

**Urban lighting in  
Lech am Arlberg**





**Municipality of Lech am Arlberg, Lech am Arlberg | AT**

Client: Municipality of Lech am Arlberg, Lech am Arlberg | AT

Lighting design: Dieter Bartenbach, Innsbruck | AT

Electrical installation: Elektro Müller GmbH & Co KG, Landeck | AT

Lighting solution: Pole and façade luminaire SUPERSYSTEM outdoor, situation-specific assemblies of 6 to 34 LED tubes, central Zumtobel outdoor lighting management system with web interface



### **Shining a light on an exclusive ski resort**

Nestled in an impressive mountain landscape, this world-famous ski resort stretches through the Tannberg district along the River Lech. Lech am Arlberg has a population of 1500 people, 8500 guest beds and almost one million overnight stays each year. The “most beautiful village in Europe” makes a good living from tourism, because in addition to the beautiful scenery, Lech is also known for other features, such as the ski resort, the visitors, the hosts – and most recently the new lighting concept. As was the case in many other towns and communities, the nightly townscape of Lech was previously blurred by “a mess of lights”. This effect was created by a conventional lighting system using open light luminaires. In his capacity as a process-oriented lighting consultant, Dieter Bartenbach was responsible for gaining the support of politicians, the administration and local hotel owners for the renewal of the outside lighting facilities. The mountain river plays a key role in the new lighting solution, as the riverbank and the adjoining walls are now illuminated by targeted lighting. Visible spatial depth is created by focusing the light on prominent objects. Now the church, an old wooden bridge, groups of trees and the hotel façades all form part of the lighting scene at night. And the nice thing about it is that one single family of luminaires performs all the lighting tasks – either mounted to façades or with the help of just a few poles.

# Light creates space

## The future of urban lighting



“Residents and tourists want to experience the different areas. Therefore we are moving away from conventional street lighting concepts that use products like open light bell luminaires. In Lech am Arlberg, a differentiated lighting concept is used to integrate the mountain river, trees and façades of prominent buildings. In this way, we were able to provide orientation points and allow individuals to truly experience this place.”

Dieter Bartenbach, process-oriented lighting consultant, Innsbruck | AT  
[www.dieter-bartenbach.com](http://www.dieter-bartenbach.com)

### **Mr Bartenbach, what was the idea behind the town lighting concept?**

Complex spatial structures and different sequences of spaces and places turn cities and towns into interesting places. At night, it is normally impossible to experience this spatial complexity and the access points are difficult to ascertain. In part, there is also a lack of recognition value. There is therefore a considerable deficit in terms of orientation and guidance. The reasons for this situation can be found in the conventional street lighting concept using bell luminaires, which produce a lot of glare, and also the sometimes extreme illumination emanating from shop windows and advertising facilities. In both cases, the light sources become glaring points or areas of light because of their density. People lose their sense of space if their gaze is directed at the source of the glare, because they are no longer able to experience the space and its structure. Another problem of diffuse and open light concepts is that 60 percent of the light is emitted into the sky without any constructive function, which creates unnecessary light pollution.

### **So what concepts are you planning to use to solve these problems?**

I am relying on an integrated view of light and space, with the goal of visualising the typical elements in that space as well as providing proper basic lighting. This should maintain the recognition value of the urban landscape at night and also lend a tangible sense of space to the surrounding environment. This approach is based on a distribution of intensity, in terms of a theoretical luminance model that uses the hierarchical structures with their spatial sequences, lanes, places and expansions as orientation points. This in turn draws attention to these aspects and turns them into something tangible. Access points are highlighted with more intensive façade lighting at the corners of buildings. Significant vertical features, such as façades, which are defining elements of spatial quality and orientation, are also illuminated. This creates a clear sense of guidance. Minimal basic lighting is sufficient for the safe illumination of transport connections and footpaths.

### **What are the advantages of this type of lighting?**

The spatial structure is ideally visualised with the proper illumination of vertical and horizontal surfaces. In this regard, both the number of luminaires and the energy consumption can be reduced to a minimum. Groups of luminaires can be turned off to change the spatial environment and to adjust the lighting to reflect visitor frequencies. A typical schedule could look like this: All systems are in operation from dusk until 10pm, when the façade illumination systems are turned off. At midnight, the brightness of the street lighting is reduced by 50 percent. Compared to conventional candelabra lighting, this lighting concept reduces energy costs by around 60 percent. At the same time, the lighting level is increased significantly and other benefits follow, such as a strong sense of comfort and safety.



