Case study

Zeeburger tunnel refurbished with T-line LED lighting

Location	Zeeburger Tunnel, Amsterdam (The Netherlands)
Lighting solution	T-line

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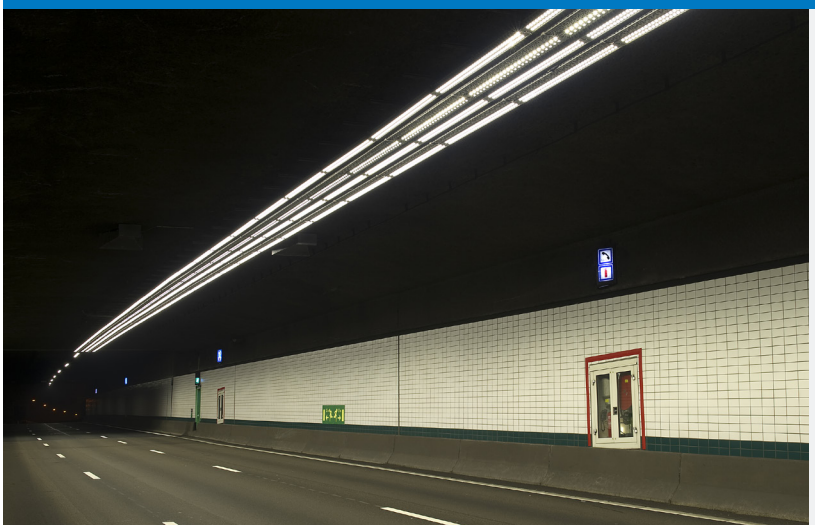
Johan Bal
Project manager at Vialis, responsible for the project



Fast facts

Client
Rijkswaterstaat

Location
Amsterdam, (The Netherlands)

Year
2012

Lighting plan
Philips

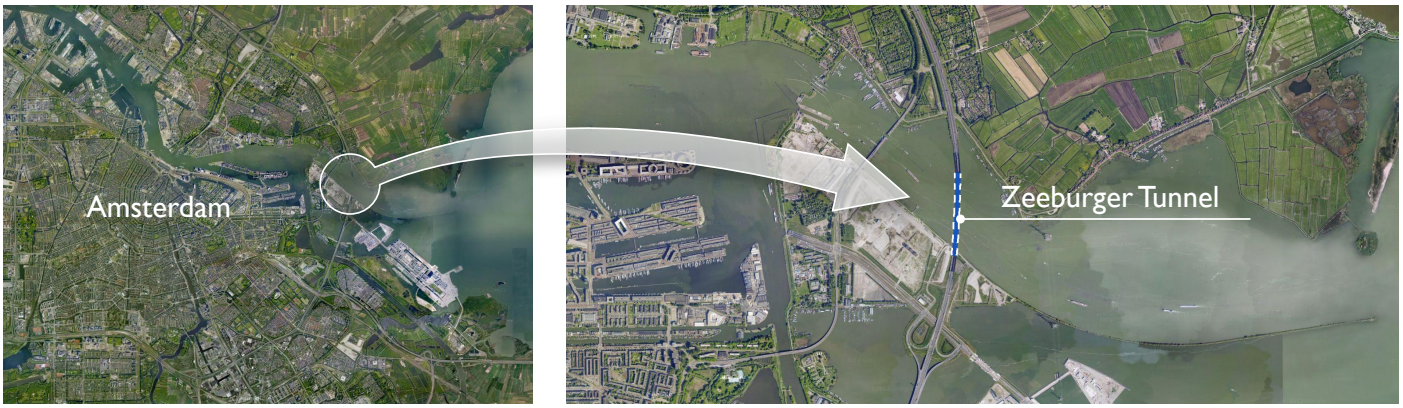
Lighting solution
T-line entrance - 420 luminaires
T-line interior - 574 luminaires

Background

End of 2012, the T-line was installed in the Zeeburger Tunnel. Following the successful installations in the Vlake Tunnel and the Heinenoord Tunnel in The Netherlands, Vialis (commissioned installer) and Rijkswaterstaat (Dutch authority for Infrastructure and Transports) also opted for the special LED tunnel luminaires from Philips Indal for the replacement project in the tunnel near Amsterdam. A tremendous improvement of the light quality and reduction of the energy and maintenance costs are the main results.

The Zeeburger Tunnel was first opened in 1990, the 546 meter tunnel is part of the A10 motorway (eastern ring road near Amsterdam).

The tunnel passes under the canal Buiten IJ and connects the Zeeburger Island and the North of Amsterdam.



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The Project

The Zeeburger Tunnel is the third tunnel in the Netherlands to be equipped with the T-line. The T-line has several advantages compared to equivalent tunnel lighting solutions.

T-line is equipped with Philips proven LED technology, the surface of the T-line is smooth, which makes the luminaire easy to clean. In addition, lamps no longer need to be replaced during the normal service life of the installation, which significantly reduces the maintenance costs for Rijkswaterstaat. Moreover the LEDs will operate for at least 15 years.

The Solution

In 2010, the Vlake Tunnel became the first tunnel in the world with a LED line lighting installation. The Heinenoord Tunnel followed in the spring of 2011. Based on the experiences gained in the two tunnels – energy savings of 50% and an improved vision and guidance for road users – the choice was once again made for T-line for the Zeeburger Tunnel. Both the interior lighting and the entrance lighting are equipped with the T-line lighting concept .

