HOCHSCHULE KONSTANZ
TECHNIK, WIRTSCHAFT UND GESTALTUNG

University of Applied Sciences Constance
Brauneggerstrasse 55
78462 Konstanz

+49 7531 206-0
kontakt@htwg-konstanz.de
www.htwg-konstanz.de

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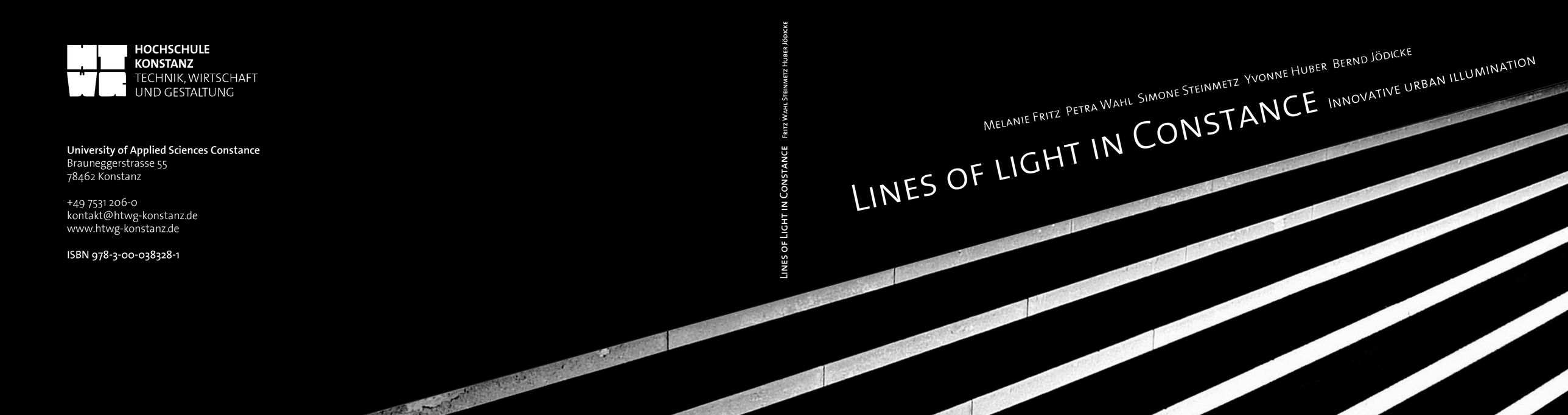
Lines of Light in Constance Fritz Wahl Steinmetz Huber Jödicke

Melanie Fritz Petra Wahl Simone Steinmetz Yvonne Huber Bernd Jödicke

Lines of light in Constance

Innovative urban illumination



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Petra Wahl
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Yvonne Huber
Bernd Jödicke

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Content

„Opportunities and Limitations in Architectural Illumination" was the title of the master class „Light" by Prof. Dr. Bernd Jödicke. The four of us enrolled this class within the winter term 2009/2010.

The task we set ourselves was to find out how to use the new LED aligned luminaire that was co-developed by our University. Which new possibilities would it offer and is it at all suitable for architectural lighting? Does it offer advantages compared to conventional facade illumination systems?

The only way to find answers to these questions was simply to try out. So we buckled to our task with a lot of optimism and eagerness to experiment. To get a really objective picture we decided to give the LED aligned light a trial on as many buildings and objects as possible. Therefore a quick setup possibility proved to be necessary. Mr. Richter, a staff of the Institute for Natural Sciences and Mathematics, was quickly inspired by our idea and mounted a battery to the LED aligned light. To our great delight, this battery turned out to be much easier in weight than our former planned car battery.

It gave us the chance to experience while observing the reaction of passersby. At a felt temperature of -20°C in the middle of winter we started the first of our forays to Constance. With a rapidly growing enthusiasm, we noticed that it is easy to achieve good results and moreover, that there are new possibilities in the use of the new light.
Inherently, the very good energy balance and therefore the environmental sustainability of our linear light beats the pants of all other conventional lights. However, we want to point out that any artificial light can disturb sensitive ecosystems and especially the animals' peace at night. The LED aligned light offers quite a number of fascinating and enriching possibilities in architectural lighting.
Primarily, the result that only a single LED aligned light can produce a complete professional facade illumination, both surprised and delighted us. In this brochure we want to present these originated images. Our booklet acquired vogue by the manufacturer of our prototype LED aligned light, the company Chromasens. So we got the chance to create a real book, which now appears as the second edition of the booklet.

We hope you are as pleasantly surprised by the result as we are...

University of Applied Sciences

placed emphasis on the University of Applied Sciences

University of Applied Sciences

Usually the University can't be recognized from the opposite riverbank of the Rhine at night. Caused by a lack of lighting its silhouette totally disappears.

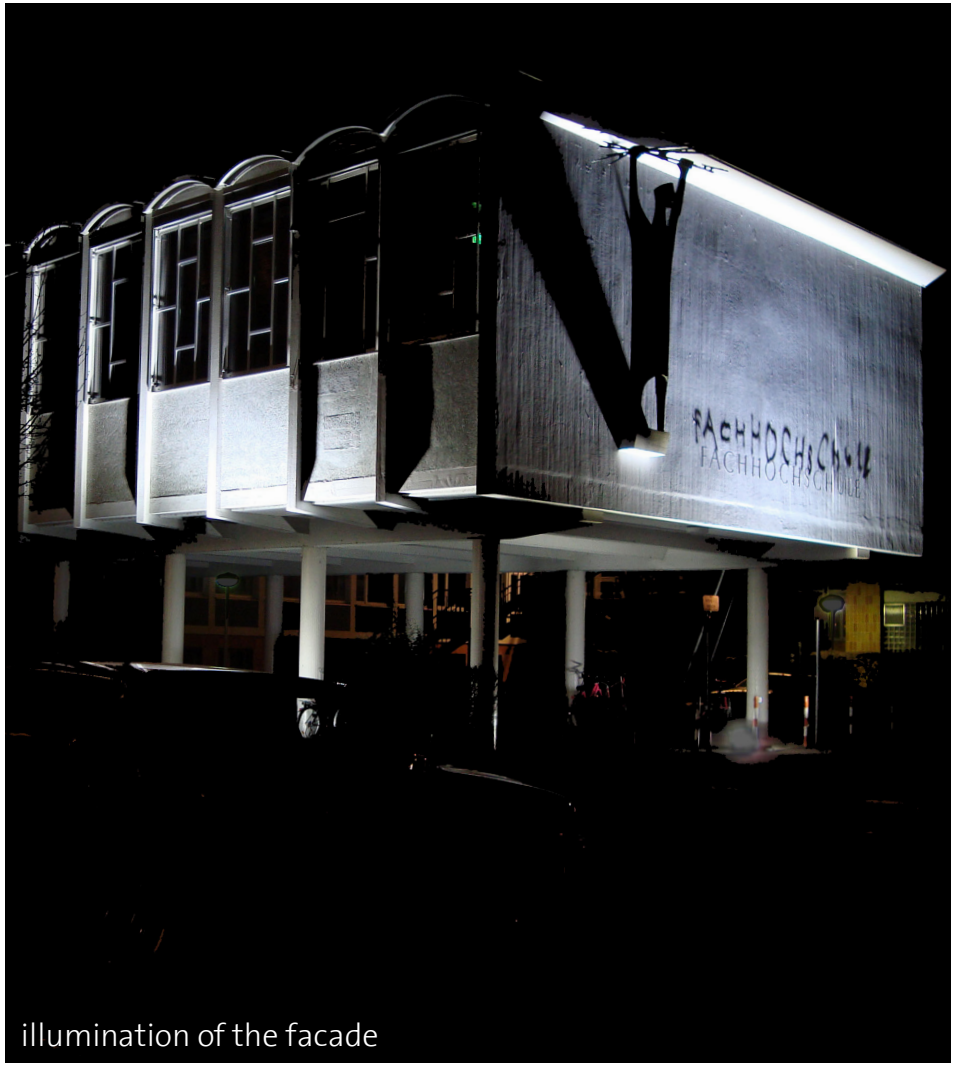
A single LED aligned light creates a visibility that can be spot even far away and creates a view that accentuates its characteristic appearance. Furthermore, the LED aligned light beneficially underlines the architectural identity of the auditorium in a way never seen before.
On the one hand the lighting of the roof edge point out the curved roof, on the other hand it strengthened the perception of the auditoriums floating nature.