Efficient LED luminaires and centralised lighting management guarantee minimum electricity consumption.



“The improved night townscape is an investment in the future in many different ways. The new town lighting creates a positive atmosphere and generates considerable savings in terms of energy costs. Never before has a change in the urban core of Lech been so positively received – guests and residents are very excited.”

Ludwig Muxel, Mayor of Lech am Arlberg | AT

## Space creates identity

Space-creating lighting concept



The mountain river defines the townscape during the day – and now the same can be said at night thanks to the new lighting system. LED tubes attached to the lighting columns direct light towards the riverbank and the surfaces of the adjoining walls.



The image of a tourist town is to a large extent driven by appearance. Lech am Arlberg welcomes a large number of guests, particularly during the winter season, so lighting that also illuminates the town during the long night hours is particularly effective.

The new LED lighting concept accentuates the night townscape and showcases classic elements such as the promenade and various hotel and restaurant façades. As a result, Lech am Arlberg is also able to display its unique identity at night. Public places, the church, the old wooden bridge, groups of trees and even some smaller areas like hotel gardens were integrated into the overall concept to achieve a balanced effect over both short and long distances. A special priority for the planners was to turn the mountain river into a tangible part of the townscape at night. The new lighting concept draws the river, which is dark and almost invisible during the night, back into the town environment. The illuminated riverbank and wall surfaces are reflected along the water course and create a dynamic image, captivating the viewer through the movement of the current with a three-dimensional effect.

## Space maintains identity

Uniform appearance



The SUPERSYSTEM outdoor product family carries out a variety of lighting tasks with efficient precision, providing a lighting solution that is simultaneously distinctive and harmonious.

The selection of the luminaires also highlights the emphasis that was placed on achieving a perfectly designed townscape. In Lech am Arlberg, all lighting tasks are performed by the innovative SUPERSYSTEM outdoor LED luminaire family. With the modular design of the LED tubes, this luminaire offers a variety of distribution characteristics. The luminaires are mounted at a height of 4.5 to 10 metres, mostly on house façades, which reduces the number of lighting columns to a minimum. The advantages of the integrated lighting concept therefore start with a pared-down stylistic idiom, continue with a uniform light colour and end with a controlled light level over the entire urban area. Time adjustments are made using a central lighting management system. The concept offers hotel and restaurant owners an opportunity to showcase their own architectural identities in harmony with the public lighting concept. Luminaires for public areas are also discretely integrated into hotel and restaurant façades. Electricity is provided from the house grid of the respective building. To reimburse the owners for the electricity costs, electricity consumption is carefully recorded and the information is gathered centrally using wireless networks.



Objects and buildings showcased by light tell stories of times gone by and give the luxury ski resort a unique identity.



SUPERSYSTEM outdoor luminaires can be tastefully integrated into a variety of façades. During the day, the luminaires are barely visible, whilst at night they perfectly highlight their surroundings.

## Light assumes responsibility

Environmentally-friendly lighting



Maximum lighting effect with minimal energy consumption. The division of town lighting into 16 luminaire groups, along with a web-based lighting controls system, makes it possible to precisely coordinate illuminance levels in the overall context.



The light is now apportioned in a carefully prescribed manner. Based on the data from a central light sensor, the lighting management system coordinates the operation periods of the lighting system throughout the town. It can also be adjusted to take the presence of snow into account. Snow reflects the light in winter, which means that the luminous flux of the luminaires can be reduced. Lowering the street lighting to 50 percent illuminance during the quiet night hours is also an important feature of the system. Variable lighting distribution characteristics and the precise bundling of light, coupled with effective glare suppression and management, mean that the SUPERSYSTEM outdoor system increases the efficiency of the town lighting and is more environmentally-friendly than conventional solutions. Diffuse and open light luminaires use 60 percent of their light to illuminate the sky. In contrast, carefully targeted light removes unwanted light pollution from the town centre. The switch to LED lighting also reduces the risk of small animals converging around the luminaires.

## Light provides security

Spatial depth supports orientation



Even local residents appreciate the clear illumination of the footpaths as they make their way back home. Illuminated objects lend a sense of depth to the space, which helps significantly with orientation.

The design deliberations of Dieter Bartenbach provided the impetus for illuminating not just the street but also the surrounding environment. By making the mountain river visible, the town maintains a natural sense of order, even at night. Prominent spaces, objects and buildings were also integrated into the lighting concept. These important points of reference were not included in the previous street lighting concept. In addition, the luminance of the luminaires was up to 10,000 times higher than that of the illuminated areas. In this situation, attention is focused on the source of the glare, meaning that the space itself can no longer be properly experienced. The SUPERSYSTEM outdoor luminaire family distributes the luminous flux over several LED tubes, so that pedestrians and drivers do not experience excessive glare. Colour perception is supported by the carefully colour rendition of the LED luminaires. Finally, the light is now much more precise than before. This is achieved thanks to the meticulous alignment of the tubes.



