Case study

Heathrow Airport Airside Tunnels.

Background

Pre-pandemic, Heathrow Airport was experiencing up to **250,000 passengers per day** passing through the various terminals whilst also catering for an annual throughput of over **two million metric tonnes of freight**, quite a logistical challenge in its own right. Unbeknownst to many, a significant amount of the operational logistics of the airport happens underground in seven air-side traffic tunnels beneath the entire complex.

This network of vehicle tunnels provides unfettered access for fuelling trucks, baggage handling vehicles and general airport staff circulation. It spans between terminals, ultimately minimising the traffic on and around the aircraft taxiing areas and aprons. All of the tunnels are subject to the same road tunnel lighting standards as any highway or motorway tunnel and the fact that these tunnels, if placed end to end, would be in excess of 6km long, the environmental impact alone of over 4,500 lighting points is quite significant





Solution

Having originally provided the lighting for these tunnels in 2005, TRT Lighting had a vast knowledge of the network and of course what we could offer as a replacement to a lighting installation that is now more than 16 years old. As it happens, our circular economy hats were already being worn back in the noughties as we had the vision back then that our luminaire housings would be fit for purpose for a minimum 30 years of service life.

The same cannot be said however for the conventional gear and lamp within each enclosure. Having operated continuously for over 130,000hrs, the existing technology, whilst being pioneering at the time using DALI dimmable discharge lamps and gear, had reached its end of life. With easily removable gear trays, lamp holders and reflector assemblies already designed and incorporated into the product some 16 years ago, the ability to retain the existing luminaire carcasses and upgrade the integral light engines and control devices was a fraction of the cost compared with a complete refit of all tunnels. Of course, going hand in hand with this significant cost saving for the client, is there-use and re-purpose philosophy that forms the basis of the circular economy approach to our products.

Working with TRT lighting, a cost saving benefit was seen to be made in the Heathrow road tunnels by installing LED lighting in place of our existing HPS lighting. As well as improving safety, reducing energy consumption, and reducing Opex costs in line with Heathrow's sustainability objectives.

TRTLIGHTING

TRT had developed a retrofit LED tray that replaces the HPS components inside the existing housing to offer a much simpler alternative to a full relighting option. Each of the boost lighting replacement trays is approximately 55% of the power with the equivalent light output and the basic lighting trays can be as low as 28% of the existing power. Including the cost for all components and installation, the replacement system will return an estimated payback in year 4. Following this an estimated saving of over 12k per annum.

Simon Jacobs Senior Engineer – Low Voltage Heathrow Airport Limited

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Knowing the tunnel network inside out, in conjunction with P.Ducker Systems Ltd (PDS), we were able to develop a new retrofit LED solution which not only brought a new lease of life to the tunnels but also delivered significant energy savings to the airport. With every I ighting point having a specific set of DALI parameters and addresses, each retrofit light engine was manufactured and labelled with exactly the same settings allowing a seamless integration into the existing PDS control system. With a phased installation programme in place and limited access time to each tunnel, the speed and ease of the retrofit process was paramount.

Equally important was the fact that, irrespective of where the installation had reached at the end of the shift each night, we were able to completely open and operate all tunnels in automatic mode, albeit with a temporary mixture of LED and discharge light sources. With a swap out time of less than 10 minutes per lighting point, any disruption was also kept to a minimum from the outset.

Who knows what these luminaires will look and operate like in another 16 years and what lighting technology will be available then? All we know is that by maintaining our core principles of re-use and re-purpose, we may well be retrofitting yet more advanced technology in these original luminaires for a second time over a 30yr+ timeframe.

Outcome

Predominantly, factors such as energy saving and a reduction in maintenance costs were the driving forces from the client's perspective. With a significant reduction in maintenance activities already being achieved, plus a minimum 45% energy saving across the seven tunnels, the ultimate goal was most certainly achieved, especially considering the return on the investment will be realised in year three.

From a TRT Lighting perspective, our forward-thinking design principles almost two decades ago came to the fore on this project and allowed a very detailed, yet simple, site wide upgrade programme to be developed and met with minimal impact on the operation of the airport. More importantly, this was all achieved with a 'Maintain, Prolong and Share' philosophy in mind. Thus keeping original manufactured products and materials in use by prolonging their useful life with no detriment to the application. The benefits of which will be shared amongst both the users and asset owners for years to come.

For more information



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