The word 'Fachhochschule' is highlighted by an artful shadow which creates an eye-catcher effect. A second luminaire is used to illuminate the library and thereby accentuate the central contact point for all faculties. The facade of the library keeps its actual plasticity through an illumination by the LED aligned light.

current situation

placed emphasis on the roof edge of the auditotium and the facade of the library

staging of the auditorium



illumination of the facade

illumination of the library

Rheintorbogen

placed emphasis on the wall structure with a single luminaire

Rheintorbogen

(A medieval defence tower)

During the illumination of the Rheintorbogen we recognized how much the LED aligned light differs from all the other conventional luminaires. The whole tower is usually illuminated by a sodium lamp at night. Through this kind of extensive and uniform illumination the structure of the crumbling wall gets lost. Even the noticeability of the gate`s arch itself gets lost in the plane usage and the sheer mass of light.

By using a single LED aligned light both of these typical elements, the structure of the wall and the gate`s arch, are highlighted. It creates a totally new impression by a changed view at the entrance of the historic district. At a single blow the Rheintorturm is no longer perishing into the sea of cities illumination. The orange light of the sodium lamp and the white flare of the LED aligned light are completing each other perfectly in this case. The different colours of light produce an exciting and impressive atmospheric ambience. So, the Rheintorturm forms the portal to the historic district of Constance at night.

current situation

high- lighted gate`s arch

staging of the wall structure

current situation

placed emphasis on the gate`s arch

FACADES

villa at Hérose Area

Facades

The LED aligned light is ideal for architectural lighting. By one single luminaire a complete facade can be illuminated. So, the conventional wall radiators can be replaced by a single exemplar.

In addition, the LEDs require just a little power and are well-known for their long-living. Generally the usage of the LED aligned light saves energy and raw materials.

Moreover, the linear light is able to set different visual accents. Installed centrally, recessed into the ground in front of the facade, its light spreads over the whole facades surface out of a focused light source in the ground.
The light curtain is expanding at a fan-shaped structure, and emphasizes the facades effect by the creation of a unique plasticity.
The accentuation of the entire roof edge completes the light composition that also intensifies the perspective occurrence in a pleasant way.

