



PHILIPS

Tunnels

Public lighting



TOMTEBODATUNNELN
102 m

Case study

Dynamic controlled
LED lighting
in the Tomtebododa tunnel
Stockholm, Sweden



The tunnel entrance has some appealing architectural **dynamic RGB lighting**



The Tomtebodas tunnel has been renovated. The entire facility – all tunnel lighting and other technology – is networked via a lighting control system. This means that the tunnel can be monitored and controlled remotely through a computer or touch panel.

Background

The Tomtebodas tunnel is a 102 meters long road tunnel in Vasastaden, Stockholm. The tunnel has two lanes for traffic going south from E4/E20 (Norra Länken) to Klarastrandsleden. The Tomtebodas tunnel used to have problems with water leaking in and freezing over on the road and tunnel walls during the winter. In order to fix these problems – by applying shotcrete inside the tunnel walls – the tunnel was closed to all traffic in 2011. At the same time the Traffic Administration Office decided to refurbish the lighting installation. The high-pressure sodium lighting that had been in use since 1991

needed replacement. The Traffic Administration Office wanted to try LED and dynamic lighting controls for the tunnel lighting, reduce power consumption, reduce maintenance costs and have a lighting installation with long lifetime reliability.

More challenges

“I saw the Philips tunnel lighting system T-Line for the first time at the Light+Building trade show in 2012. The main reason why we chose the Philips tunnel lighting system was



Tunnel & Underpass

“

Because the entire installation is based on network technology, **the support was facilitated by Philips engineers and lighting experts** around Europe and even in New Zealand.”

Mats Nilsson

Elfströms Tekniska



because back then the T-Line LED luminaires were the first in the industry that were fully controllable and could be remotely dimmed to any lighting level. When we had installed the cable racks, luminaires and driver boxes the concrete began to crack. Everything had to be dismantled and part of the concrete was reapplied. After that the LED luminaires, cable racks and driver boxes were re-installed. In conjunction with this it turned out that the Swedish Transportation Administration had built another bridge – as part of the Norra Länken project – connecting to the Tomtebodavägen tunnel exit. This meant that the tunnel exit lighting conditions had changed. The brightness and evenness of the light was not satisfactory. In addition, the place where the B-Scout Master control equipment was initially located was to be shut down and be emptied. This – at the end of 2013 – we worked with Indal, now acquired

and integrated in Philips Lighting”, says Marika Andersson, Lighting Engineer at the Stockholm Traffic Administration Office.

The Project

“In conjunction with the control system B-Scout Master being moved to a new place close to the tunnel entrance at the end of 2014, we repositioned some of the tunnel lighting. The exit lighting was increased and lengthened with a number of additional T-Line luminaires with their own photometer and the control unit was extended with a supplementary database. The luminance control customizes the exit lighting according to the outside light level as accurately as possible”, says Marika Andersson.



68 T-Line LED linear luminaires are installed side by side on a cable tray in the center of the tunnel ceiling. The luminaires, that are made of aluminum, are corrosion-resistant. The mounting flanges are made of stainless steel and the clamps are made of plastic to avoid corrosion between the luminaires and the mounting flanges. The luminaires produce a neutral white light at 4000K color temperature. Regular light measurements are performed in order to optimize the Tomtebodavägen tunnel lighting. The lighting is controlled remotely by the B-Scout control system. The entrance lighting receives a signal from a luminance photometer outside the tunnel that measures the lighting

conditions outside the tunnel entrance. That way the entrance lighting accurately compensates for the entrance lighting conditions.

The tunnel entrance ceiling also has some exciting colored grazing lighting. Ten RGB fixtures LEDline are controlled by a dynamic DMX control system. The lighting has five different striking scenes that change around the year. We can reconfigure the architectural lighting and choose lighting colors for different events, such as the Eurovision Song contest, or holidays such as the National Day of Sweden.

