CASE STUDY

Asfinag Tunnel

Tunnel LED lighting

BUCK

PROJECT INFORMATION

Name
“Asfinag” tunnel

Location
A10 motorway, Salzburg - Villach (Austria)

Purpose
Public lighting, tunnel lighting

Year of completion
2020.

AUSTRIA

Location

The A10 - Tauernautobahn is an important internal Austrian north-south transversal between cities of Salzburg and Villach, with significant role in the European transport network. The A10, same as E55, is a part of a north-south transit axis across the Alps, eo ipso an important transit route from northern Europe to the southeastern regions.

Object

Tunnel St. Andra (UFT underground route 470m long) is located on the A10 - Tauern motorway near the centre of Villach, built during the construction of the Osvaldiberg tunnel and completed in 1988.

Disadvantages

The lighting system's evaluation in 2019 showed that a large number of the entrance (EFB) and transient (DFB) luminaires had serious electrical and mechanical defects. The suspensions and closures of the luminaire housing were severely corroded, the terminal strips were partially peeled and were cracking during opening and closing.

Challenge

The existing entrance lighting with high-pressure sodium light sources (NaH 1x400W / 250W / 150W / 100W) was to be refurbished with LED tunnel lighting using the existing installation, maintaining the light intensity control at 8 levels (12.5 / 25 / 37.5 / 50 / 62.5 / 75 / 87.5 / 100%).

The challenge, regarding lighting solution itself, was the distance between the luminaires that was not to be changed due to the ceiling construction with accentuated beams.

THE SOULUTION

All 280 existing luminaires, arranged in two entrance zones of the tunnel, were replaced by the same number of LED VISION tunnel luminaires in three power levels - **VISION 8, VISION 4 and VISION 3**.

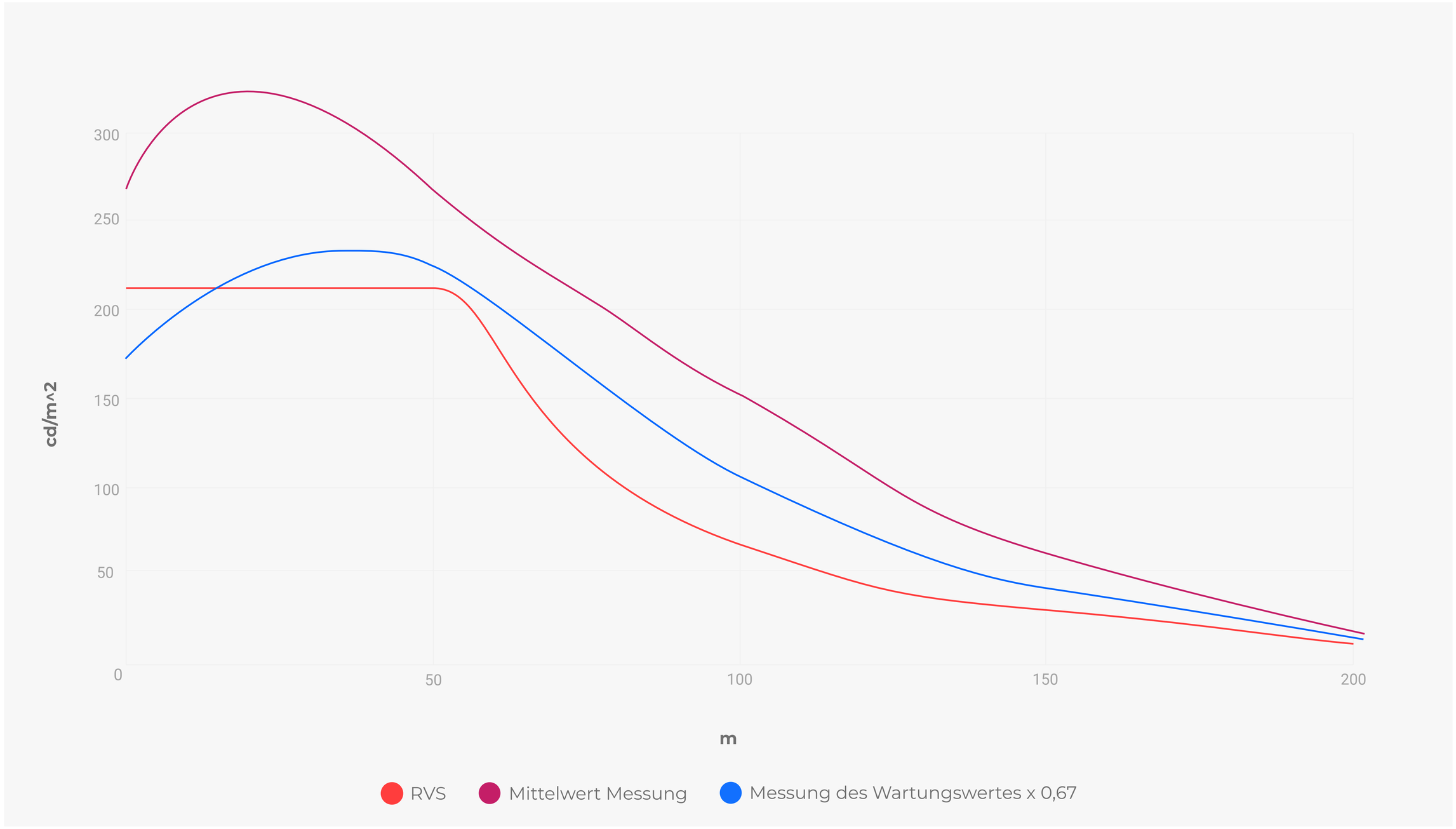
In accordance with the requirements, all the initial positions of the luminaires were successfully retained, as a result of a good choice of combined asymmetric optics. All the specifics of the requirements for tunnel lighting considered, led to achievement of an excellent, uniform lighting, without any flicker.