current situation at the Humboldt College

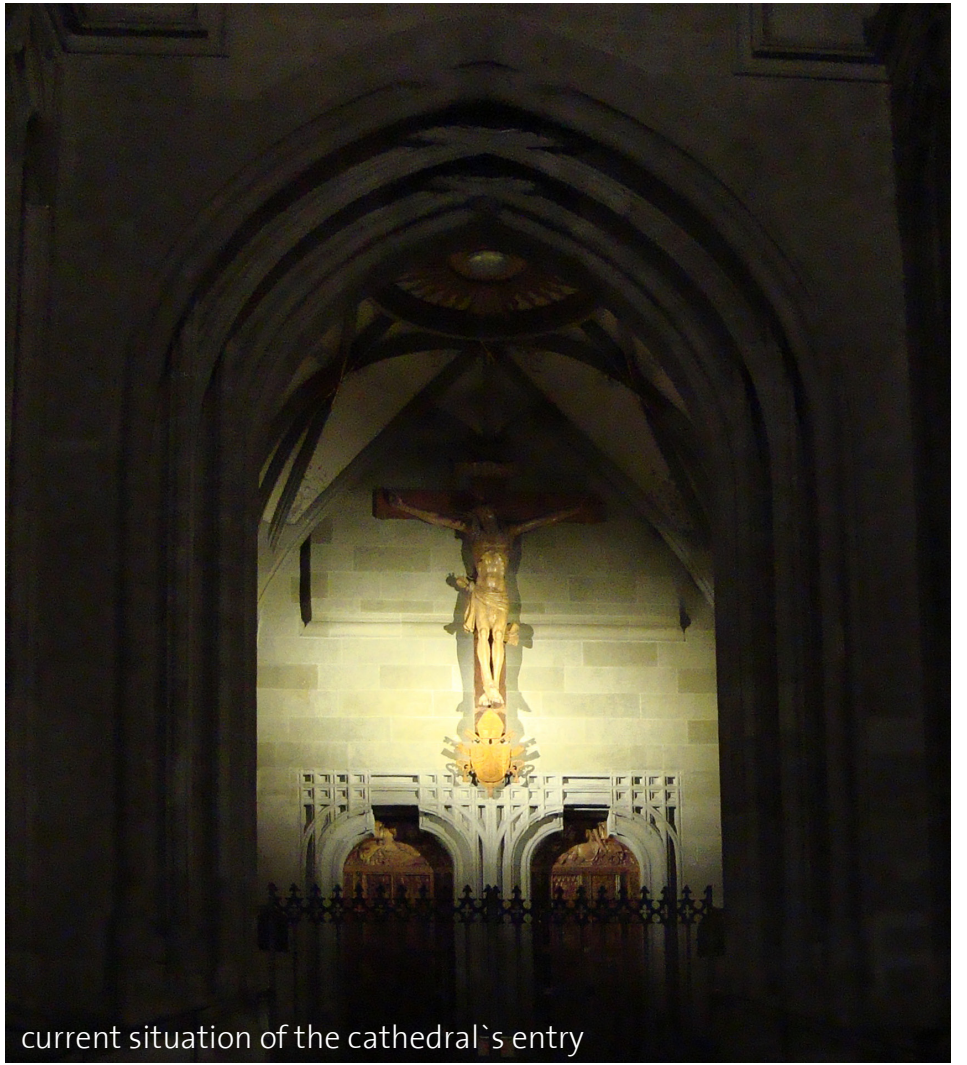
highlighted facade

staging of the character

current situation at the Cathedral Square

illumination of the facade

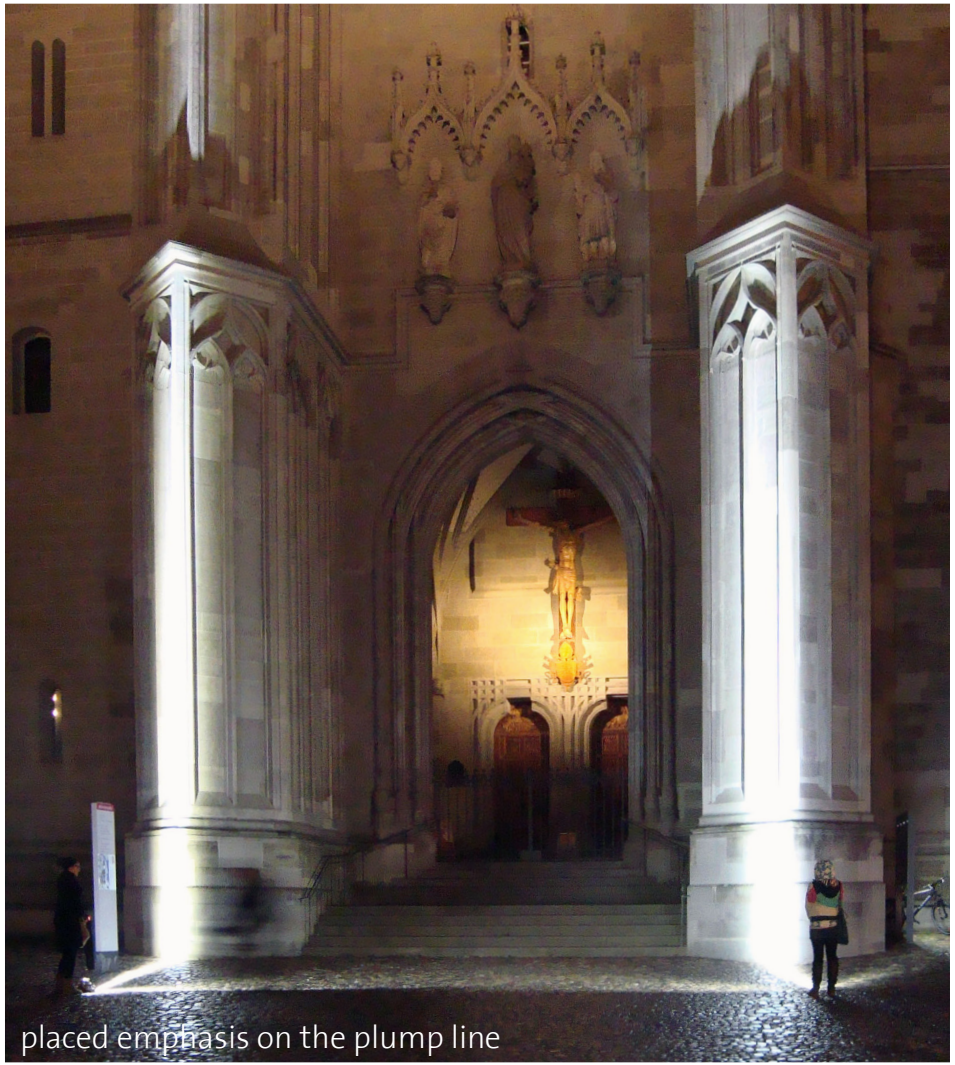
highlighted window arch



current situation of the cathedral`s entry

staging the entry`s arch

highlighted entry



placed emphasis on the plump line

Interior

reveal illuminated with a single LED aligned light

Interior

The easy illumination of corridors is another advantage of the LED aligned light.
One single luminaire is more than enough to illuminate a long corridor adequately.

Besides, the basic lighting it accentuates the structure of the wall surface, such achieving an interesting light effect.

Lit up along the ceiling especially in large halls or parking spaces it provides a basic brightness and thereby generates a feeling of security for the people moving within.

The light line is also suitable for the emphasis of an individual component such as a window recess or an illuminated blackboard as shown in the example.

Although an additional main lighting is required, the LED aligned light reveals an additional advantage for selective effects.

This way one can achieve some very new and surprising depths of space.

emergency lighted corridor

corridor illuminated with a single LED aligned light

experimental illumination of a class room

highlight the right track

Trees

placed emphasis on the cottonwood trees at Hérose Park

Trees

We discovered many variations to illuminate trees. The most surprising fact to us is that a single LED aligned light produces sufficient light to illuminate several trees.

The illumination of trees with our luminaire is extremely charming equal nice in summer as in winter. A variety of shadows arise in the summer when the wind is moving the leaves. During the winter time every single little limb of a tree reflects the light.

However it must be ensured that nobody is dazzled by the light. The height which can be reached by the beam of light is as advantageous as surprising.
The illuminated cottonwood trees along the riverbank of the Rhine are as high as a five-storied building. A single LED aligned light is able to illuminate them from the bottom to the top.
The luminaire can be mounted directly in front of the tree in a kind of pylon and is thus ideally suited for the accentuation of individual trees.

current situation at Winterersteig

highlighted tree

placed emphasis on a single limb

current situation at Cathedral Square

highlighted trees

Hedges

highlighted hedgerow with a single luminaire

Hedges

Another very good location of the linear lightning are hedges, which are usually planted in rows.

A varied light and shade show can be seen in summer as well as in winter. A single linear light is enough to accompany a walk or to mark several hedgerows as entrance zone, as here, the front of the library of the University of Applied Sciences.

In addition, the hornbeam hedges in front of the library offer the opportunity to install the linear light either at the bottom of the hedges, which results to varied shadows on the wall depending on the season.

It is also possible to light the hedges from above which highlights the hedges direction of growth even at night.

