Tbilisi's Bridge of Peace Comes to Life at Sunset with All-White Interactive LED Light Show

Photo by: Ivane Goliadze

In May 2010, the city of Tbilisi in the Republic of Georgia opened a new pedestrian bridge topped by a curvy steel and glass canopy and shimmering with an interactive light display generated by thousands of white LEDs.

The roof of Tbilisi's Bridge of Peace is fitted with more than 1,200 custom LED fixtures designed and built by Netherlands-based Primo Exposures and RENA Electronica, utilizing over 6,000 high-power LUXEON Rebel LEDs supplied by Future Lighting Solutions in a narrow binning range to ensure color uniformity. The glass panels that run the full length of the walkway are embedded with linear low-power LED arrays. The entire lighting installation comes alive 90 minutes before sunset, illuminating the Mtkvari River in a dance of 21st century light that serves as a striking counterpoint to the historic buildings on either bank.

Over 1,200 custom LED fixtures with special louvers create an all-white light show on the curvy bridge canopy

4-MONTH TURNAROUND

Commissioned by officials in this city of 1.5 million as both a connector between its two downtown districts and a symbol of Tbilisi's progress in the post-Soviet era, the Bridge of Peace was designed by Italian architect Michele De Lucchi with a lighting design created by Philippe Martinaud. The bridge structure was built in Italy and shipped to Tbilisi in 200 trucks. The lighting was installed on site in Georgia as the bridge was being assembled.

"Our customizable Vincent Ledline fixtures are designed for fast production, but we are entirely dependent on the supply chain for getting us the LEDs we need in a timely manner. On this project Future Lighting Solutions was able to deliver 6,040 LUXEON Rebel LEDs in the color temperature we specified in just two weeks."

Marcel Wamsteker, Project Manager, RENA Electronica

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High-power LED fixtures in the sunroof plus low-power LED arrays on the parapet come alive 90 minutes before sunset

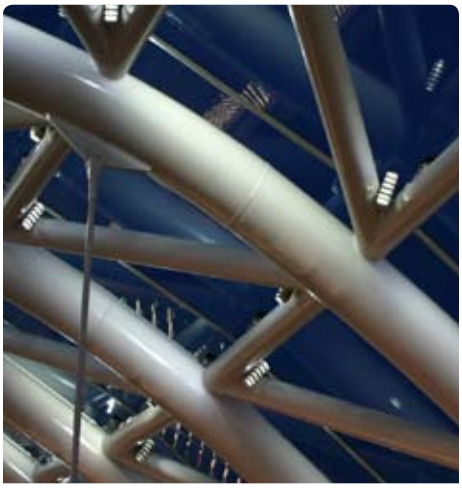
Primo Exposures was brought into the project to execute Martinaud's lighting concept, following previous Primo/Martinaud collaborations in lighting Tbilisi's Ministry of Internal Affairs and Presidential Palace. As technical designer, Primo's Marco de Boer decided that the optimal solution for lighting the bridge roof was an off-the-shelf RENA fixture offering three key benefits: a small footprint enabled by the compact LUXEON Rebel package, customizable configuration with rapid delivery, and proprietary two-wire connectivity that would substantially simplify installation.

Built to order by RENA with five cool white LUXEON Rebel LEDs per module and a Carclo elliptical beam optic, each of the 1,208 fixtures in the bridge canopy also features a patent-pending louver system designed by Primo to both direct the beam and conceal the point source. Just four months elapsed between the time Primo got the job and the arrival of the finished fixtures in Georgia, thanks both to RENA's configurable Vincent Ledline module and Future's ability to quickly fulfill RENA's order for 6,040 LEDs with a 4200K color temperature.

"The whole idea behind our Vincent Ledline series is that we can rapidly produce a custom fixture without starting from scratch. We use a standard module that has already been fully engineered and tested, and we tailor it to the customer's size, color and optic needs," said Marcel Wamsteker, project manager for RENA. "In this case, we received all of the cool white LUXEON LEDs we required from Future in just two weeks. All of these factors helped us meet Tbilisi's tight deadline for the bridge unveiling."

7,000 DMX CHANNELS

The finished fixtures measure just 6 cm deep, 7 cm high and 19 cm long including louvers and heat sink – roughly the size of a computer speaker – and consume just 8W of electricity apiece per hour of operation. They are mounted on the steel framework that supports the bridge's sea-colored



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Fixtures mounted in each triangle portion of the bridge roof were built to order based on an off-the-shelf product for rapid delivery

glass roof, occupying a corner of each steel triangle that gives the structure its distinctive fishnet look.

Installation was expedited by RENA's proprietary powerline wiring strategy, which requires only two wires for the 24VDC power supply and data transmission rather than the usual two for power and three for communication. Each of the 1,208 fixtures in the sunroof represents its own dimmable DMX channel and is programmed through a control interface designed by RENA.

With the additional controls for the low-power LED arrays that line the parapets on either side of the 150-meter walkway, the Bridge of Peace has over 7,000 DMX channels that are connected via networked Pharos DMX controllers. In concert with motion sensors on the parapets as well as a series of unusual program designs, the system creates a dynamic light sculpture that resembles a marine creature undulating across the river.

"This is a case where the lighting effects are inseparable from the structure. The LEDs are in constant motion, interacting with the eyes as well as the feet of those who are crossing the bridge," said Primo's Marco de Boer, the system designer on the project. "RENA's electronics are as important as Michele De Lucchi's architecture, Philippe Martinaud's lighting treatment and the fixtures themselves in the success of this project."

Photo by: Ivane Goliadze

Four lighting programs on the canopy create a light sculpture that seems to change constantly

DRAMA IN WHITE

From 90 minutes before sunset until 90 minutes after sunrise, four different lighting programs run on the canopy every hour.

At times the bridge appears to light up in waves from one side of the river to the other. At other times the pattern begins with a band of light at either end, continues from either direction until the light meets in the middle, and then fades to black before starting over.

A third program starts by lighting the outer fixtures trimming the roofline, then briefly illuminates the entire canopy before going entirely dark. The fourth makes the roof twinkle like an understory of stars as different groups of fixtures light and dim across the entire bridge span.

Meanwhile, on the bridge walkway, the low-power linear LED arrays embedded in the protective glass railings are triggered by motion sensors as pedestrians pass, making it seem as if the bridge is lighting the way for each

Photo by: Ivane Goliadze

The modern bridge with its dancing white lights forms a striking contrast with the historic buildings in this capital city of 1.5 million

person who sets foot on it. In addition, a message that renders the periodic table of the elements in Morse code scrolls across the two parapets every hour in what Martinaud has called a communication that "celebrates life and peace between people" – hence the "Bridge of Peace."

Considering Georgia's difficult history as part of the former Soviet Union and its 2008 war with the nearby republic of Russia, the name is apt. But even without that symbolism, Tbilisi's Bridge of Peace has taken its place as a local landmark. With its all-white interactive LED light show illuminating the river for hours every day and night, the bridge is a study in a new kind of art made possible by solid state lighting technology: essentially painting with light.

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