The required levels of light intensity have been achieved by incorporating a separate dimming signal at 50% of power for each of the luminaires.

According to the precise photometric measurements, it was concluded that the average luminance of the road surface, at the first part of the threshold zone, Lfe od 204cd/m², the overall uniformity of lighting Uo =0.65 and longitudinal uniformity Ul = 0.65, have thus fully fulfilled the requirements of the Austrian standard for tunnel lighting - RVS 09.02.41. Tunnelausrüstung Lichttechnik Beleuchtung, (luminance of the road surface Lfe min 200 cd/m², overall uniformity of lighting Uo min 0.40 and longitudinal uniformity Ul min 0.6.).

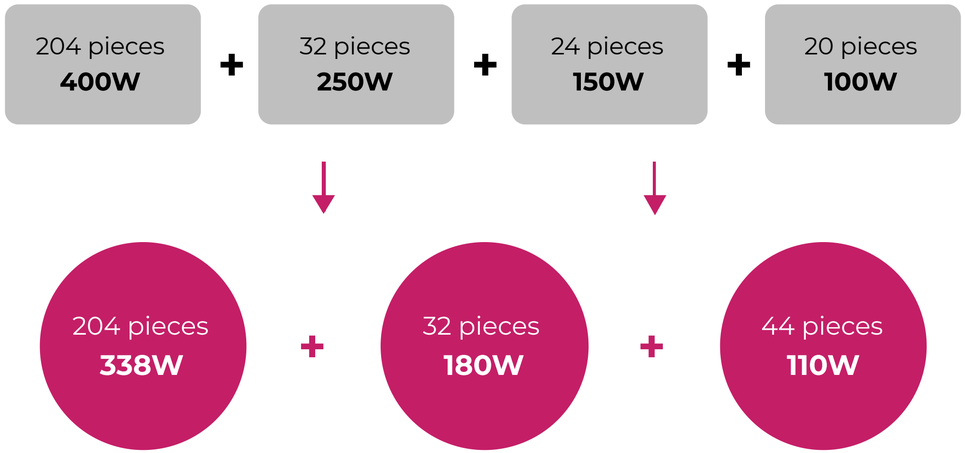
As prescribed in the standard, the tunnel wall is illuminated at a 2m height above the elevated evacuation route with Lav = 158cd/m² (at least 50% of the road surface luminance in accordance with the previuosly mentioned standard) with the achieved longitudinal uniformity Ul = 0.68 (required min 0.4) at a height of 1,0m above the trail.