In the library example, the edges of the building are highlighted in this way, however, in an impressive and new way caused by the shadow effects on the wall.

hedgerow illuminated from below

luminaire at the top of a hedgerow

illuminated water channel around the Inselhotel

Water

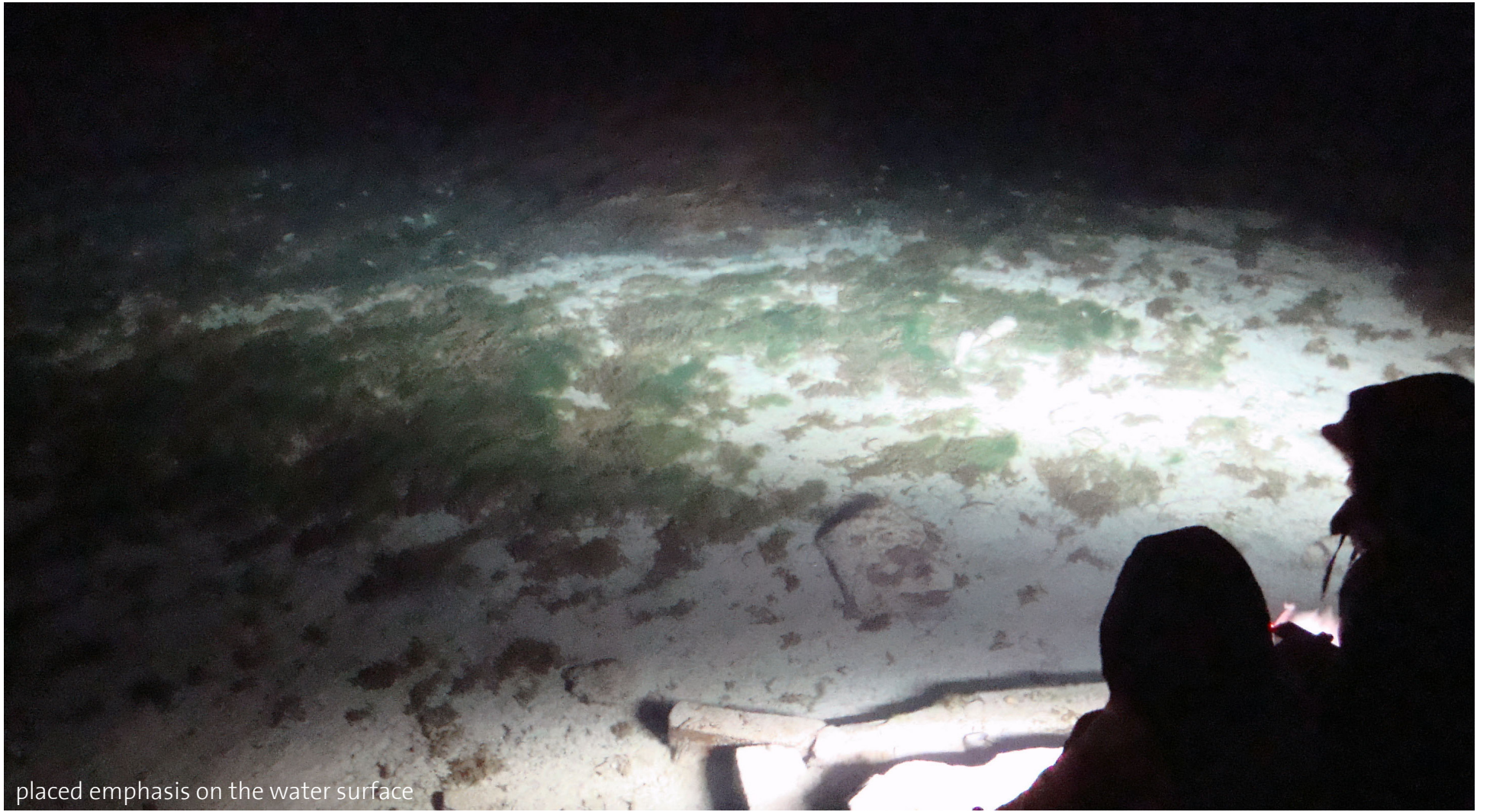
Due to the very bright luminaire, there are also interesting possibilities to illuminate water.
On the Rhine river bank, for example, you can see every wave and motion above the illuminated water over an astoundingly large surface, similar to a carpet of light.

Furthermore, you can see right down to the rivers ground. This vision of things that are normally hidden creates an almost mystical mood and makes an otherwise ordinary place of a highlight in the truest sense of the word.

This also convinced us to illuminate the water channel around the “Inselhotel”. In this example, current and wave reflections are projected onto the wall. As a result, the waters‘ movement is visible as well as the ground of the canal, we lighted with a second linear light.
In particular, we were convinced by the atmosphere that produces the unique and individual lighting.