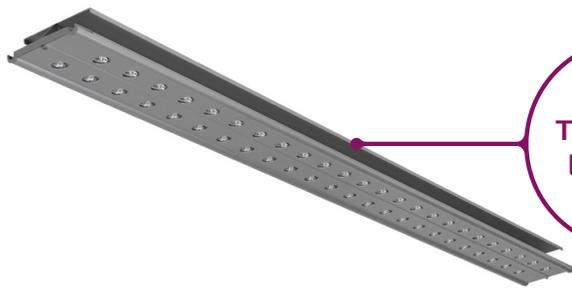
In 2015 we installed new Philips guidance lighting with separate

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Marika Andersson

Lighting Engineer, Stockholm Traffic Administration Office



T-Line LED luminaire



LEDline

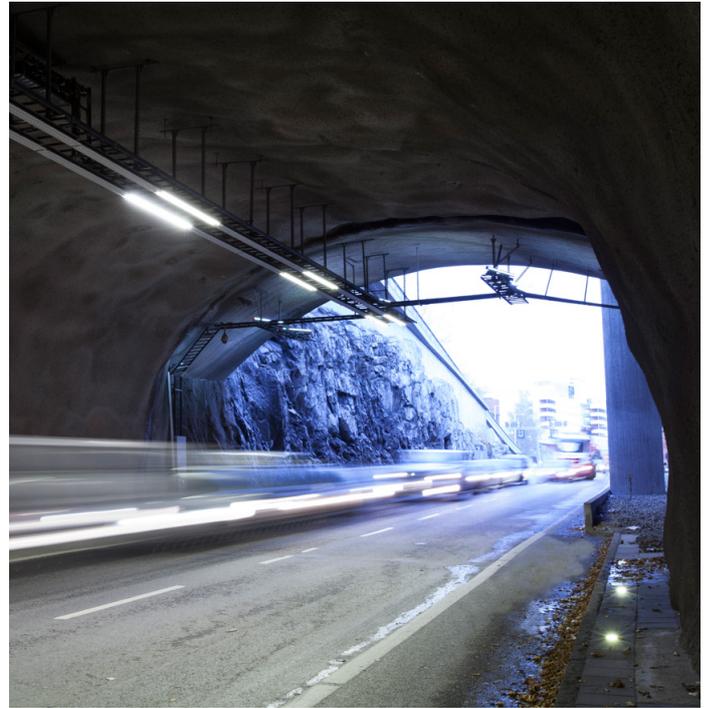
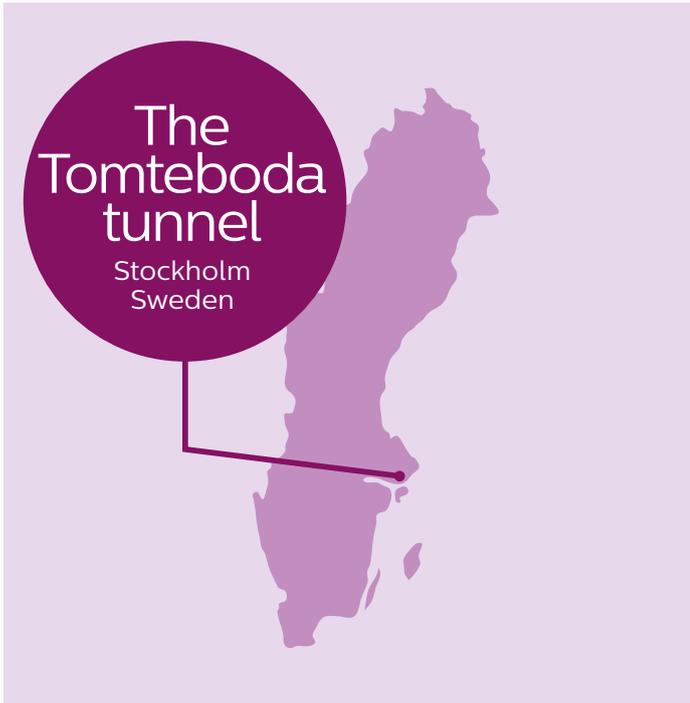


B-Scout Master



Guidance markers





controls. The markers are recessed into concrete slabs on the ground along the left side of the road. We can choose how we want to use the markers – for example fixed lights or cycled lights along the road. It's a flexible guidance lighting solution, that can be easily adapted to the driving conditions.

The evaluation will take into account power consumption and maintenance of the facility and lighting performances – where the focus will be on light uniformity, lighting levels and glare, and getting data insights in the lighting conditions via the control and monitoring system. In addition, how the motorists perceive the lighting from a comfort and safety standpoint will also be taken into account. Thanks to the new LED technology and dynamic lighting controls, the Traffic Administration Office have the opportunity to make large savings. The power consumption will be at least halved, and the maintenance costs will be minimized.

Full scale test facility

The new tunnel LED lighting in the Tomtebodaboda tunnel has been in use since fall 2015. It's a full scale test facility that will be evaluated over a ten year period.



50% energy savings



Installation and maintenance costs reduction



Easy lighting control via remotely lighting system



Improved comfort and safety by 100% LED lighting





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