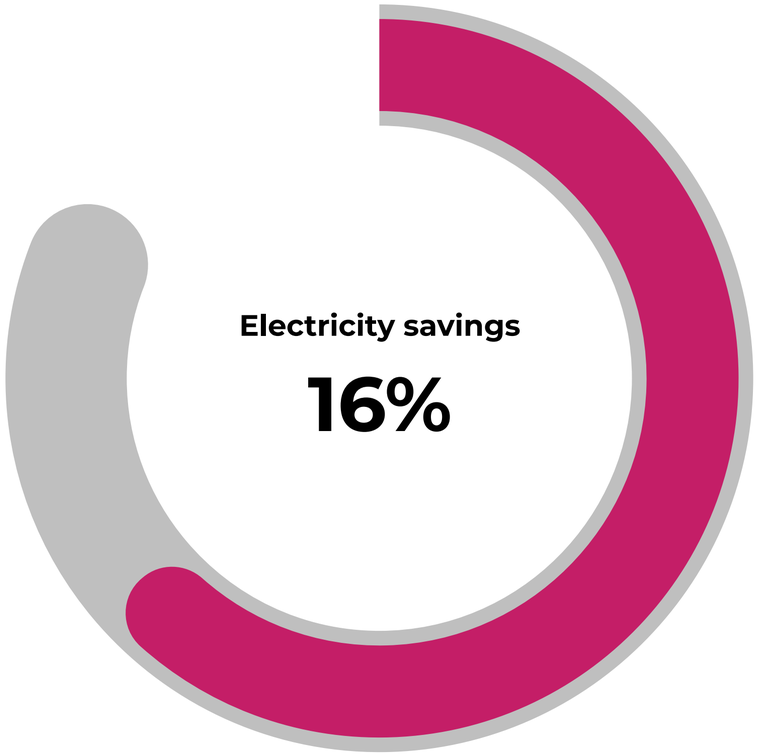
In the transition zone, the illumination was to be reduced from the level at the end of the tunnel's threshold zone to the illumination level of the inner zone, which was achieved by installing lower power luminaires. The Graph best depicts the achieved effect of the transition zone.


300
250
200
150
100
50
0
cd/m^2
50
100
150
200
m
RVS
Mittelwert Messung
Messung des Wartungswertes x 0,67

NaH luminaires vs VISION DB tunnel lamps - comparison

By comparing the previous lighting system with NaH (high pressure sodium) light sources with a total power of 95.20kW (204pcs x 400W, 32pcs x 250W, 24pcs x 150W, 20pcs x 100W) and the new lighting system with BUCK LED lamps VISION DB, total power 79, 55kW (204pcs x 338W, 32pcs x 180W, 44pcs x 110W) determined **savings in electricity consumption of 16%**.





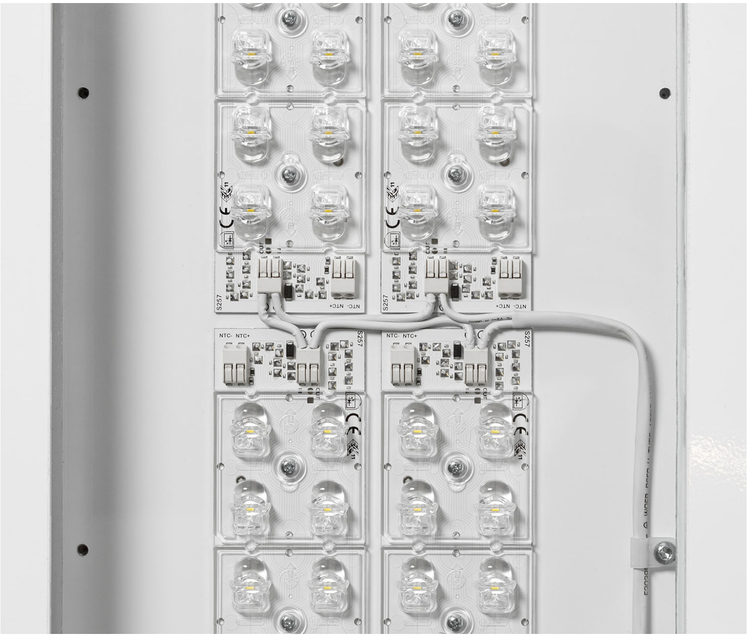
NaH luminaires
95,20kW

BUCK LED luminaires
79,55kW

VISION tunnel LED luminaires - application and characteristics

VISION luminaires are part of the **BUCK smart tunnel and subway lighting system**. A wide selection of light distributions provides an optimal solution for different types and zones of tunnels. The required intensities and uniformities of lighting are provided while achieving high energy efficiency.

Applicable in demanding and aggressive environments, thanks to the advanced technologies of corrosion, impact and overheat protection. They are characterized by a long service life, energy efficiency and reliability with low operating costs.



Project Benefits

With the realization of the new entrance lighting of the St Andra tunnel, the old generation of light sources that were mechanically and electronically unreliable have been replaced with VECTOR LED luminaire of a new generation with exceptional reliability and durability. The replacement of the luminaires was done in a ratio of 1 to 1, without additional work on the installations, while meeting all lighting and mechanical requirements and achieving savings in electricity consumption of 16%. The quality of the user experience in the usage of tunnels has been significantly improved, which is one of the most important goals from the aspect of traffic safety.

Investor Benefits

Maintenance time and work minimized. After such a successful project, BUCK continues to work with ASFINAG and STRABAG to renovate the tunnel in Austria, the case study of which is coming soon.

BUCK

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