current situation at the Inselhotel

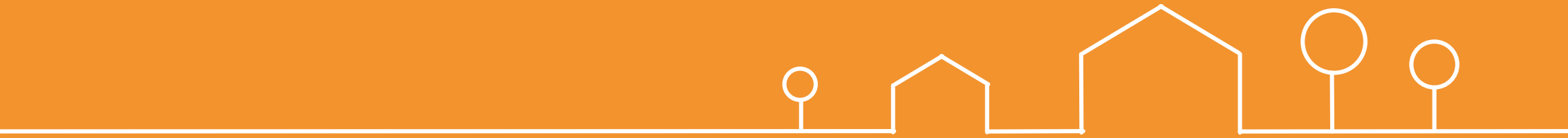
placed emphasis on the water channel



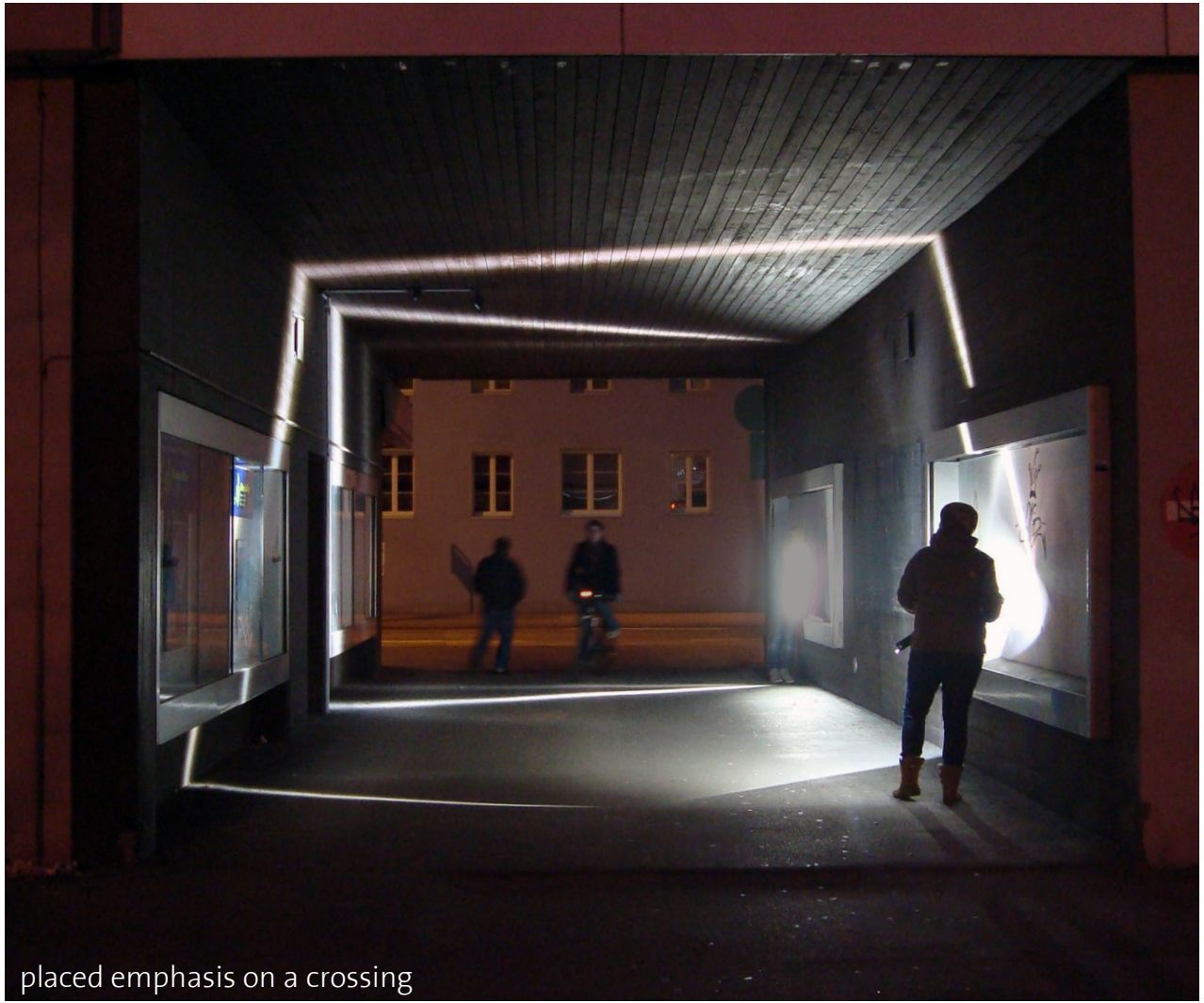
placed emphasis on the water surface

highlighted stream

Urban space



Tunnel



placed emphasis on a crossing

Tunnel

The linear light is ideal for guiding people along a route and therefore for the illumination of a tunnel, or as in the example of a crossing.

Various illumination possibilities which fulfill all of the most important functions, namely to light the passage and to provide the necessary sense of security could be found.
The side walls can be lighted which is more than adequate for a sense of security. Other options are the illumination of the ceiling or the base.
The light technician can choose an option depending on the effect desired.

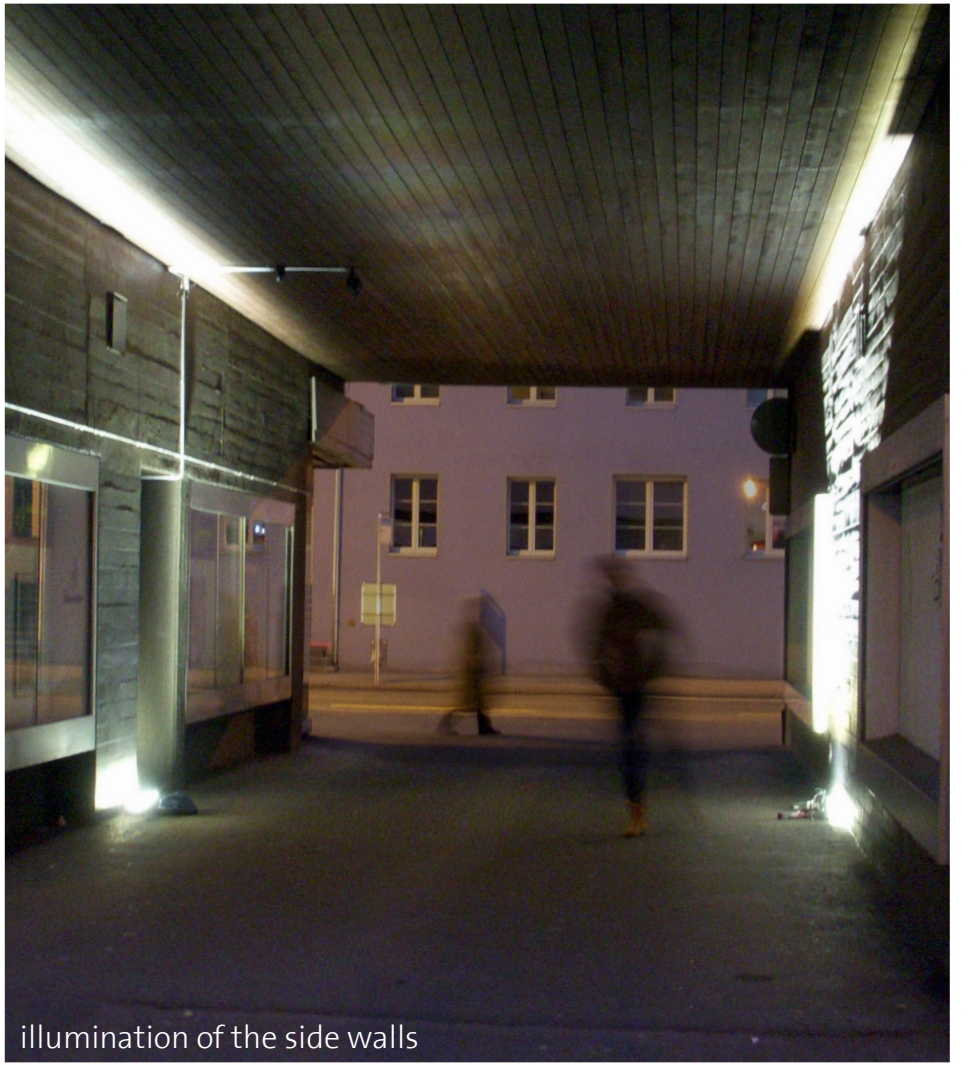
Lighting the lateral wall serves to guide and at the same time highlights the construction material.

