

# GLOWING REPORT



An effective lighting design can make all the difference to how a bridge appears at night time, but as **Faith Baum** explains, it is not just about deciding where to put the lighting units

During the day, a signature bridge is defined by daylight and shadow, revealing the structure in ways over which lighting designers have little control. But at night, that bridge becomes an empty canvas which can be 'painted' with light to show it off in unexpected ways. While architect and engineer can design a bridge form to create a daytime landmark, a lighting designer can define that form against a background of darkness to create its night-time signature.

Aesthetic lighting may be desired for a whole variety of reasons. One owner may wish to create a landmark for the community and might be willing to pay a premium for it. Another might want to address cultural or environmental sensitivities while creating a night-time signature. Or a client may need a new river crossing, and may include aesthetic lighting because, to quote one such client: "Adverse visual impacts are not consciously designed into a project. They creep in when decisions are made without considering visual consequences."

For the Maumee River Crossing in Toledo, Ohio, the Department of Transportation and



Top: for the competition for the Missouri River Pedestrian Bridge, IA illuminated the curve of the bridge and the articulated underside

Above: lighting of the cable stays, floodlighting of the pylons and a line of light emphasising the connection between the banks of the river for the Mississippi River Bridge in St Louis, Missouri

its design team collaborated with local stakeholders to develop a signature, cable-stayed bridge reflecting the history of the glass manufacturing industry in the city. In design charrettes with community members and government officials, lighting was critical to the success of the final design, which is a pylon encased in glass. At night it will glow with coloured lighting that may be static, such as red for Valentine's Day, or move and change,

for example to coordinate with an event at the city's annual jazz festival. LED lighting and a sophisticated lighting control system will make all of this possible, while an astronomical time clock will minimise the amount of ongoing maintenance the lighting system requires once the 'events' have been programmed.

Another project recently designed by Illumination Arts is a bridge in the United Arab Emirates, which will be the gateway to a new island community. The lighting will help to enhance and enforce the link between the communities on either side of the bridge, while allowing the view of the island to be the visual centre-piece for travellers. In this case, the lighting 'event' will express the beauty and strength of the structure, while incorporating movement, colour and playfulness into the design.

A third example is a bridge in the USA that will replace one destroyed by Hurricane Katrina in 2005. As might be expected, the new bridge will address many of the structural concerns raised by the failure of the original bridge. However, the owner has also asked Illumination Arts to design a simple aesthetic lighting system. Instead of being a purely functional bridge, 'necklace' lighting and pier floodlights will help to create a night-time signature for the area and provide evidence of the resilience of the devastated community.

The development of aesthetic lighting on a bridge typically involves the participation of interested parties at many levels. A lighting designer is part of a team that might include an engineer and architect, as well as stakeholders, and the process begins by analysing what the community and stakeholders want, while also assessing the context of the bridge.

What do the stakeholders want? The owner's requirements may be entirely driven by the budget, but the desires of the community may be much more emotional; the designer needs to be able to help stakeholders articulate their preferences. When assessing the context of the bridge, the most obvious thing is the physical context, but it is also necessary to think about the environmental, cultural, political and aesthetic context of the bridge.

In terms of the physical context, it is important to look at how the surrounding structures are illuminated; how long the bridge is, and think about who will see it and from where.

At the design charrette for the Indian River Inlet Bridge in Delaware, there was little question that the bridge required aesthetic lighting. Located within a state park, less than 100m from the Atlantic Ocean, the bridge needed lighting that was appropriate for that physical context. A design of deep blue uplights, controlled to minimise light pollution would allow the campers in the park to continue to appreciate the night sky, while also enjoying the view of this elegant and beautiful structure.

There were two main lighting components for the bridge; the first consisted of recessed, metal halide uplights, mounted in the central beam between the north and south lanes of the roadway and directly under the cable-supported arch. The beam spread of the uplights was narrow to minimise the amount of light escaping beyond the curve of the arch, and the angle of the lights was adjustable for additional control. Low wattage lamps, combined with deep blue filters, ensured that any light that might escape would blend with the night sky. In addition, the stakeholders and design team agreed that roadway lighting was not

necessary, and that security lighting for the pedestrian walkway was not a priority. However, it was important that pedestrians and cyclists had sufficient light to cross the bridge safely, so a low level, LED steplight was designed to be integrated into the vertical supports of the railing to illuminate any potential obstructions.

The environmental context would involve consideration of whether there were concerns or even legislation regarding light pollution and/or light trespass at the site. Designers must address any specific concerns related to wildlife, for example such as bird migration routes, and whether the area is legally protected in any way from a design that may be considered intrusive by a particular organisation or group of people?

In the early 1970s the St Croix River in Minnesota was designated a 'wild and scenic waterway' by the US Congress, but this legislation became a sticking point in attempts to replace the existing 70-year-old lift bridge. Several designs were developed over a period of years, but none was ever realised due to conflicts between the environmental legislation, the historic landmark designation of the lift bridge, and other concerns about appearance, cost, traffic, and environmental impact.

As the design for the new river crossing progressed, both the stakeholders and the



Far left: lighting the interior of the truss created a unique view of the Tobin Memorial Bridge in Boston, USA

Left: repairs and improvements to the Market Street Bridge in Wilmington, Delaware included aesthetic lighting to enhance the historic details of the structure and provide low level pedestrian lighting as well

design team concluded that attention to the lighting was necessary to avoid any adverse visual impact that might otherwise 'creep in' to the final appearance of the bridge. The aesthetic lighting is intended to reveal the unusual forms of the bridge using different levels of light on each element of the structure. A glass enclosure, located between the two curved faces of the pylon, will glow at night. Openings above and below the bridge deck, and contained by the dual pylon legs, will be illuminated with directional downlights that will light the space between these piers. These will be the brightest areas of the bridge, and will highlight one of the most unusual elements of the structure. Low wattage uplights will softly wash the cables and light the outside faces of the pylons above and below the deck. This will create a hierarchy of brightness that will help to define the curved forms of the pylon legs. To prevent the bridge appearing as a 'necklace' of lights, roadway lighting will use full cutoff luminaires and will be located between the eastbound and westbound lanes. Additional lighting of the pedestrian path will be achieved with custom LED luminaires integrated into the curved handrail. Similarly for cultural context, designers should investigate what is appropriate for the people who live there. Are there any symbols or images that might be particularly meaningful, or even offensive, to those people? How does the design of the bridge reflect the culture of the people who live there? At a charrette for Four Bears Bridge in North Dakota, the stakeholders included a group of representatives

definition, a signature bridge is developed both as a means to cross a body of water and as an icon for its community. Even in the most environmentally-sensitive areas, if the bridge is allowed to remain unlit at night, the structure does not disappear; it merely becomes a lightless mass on the skyline. Highway or security lighting then becomes the only lighting defining the bridge, and the designers of the daytime image have completely lost control over the aesthetics of the night-time image. The structure blocks the view, but without providing an acceptable alternative.

Aesthetic lighting does not need to illuminate the night sky to be effective. Revealing the form of a bridge or subtly defining its horizontal and vertical lines can be enough to create a visual signature while protecting the night sky. The use of timing devices or other strategies can protect wildlife that might otherwise be adversely affected by the lighting. Downward-directed and/or well-shielded light sources, low wattage lamps, and careful placement can all help to create a lighting design that is appropriate for such a site.

Ultimately, aesthetic lighting can achieve what nothing else can: a unique, night-time signature that increases civic pride, attracts visitors to the site and transforms a structure into an icon for the community ■

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