Maintenance is being carried out on the tunnel by VolkerRail. In June 2011, the company was given the assignment by Rijkswaterstaat to replace the installation. To do so, VolkerRail asked for the expertise of Vialis, another VolkerWessels company, which specialises in mobility solutions. Preparations began even before the end of the summer holiday season. The actual work on the tunnel began in October. "By then we had also approached a number of lighting suppliers and compared their products. Philips emerged as the best of them all", says Johan Bal, project manager at Vialis and responsible for the project. "The selection was made together with Rijkswaterstaat", he says. "A major advantage of Philips is that it was the only supplier in the Netherlands that already had experience with LED lighting in tunnels. We then investigated at whether they could meet the set of requirements for this project."

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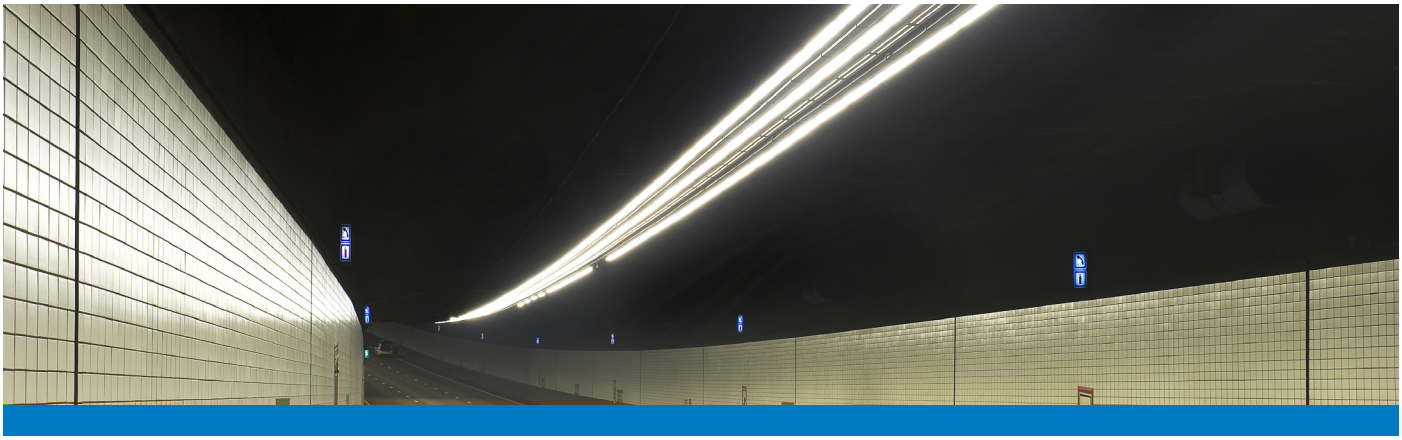

Lighting concept

The entire Zeeburger Tunnel is equipped with T-line tunnel luminaires. That means that the T-line interior lighting (48 LEDs and 50 Watts) have been combined with the T-line entrance lighting (72 LEDs and 130 Watts). To remove the old luminaires - each of which weighed 200 kilograms - Vialis designed a mobile working platform: a container module on a lorry in which all of the necessary equipment was available, such as a generator and an air treatment unit to enable the work to be carried out safely. Moreover, as a result of this solution, road users experienced very little inconvenience caused by the work activities.
"It also immediately provided a physical safety barrier for our employees, which was moveable and it was not necessary to close an entire tunnel for four consecutive weekends. This enabled us to carry out the work at night, while keeping one lane open for traffic and reducing the total installation costs."

The preference was for line lighting, which offers more comfort for the road user. Thanks to the lower energy consumption and TCO of LED, line lighting is feasible as tunnel lighting solution.

In combination with the clear, cool white light of the LEDs, which is better for the eyes, line lighting does not cause an irritating flicker effect, such as with point for point lighting. "In the entrance lighting the optics were installed asymmetrically, so that road users are not forced to look directly into the light (no glare)", explains Johan Bal. This is one of the major light technical advantages of the T-line: the LEDs in the luminaire can be aimed very precisely: on the ground, on the tunnel wall and at every desired angle. The special T-line entrance luminaire enables effective counterbeam lighting. By allowing the light distribution at an angle of less than 70 degrees, the light reflects well on the road and does not glare the road user.

Operating system

The base count computer, the operating system for the lighting, is operated remotely from the Northwest Netherlands Traffic Control Center, which operates and monitors all tunnels in the province of North-Holland. As Johan Bal explains: "Generally speaking, the installation works automatically: the light intensity is controlled by means of a light cell, but the light cells can be adjusted and dimmed manually from the control center.
"The luminaires are delivered with a pre-installed plug. The cable runs through a cable conduit and drop pipe to the central tunnel console, where all driver boxes are located. "Twenty interior luminaires or ten entrance luminaires are connected to each driver box, however, each has its own driver. The luminaires can be dimmed from the computer by means of an address system."

Benefits

- Fit and forget. Lamps no longer need to be replaced during the normal service life of the installation, which significantly reduces the maintenance costs and tunnel closures.
- Improved road safety: cool white light of the LEDs and line lighting installation do not cause the irritating flicker effect, such as with point for point lighting.
- Energy savings of 50%.
- Succesful previous experiences in The Netherlands: Vlake Tunnel and the Heinenoord Tunnel.

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