So, in our example the concrete will be staged. During illumination of the floor and ceiling, the perspective effect is amplified beneficially.

current situation

placed emphasis on the depth effect

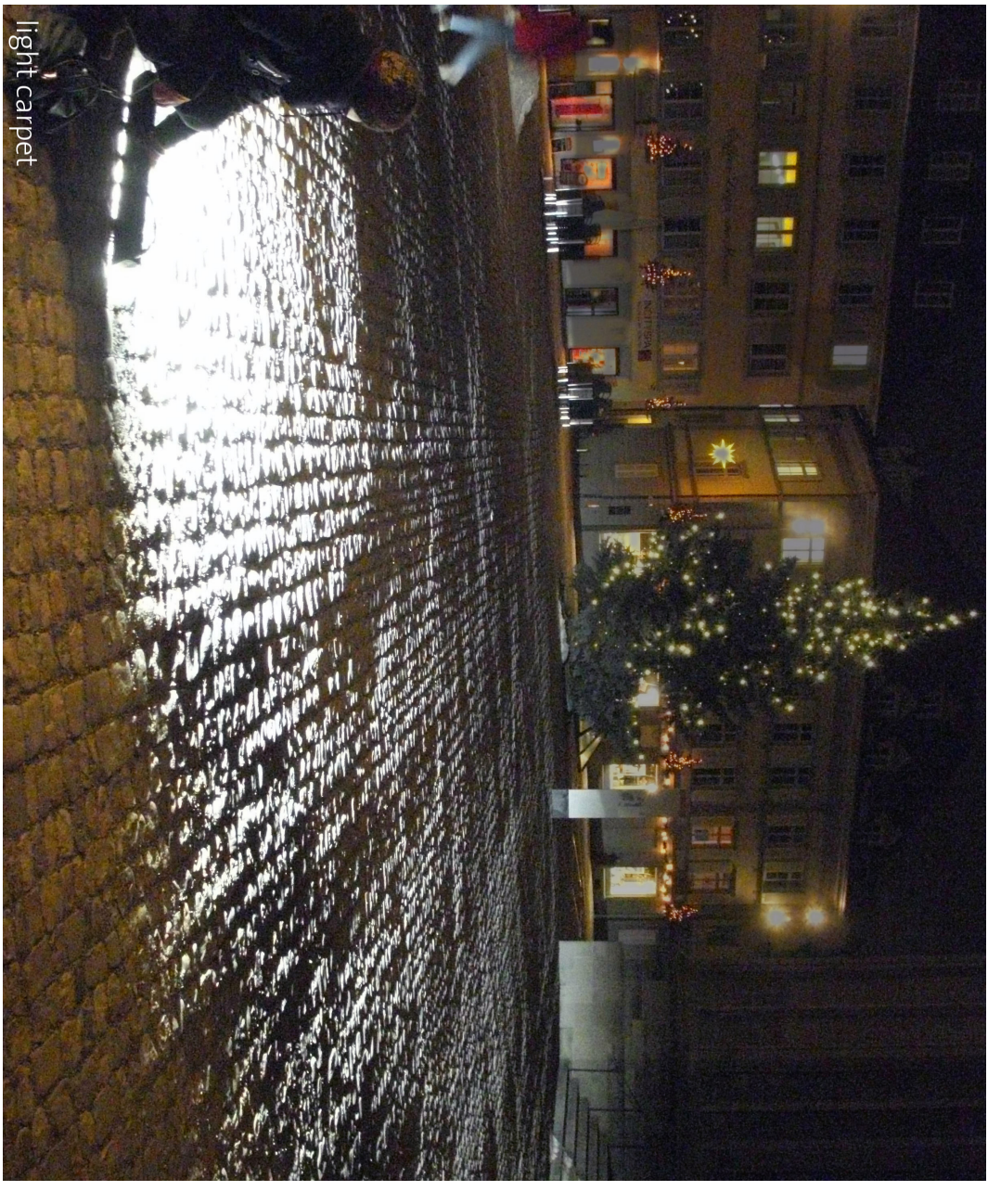
illuminated floor



illumination of the side walls

highlighted wall surface

Cathedral Square



Cathedral Square

A few years ago the Cathedral Square was revamped and with its medieval cobblestone the linear light offers many different ways of staging.
The installed lanterns on the square illuminate only the cathedral, the neighbouring facades and the pyramid.

The square itself which is a central hub of city life is, nevertheless, quite dark. The linear light offers the possibility to lay a light plane over the cobblestone pavement. In this manner, one perceives the paving anew and floats through what seems like a carpet of light.

Because of the sharply focused light beam distracting glare can be avoided.

This type of lighting was an entirely new and fascinating experience for us, not only because of improved security and the reduced risk of tripping, but also because of the experience of walking through a carpet of light.

