the Big Dam Bridge to light up the night without constant manual intervention.



The \$880,000 lighting project—paid by the county's road and bridge fund as part of the \$12.8 million bridge price tag—is visible from multiple vantage points along the river. Both the Big Dam Bridge and the nightly light shows have become a source of local civic pride and are rapidly turning into statewide attractions. Consider it Little Rock's reward for thinking big.

#### LUXEON Benefits for Big Dam Bridge

- Eco-friendly alternative to metal halide
- Bright, intense color
- 64% less energy consumption
- \$7,000 in annual energy savings
- 5 times longer life than metal halide
- Smaller, lighter, more durable fixtures
- Electronic color changing
- Color uniformity

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