Striking wooden structures like this bridge give the town a unique character. By illuminating these aspects, Lech am Arlberg can maintain its special charm into the night.



Groups of carefully illuminated from within by discrete lighting elements, helping to ensure that this space can also be experienced at night.

## Successful together

### Lighting concept and luminaire



“The SUPERSYSTEM outdoor luminaire family successfully addresses the requirements of an accentuating and spatial-partitioning lighting system. Due to their modular design, the luminaires can be adapted to suit the local situation and even the wishes of individual hotel and restaurant owners – both in terms of technical and design aspects. The luminaires can be inconspicuously integrated into a variety of façades.”

Karl-Heinz Rűf, Project Manager Zumtobel Dornbirn | AT

#### **The installation of the urban lighting in Lech am Arlberg coincides with the introduction of Zumtobel's new product range for outside spaces. Are there synergies in this regard?**

An innovative project such as the urban lighting for Lech requires the coordinated input of many people. In this case, Karlheinz Egger from the planning department in Lech paved the way for the renewal of the lighting system by classifying the existing street-lighting luminaires and their old technologies as “out of date”. However, the actual impetus came from Dieter Bartenbach, who in his capacity as a consultant for lighting and spatial environments examined a series of luxury ski resorts in Switzerland and Austria as part of a general analysis of urban development. He thought that the constellation in Lech am Arlberg was very interesting because of the topography. After many hours of discussion and with an excellent sense of intuition, he was able to convince all of the stakeholders to support his unique concept. The detailed lighting planning and development of the SUPERSYSTEM outdoor family went hand-in-hand with these developments. A considerable level of innovative effort was required from both the development team and the luminaire. Finally, it was the sales office in Vorarlberg, under the leadership of Philippe Rettenbacher, who successfully concluded the project.

#### **What distinguishes the SUPERSYSTEM outdoor system from other exterior luminaires?**

SUPERSYSTEM outdoor is not a predefined luminaire, but rather a luminaire family with a modular structure. This means that individual components can be assembled to form customised systems. Besides the different poles and attachment versions for the illumination of streets, squares, house façades and trees, it is the actual luminaire head that guarantees an outstanding level of flexibility. The standard programme offers luminaires with a choice of 3 to 30 LED tubes. The town lighting concept for Lech currently uses 230 luminaires with a total of 4270 LED tubes. A cut-out on the luminaire head means that each LED tube can be precisely angled towards the object that is to be illuminated. The luminaire offers four

different beam angles with a uniform connected load of 2 watts. Narrow, wide or asymmetric light distributions can be specified depending on the object and the distance. In this way, the light is much more precise and targeted than with other outdoor luminaires.

#### **In your opinion, what are the advantages of variable light distribution?**

The fact that the LED tubes can be individually aligned means that the luminaire can be precisely adapted to fulfil specific lighting tasks. As a result, a SUPERSYSTEM outdoor luminaire does much more than illuminate horizontal streets, squares or paths. It also offers uniform illumination of vertical surfaces and thereby further strengthens the space-forming elements of the town lighting concept. The different angle settings of individual LED tubes also greatly reduce the amount of glare. The luminaires can be mounted on façades, which means that they do not always have to be fixed to poles. In this way, we can combine a uniform appearance with the effective showcasing of building façades. This concept was particularly appealing to hotel and restaurant owners in Lech, who financed the building lighting themselves.

#### **What does the Zumtobel outdoor lighting management system offer?**

The central lighting management system with web interface offers a wide range of automation options to increase the comfort and efficiency of the lighting solution, depending on the daylight, movement or time settings. A unique feature is the connection through a wireless sensor. This not only receives control commands but also transfers data for energy consumption analysis. For example, it is now possible to calculate the electricity consumption of each luminaire. In Lech, the electricity required by the luminaires mounted on the hotel façades is supplied through the actual grid of the building. The owners of the buildings are then reimbursed for the exact amount of electricity that has been consumed.



As part of an integrated overall concept, both the wider townscape and the individual businesses benefit from the attractive illumination of the restaurant and hotel façades.



The direction of each luminaire and the individual LED tubes has been carefully calculated to fulfil specific lighting tasks in the best possible way.



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