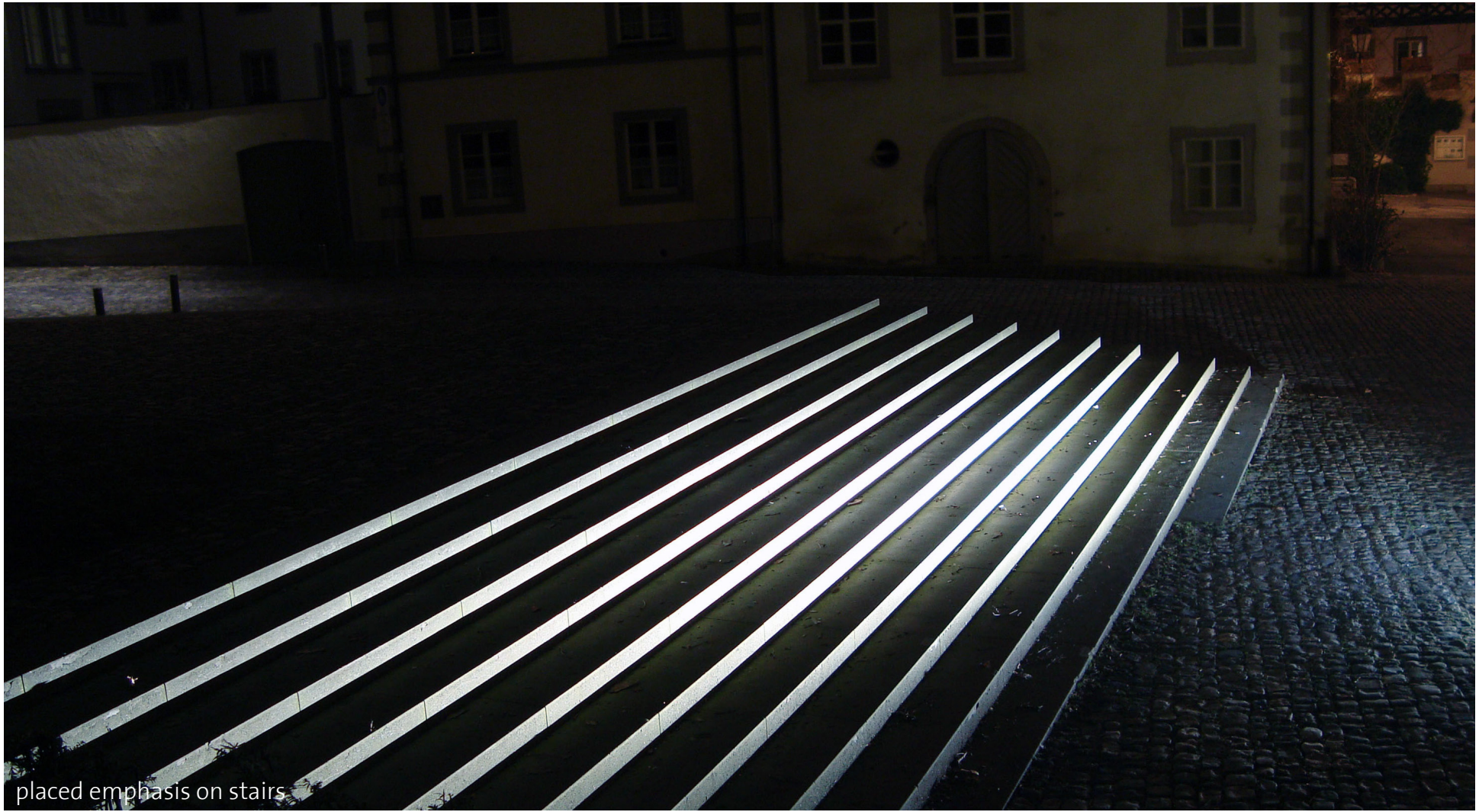
current situation on Cathedral Square

light carpet on Cathedral Square

current situation

light carpet

current situation at night



placed emphasis on stairs

current situation

highlighted square

Alleys

light carpet in historical district Niederburg

Alleys

The alleys of the historic district Niederburg in Constance are illuminated with traditional lanterns.
Here we noticed that the faint glow of the lanterns distributed far apart from each other barely reach the ground. This, in combination with the medieval cobblestone pavement is a cause for tripping and stumbling. Furthermore, the residents complain that the lanterns' light glare through their windows.

In this instance, all these problems can be resolved with the help of linear lighting. A linear light replaces up to three lanterns and is also more economically viable since it uses very little energy. The ground is optimally illuminated, and so every cobble stone is visible and prevents from tripping and glaring. In addition, this kind of lighting reinforces the flair of the alleys and allows it to be experienced anew. This is a novel and fascinating opportunity that could be a real competitor or complement to conventional street lanterns.

current situation

light carpet in a small alley

Campus of the University

placed emphasis on the Campus of the University of Applied Sciences

Campus of the University
of Applied Sciences in Constance

The central campus of the University of Applied Sciences with all the faculties grouped in surrounding buildings is the place where the college life takes place.
The campus is lit in the evenings, however the lighting that should actually illuminate the globe Norway maple trees' foliage from below is arranged in such a way that it shines exactly between two trees into the night sky.

Thus, the well planned and desired effect of lighting the branches of the trees is unfortunately not very successful.

It is surprising that one single linear light is capable of achieving this effect and illuminating a complete row of trees. The only problem is the glare, which is posed in a small special angle.

We like the different light colours that highlighted the colourful campus life in a wonderful manner.

current situation

highlighted tree rows

Stairs in Herosé

highlighted stairs

Stairs in Herosé

Herose's waterside area was transformed according to architect Prof. Klaus Theo Brenner's concept to the „Stadt am Seerhein".

The steps where people may sit became a popular meeting and resting place during the day as well as in the evening.
However, this area with its steps is completely unlit in the evening. In this instance, the linear lighting offers various impressive lighting possibilities.

One linear luminaire is sufficient to light along the steps and stage the entire promenade. We want to point out that there is no resulting glare at all.

The brightness of the linear light is particularly impressive, especially from the opposite side of the Rhine.

view from the opposite side of the Rhine

light intensity from the opposite side of the Rhine

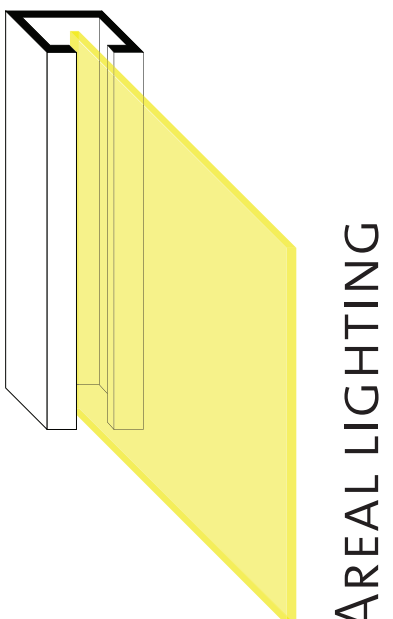
Linear lighting

The LED aligned light

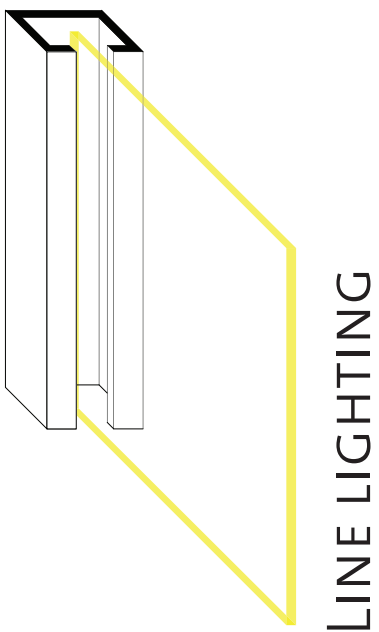
Since the introduction of LED technology in common illumination there is a light source available for lighting designers that allows new light solutions at all. The saturation of coloured LEDs, high luminous efficacy of white LEDs, the small size and their longevity open up applications to the semiconductor lighting that were not realizable with conventional light sources. Therefore one example is the LED aligned light. This innovative lighting solution, that was co- developed at the HTWG Constance, takes an advantage of the extremely high luminance of the LEDs. The fact that LEDs emit a relatively high amount of light by a small area leads to two consequences: First, smaller and more compact luminaries can be build with light sources that have such a high luminance, and secondly the luminance levels are that high that one should always avoid to look directly at the light sources. The prototype that was constructed for architectural usage called “Corona” has a length of 637 mm and is equipped with 80 LEDs arranged along a linear parabolic reflector which produces a manageable output power up to 100W. The mirror collects about 70% of light emitted by the LEDs. Depending on the focus the light can be bundled in a high or less concentration. Thereby the LED aligned light achieves an extremely sharp defined light stripe.

[„Linienlicht für die Architektur“, Source: Journal „Licht“, September 2010]

Characteristics



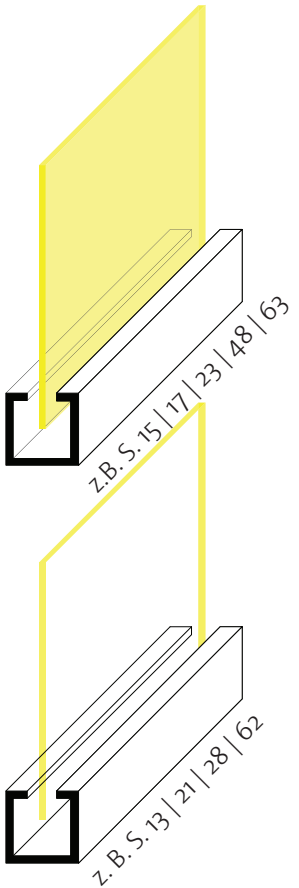
Areal lighting



Line lighting

The LED aligned light is very suitable for the illumination of facades, squares, alleys and hedgerows. With very little effort it provides impressive effects, which are arbitrarily controllable in their brightness. In addition, in direct comparison to other conventional lighting it saves on a great deal of energy and is very easy to install. The LED aligned luminaire is able to produce unique structures and light moods. In each case, an exciting, professional atmosphere with only one luminaire is produced.

