

Glasgow leads the world

FAST FACTS

Industry

Outdoor Architectural

Customer

Glasgow City Council

Contractor

Lightways Limited

Lighting challenge

To light the bridges' external and under-arch surfaces

Lighting solution

The solution was found in Philips 58W linear cool white LEDline luminaires, chosen for the clean line and low profile.

Products

- 58W linear cool white LEDline floodlights
- 150W metal halide floodlights

Benefits

- Dramatic night-time effect
- Emphasis of bridge structure
- Creates a beautiful reflection from water down below

Contact

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Three Clyde bridges shine in the light of the future

The Background

Three of Glasgow's bridges over the Clyde, the George V, the Glasgow and the Victoria, have been dramatically and beautifully floodlit using a new light source – high-intensity light-emitting diodes (LED's). This is believed to be the first time LED's have been used as the predominant light source on a bridge anywhere in the world.

The Challenge

Each of the three bridges is around 120m long, and the broad brief to the designer was to light the bridges' external and under-arch surfaces, whilst taking into account the cost of installation and ongoing maintenance cost.

The Lighting Solution

With the brief in mind, the lighting design section of Glasgow's land services conducted trials with conventional light sources such as linear fluorescent, high-pressure sodium and self-coloured metal halide before selecting Philips LEDline utilising high power LEDs as the most appropriate luminaire/light source to fulfil the brief. The LEDline was able to create intense show-stopping effects, with all the advantages of extra long life, cool running and simple maintenance.

“The excellence and strength of the colour far exceeds our original aspirations. It provides a bold and positive statement linking the two sides of the City. It also provides a constant visual moving effect with the changing heights, waves and tidal flows of the river. Our challenge was not only to produce a beautiful scheme, but also to provide a low cost maintenance installation. The application of LED's for floodlighting three major road bridges should do the job. The luminaires should last for 20 hours, burning for 2,500 hours a year, so effectively this is a fit-and-forget installation.”

John Fagg, Glasgow City's designer responsible for the scheme.

From all viewing positions the night-time effect is dramatic. There is a strong clarity of colour, continuity and emphasis of the bridge structure. The relationship of the blue underside arches with the white balustrades complements the bridge, and the even continuous effect resulting from the linear floodlight creates a beautiful reflection from the water below.



LEDline



LEDLines – floodlights of the future?

Glasgow's bridges are lit by easily-installed Philips LEDLine 1.2m linear floodlights, each containing 4 modules of twelve high-brightness Luxeon Star 1W LEDs. The LEDs used are Luxeon LEDs by LumiLeds, a company that is a joint venture between Agilent Technologies and Philips Lighting. Luxeon LEDs are a considerable technological advance on the tiny red, green and yellow LED's used for signalling purposes on today's electrical equipment.

The technical details

Like all LEDs, LumiLeds Luxeon LEDs produce a specific wavelength of light at the junction of a solid-state diode 'poisoned' with materials chosen according to the colour of light required. Consequently, they are entirely solid-state, with no filaments, glass envelopes or vacuum tubes to break or go wrong, and therefore have life expectancies usually equalling or exceeding that of the equipment in which they are installed.

Unlike ordinary LED's, LumiLeds Luxeon LEDs contain heat sinks to increase power handling capability and therefore light output. Because the light-emitting area of an LED is small (typically 1 sq.mm), precise optical control is possible. Whilst lens systems can be designed as part of the LED module to focus the light, in the case of the Philips LEDline floodlights, Philips have created an optical system built around the LED. The LEDline features a unique optical collimator (lens), designed to efficiently capture the light emitted by the Luxeon LED and focus it into an intensive tight $2 \times 3^\circ$ beam. Spacing and light distribution are designed so that the floodlight appears to project a continuous linear sheet of light. The result is a beam that, in this case, has the power to wash concave curved surfaces up to 20m. This enables the LEDline to create a blanket lighting effect on the under arches of the bridge, grazing the surface to reveal the form and texture in a way that would be impossible to achieve with any other luminaire/light source combination currently available.

High power LEDs may well prove to be the light source of the future. They are already superior to conventional tungsten and halogen light sources in terms of luminous efficacy; the rate of development from companies such as Lumileds is so fast that they are soon

expected to rival the efficacy and light quality of fluorescent and discharge lamps.

The benefits of LEDs

The decision to use LEDline for the bridges on the Clyde was in many ways due to the unique benefits LEDs can bring to all lighting applications. These can be summarised as:

- Life expectancy is a massive 50,000 hours for only 5% failure incidence – twelve years of year-round burning during the hours of darkness. This is a massive cost and labour-saving benefit, particularly if luminaires are difficult to access, as is the case with bridge applications
- LEDs are low-voltage devices, and are therefore safe to use near people, even outdoors and in wet conditions. Philips LEDline is run at 55V DC.
- System efficacy is high, giving exceptionally low lighting ownership costs.
- Unlike discharge lamps, full light output is obtained as soon as the devices are switched on.
- LED's can be switched on and off indefinitely without affecting life expectancy.
- Dimming to extinction is possible without affecting life expectancy or causing colour shift.
- Since LEDs can be manufactured in virtually any colour, the need for colour filters, with associated light loss, is eliminated. The blue effect on the bridge is pure and strong. This colour effect would be extremely difficult and costly, if not impossible to achieve with traditional floodlights.