5.10 Urban – architectural floodlighting

Techniques

General

The purpose of architectural floodlighting is to reveal the beauty of a structure or in some cases add a dimension by showing a structure in a new way. Architectural lighting adds an aesthetic quality to a scene. Points of note are:

Generally a structure will have one or more principal viewing positions. Therefore the lighting should be sympathetic for an observer positioned at these viewpoints.

The light levels used on a structure should be in harmony with the light levels of the surrounding area. In darker areas comparatively little light can be used to good effect, but in areas with a large amount of ambient lighting higher light levels will be required.

A coherent flow of light across a structure is often desirable, implying one general aiming orientation for the main floodlights. This direction should not coincide with the most common viewing direction for the structure as no shadows will then be visible and the scene will appear flat and uninteresting.

Care should be taken when mounting the floodlighting equipment to ensure that the lighting units do not appear in silhouette against the lit scene, as this will spoil the overall effect.

Structural detail

The main objective is to highlight significant features of the structure whilst ensuring the structure still appears as a coherent whole. Points of note are:

Light naturally attracts peoples attention so highlighting specific features will help an observer read the structure. Care should be taken to only light those details that are required, as too many highlights will destroy the effect and either makes the structure appear bland and uninteresting or disjointed and incoherent.

Completeness of lighting is an important consideration to ensure a coherent whole. Care should be taken to avoid a floating appearance, caused by the base of the structure being under lit, or high level lit detail seeming unconnected due to the upper parts of the structure being insufficiently lit.

Shadows can make as useful a contribution to the final lit effect as do illuminated areas. A good technique is to highlight specific features and to give a low-key wash of light to the rest of the structure. Therefore smaller lighting units are needed to highlight the detail, as well as units with a more general distribution to cover the broader area.
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Positioning floodlights at a distance from a structure and therefore giving light closer to the horizontal will tend to reduce the visibility of the textures of the materials used in the construction of the structure. Conversely positioning floodlights in a close offset position, and therefore giving light closer to the vertical will tend to enhance the visibility of the textures of the materials used in the construction of the structure.

Daylight has a generally downward bias, forming shadows from architectural details below the detail itself. Floodlighting a structure from above can mimic this effect, whilst floodlighting from below will reverse the shadows and can often give a fresh appeal to a structure by giving it an individual day time and night time appearance. Lighting laterally will enhance any vertical features of the structure.

Showing features in silhouette may enhance the lit appearance of a structure. Lighting behind features such as columns will show the form of the structure and display the columns in silhouette against the lit structure.

Obtrusive light

The main objective is to maximise the amount of useful light (that is light falling onto the structure) and minimise waste light that spills light onto the surroundings or upwards into the sky. Points of note are:

Close off set lighting will reduce waste light by minimising light lost through scatter in the air, especially in urban areas with lower air quality.

When uplighting a structure the upward light ratio (ULR) is not very useful as an indication of obtrusive light. A more useful measure is the utilisation factor, that is the amount of light actually lighting the structure compared to the total amount of light produced by the scheme. This gives the percentage useful light, and therefore the percentage waste light. It should be remembered that any reflected light will be in a predominantly upward direction and can give a significant contribution to obtrusive light. Therefore where possible uplighting should be used for structures that use low reflectance materials in their construction.

To minimise obtrusive light additional attachments should be used on the floodlight such as louvres or visors to shape the floodlight beam and help it conform to the shape of the structure.

Where possible niches and overhangs should be used to contain obtrusive light.
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Floodlight technology

The main objective is to ensure that the correct technology in terms of lamp, optic and floodlight body is chosen for the application. Points of note are:

The fabric of a structure has a colour, or in many cases a mixture of colours. Light sources that are monochromatic or strongly biased towards a small range of colours can distort the structure appearance. Therefore, light sources with a wide spectrum, (such as metal halide) or with a colour temperature that blends with the structure materials (such as high-pressure sodium on sandstone) should be used. Colour filters or RGB colour mixing should be used with care but can be very effective for dramatic effects or seasonal/festive events.

Floodlights have a beam distribution that is mainly relative to the shape of the reflector. A round reflector will produce a conical beam useful for long-throw requirements, typically to pick out a single feature. A rectangular reflector will produce an asymmetrical beam useful for lighting areas rather than small points.

Constraints in mounting position or specific application requirements often require a modified beam distribution. Additional optical components such as refractor glasses that vary the beam shape, or louvres that reduce obtrusive light are useful in getting the correct result.

Floodlighting set-ups are generally aimed at night to enable fine-tuning of the finished appearance. However, maintenance will be done in daylight, and often the floodlight will need to be moved to allow access to the lamp, etc. Floodlights with a re-positioning lock system are helpful to ensure the lit appearance is maintained over successive maintenance operations.

Key luminaires:

Scheme: Building façade
Luminaire(s) used: Avenue Deco bollard 50W MBF, Avenue Deco 125W MBF at 3m mounting height, Elact LED, Mica B 70W HIT-DE and Contrast Pinspot 70W Par 30.
Road Eav = 7lux
Pavement: Eav = 1.5lux away from the façade, Eav = 3.5lux along store façade

Schemes – Building facade
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The curved roof is washed with light, making it appear to float over the building. The structure itself glows from the interior light spilling through the glass facades.

Lighting of glass facades is difficult and it is more usual to let spill light from the interior light up the building and define its night-time appearance.

The suspension tower and cabling are lit to provide a distinctive appearance. Narrow beam floodlights are directed along the cables to make them glow, whilst the central tower is washed with light. The structure seems to float above the surface of the water.

The appearance is built up using layers of light. The lower section of the building has a general wash of light with highlighting above the central columns. Lighter and darker areas give depth to the façade. The upper storey mainly comprises grand window openings, and these are lit with a white light to accentuate the detail of the window surrounds. The detail around the top of the façade (below the roof line) is lit to define the transition to the roof space, and additional windows within the roof space are lit, along with chimney work, with a small amount of spill light showing the roofline.