The two basic possibilities to illuminate building facades or squares are areal or line lighting. By varying the angle of installation both can be achieved with the linear light. It is worth mentioning that when producing area lighting a line of light is also always simultaneously produced. This great effect allows a building's facade and roof edge to be accentuated with one single linear light.

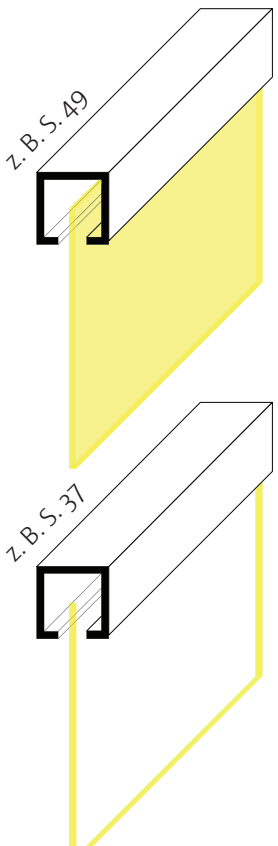


The light wall

+ is installed with very little effort and close to the building
+ can light a complete building facade with one single luminaire
+ creates a light mood, as designed by the lighting designer
+ highlights the facade's structure
+ accentuates the roofs edge as well as the facade with line lighting
+ highlights single features such as window recesses or portals
+ allows the brightness to be adapted to each individual situation by means of the good dimming function

- can glare when traversing
- nature and wildlife should be taken into consideration when installing the lighting

Conclusion:
The linear light is well suited for the illumination of building facades. In comparison to standard facade illumination, the linear light saves on energy, is less difficult to install and can produce great effects with just one luminaire. In addition, the entire facade is staged.

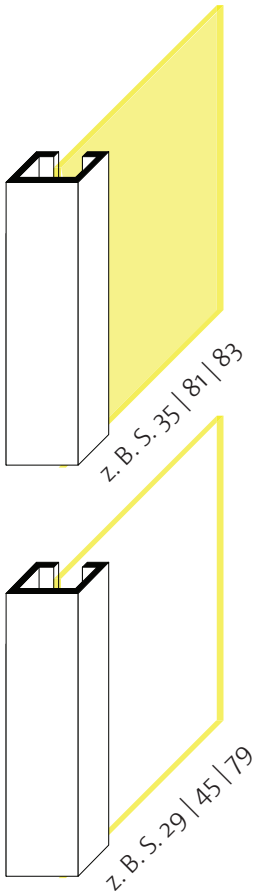


The light fall

+ provides guiding lines of light which facilitate orientation
+ highlights the base area with surface light and creates an impression of floating
+ brings out the illuminated material's texture
+ can be used for artistic lighting

- must be attached in such a way that no impairment results from glare
- nature and wildlife should be taken into consideration when installing the lighting

Conclusion:
The linear light is well suited for illumination by means of a light fall. It is especially useful for guidance, either along a stairwell, at squares or hedges and creates individual, novel lighting accents. Security is provided via the individually adjustable brightness and therefore, caters for a pleasurable visit to locations such as squares. Special attention, however, must be paid to correct installation to prevent any disturbing glare.



The light beam

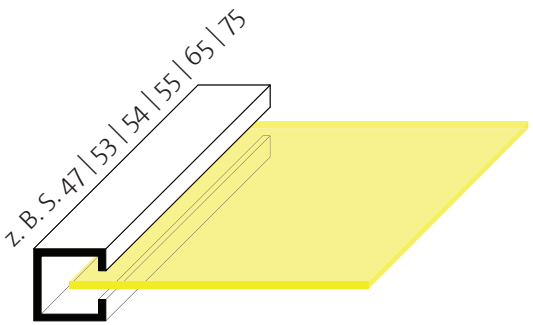
+ illuminates a complete tower facade with only one luminaire
+ only illuminates the tower and doesn't produce any lateral glare

+ / - doesn't highlight the facade's texture but illuminates uniformly

- produces glare between the luminaire and the tower
- nature and wildlife should be taken into consideration when installing the lighting

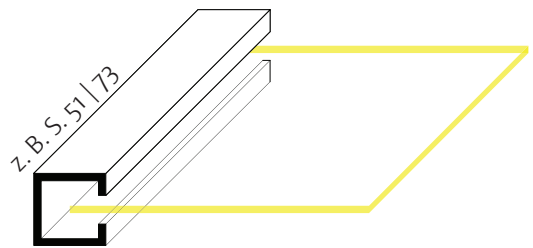
Conclusion:
The linear light is well suited for illuminating the front of towers and facades. Church towers can be highlighted over their entire height with one single luminaire. The wall's texture is not highlighted with this type of illumination but can, nonetheless, be very appealing. Unavoidable glare, however, between the luminaire and facade is produced and no areas occupied by people should be located within the beam's glare.

The light carpet



+ caters for maximum security due to the visibility of the floor's structure
+ caters for a pleasurable visit
+ caters for an individual lighting and an innovative, great design
+ optimally complements existing lighting
+ creates an exciting lighting atmosphere
+ impressively stages large steps on squares

- only applicable on a level surfaces
- glares little animals
- nature and wildlife should be taken into consideration when installing the lighting



Conclusion:
The linear light is extremely well suited for producing a light carpet and is at the same time the only light that can illuminate the ground of a square in this way. The light carpet caters for an individual, very exciting and above all a unique atmosphere in alleys and squares. Such lightings can replace or complement street lanterns.

Acknowledgment

We would like to cordially thank Mr. Richter and Mr. Waller from the Institute of Natural Sciences and Mathematics at the University of Applied Sciences Constance for their support. They encouraged us any time with advice and practical help.
We also thank the company Chromasens for supplying us with the linear lighting.

© Lines of light in Constance

Melanie Fritz, Petra Wahl, Simone Steinmetz
Yvonne Huber

University of Applied Sciences Constance
Prof. Dr. Bernd Jödicke

conceptual design and content
Melanie Fritz, Petra Wahl, Simone Steinmetz
Yvonne Huber

Texts, layout and composition
Melanie Fritz, Petra Wahl

Translation from German
Melanie Fritz, Petra Wahl, Natalie Nowack, Stefanie Balla, René Kirstein

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