

# Specific Techniques

## 6.9 Lighting for crime prevention

A firm body of evidence now exists to support the theory that lighting can have a positive effect on crime prevention. With the increasing prevalence of CCTV cameras in shops and public spaces lighting also has an important role in aiding the authorities in identifying suspects. These benefits however have to be designed into a lighting installation, and it should be accepted that improvements in lighting cannot overcome bad design of structures or of a space. (For example the pedestrian tunnel shown has untended shrubs, a perfect hiding place, and an overhang ideal for a person to hide on, even before the pedestrian has entered the blackness of the tunnel).

Lighting can be used to affect two aspects related to crime

- Actual crime. This is the act of a criminal event occurring. Lighting can either inhibit crime, or aid in the identification of a suspect.
- The fear of crime. This is the mental worry of a criminal act occurring. Fear of crime tends to be more prevalent than it used to be due to improved communications. Knowledge of crime that occurs in a different geographical area can induce fear of crime in a totally unrelated area, however irrational. Lighting can be used to create a safe and reassuring atmosphere.

It is important to understand that when considering lighting for a space it is not always possible to understand the problems of the space without seeing it in all conditions. Frequently the daytime appearance is completely different to that at night.

How can lighting be used as a tool in the fight against crime? Some general points can be made. For exterior areas, including car parks, light fixtures and fittings should incorporate vandal resistant features such as polycarbonate or reinforced glass fittings with sources positioned out of reach. The effect of lighting should not be restricted, either by internal fixtures and furnishings or by exterior structures or landscaping.

Lighting columns/fixtures should not aid access, for example over perimeter fencing/walls. And cables and wiring serving lighting systems should be enclosed to restrict accidental damage or criminal attacks.



**Fig. 6.40** A forbidding entrance to a pedestrian tunnel

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When lighting for crime prevention the main requirement of lighting is to ensure a high level of visibility and modelling. It must be understood that whilst precisely targeted increases in lighting generally have crime reduction effects, more general increases in lighting seem to have crime prevention effects but this outcome is not universal. However, even untargeted increases in lighting generally make people less fearful of crime and more confident of their own safety.

To increase visibility and modelling requires consideration to the illumination on the vertical or semi-cylindrical planes. Pedestrians need to be able to see other people clearly at a maximum distance, to be able to perceive any possible threat, either from facial expression, posture or objects carried (such as a knife) allowing them sufficient time to react to the threat.

When considering street lighting a change in design approach is required. Generally street lighting is designed for maximum efficiency, using the fewest lanterns/columns and switching lanterns dependant on time. However, lighting should be designed for both road users and pedestrians, either by using lanterns that have a high level of performance in lighting both the road and paths, or with combined lighting units (Figure 6.41), or by separate lighting units for each task. Lighting should provide maximum quality and reduce shadows. Hence, lower wattage lamps spaced closer together are preferable, and lamp type should be chosen carefully to ensure a good colour of light and colour rendering (white light has been shown to increase peoples feelings of security, whilst a lamp that obviously renders colour incorrectly reduces a person's confidence in the lighting).

If lighting units are dimmed or switched off during the night high levels of maintenance are essential as the failure of a lighting unit will have a larger effect if only some of the lighting units are lit compared with the case if all the lighting units were on.

When lighting footpaths and cycle paths they should be lit in a manner that shows the direction that the path takes. Care should be taken where necessary to illuminate beyond the boundaries of the path in order to increase the visual area and provide more confidence to people using those routes. It should



**Fig. 6.41** Combined lighting units with high mount lanterns and bollard height lighting

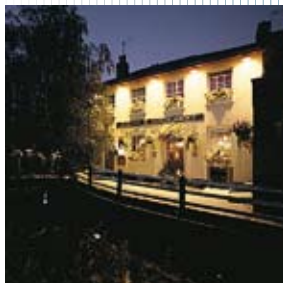
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be recognised that steps and changes in level are also part of the path and they should not be considered as independent areas. In urban areas it is important not to rely on lighting from commercial premises to supplement the amenity lighting as if the commercial lighting is switched off heavy shadows may occur. Lighting of commercial buildings should be controlled to prevent high levels of illumination resulting in adjacent areas appearing gloomy or dark (as shown). For open areas such as parks or large pedestrian spaces the lighting should give guidance on the configuration of the space.

A specific hazard for footpaths are pedestrian tunnels. These generally have two problems, dark inside and light outside during the daytime, or light inside and dark outside during the night. This has implications for visibility as the eye has to adjust to the different conditions which takes time, especially when passing from relatively bright light into darkness. The lighting needs to be controllable to adjust to the different lighting requirements (e.g. higher light levels during the day and lower light levels at night with lighting outside the tunnel matched to the light levels inside the tunnel). As lighting units in pedestrian subways are generally accessible by the public they should be vandal-resistant and maintained to a high standard.

Car parks should also be considered as pedestrian areas.  
N.B.;

- Cars are generally stationary at entrance and exit points. Therefore these areas need higher lighting levels.
- Special consideration should be given to stairwells, lift areas and areas with payment machines.
- If possible light coloured surface treatments should be applied to ceilings, columns and walls to maximise and reflect the effect of the lighting system



**Fig. 6.42** Façade lighting creating areas of deep shadows

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When lighting for CCTV cameras additional points need consideration. To aid in the production of a good image the following ratios should be checked;

Ratio 1 =	$\frac{\text{Upward horizontal illuminance}}{\text{Downward horizontal illuminance}}$	Ideally Ratio 1 > 0.3
Ratio 2 =	$\frac{\text{Downward horizontal illuminance}}{\text{Vertical illuminance towards camera}}$	Ideally Ratio 2 < 5.0
Ratio 3 =	$\frac{\text{Average luminance of subject}}{\text{Average luminance of background}}$	Ideally Ratio 3 > 0.3 and < 3.0
Ratio 4 =	$\frac{\text{Vertical illuminance left}}{\text{Vertical illuminance right}}$	Ideally Ratio 4 > 0.3 and < 3.0
Ratio 5 =	$\frac{\text{Vertical illuminance to the back}}{\text{Vertical illuminance toward the camera}}$	Ideally Ratio 5 < 3.0

For interiors a luminaire with a batwing distribution will give good facial modelling. Additionally when considering the camera position better quality may be achieved by mounting the camera in a position sympathetic to photography (e.g. between light fittings and with a low contrast background). Therefore lighting should not cause heavy contrast patterns down the wall used as a backdrop to the camera sight). It may be possible to channel customers and would be criminals using a roped queuing system to between luminaires where more acceptable light conditions are available. Consider daylight as this can cause problems due to colour differences or high contrast between subject and background

For exteriors the relationship between subject and background brightness should be controlled with a maximum of 3:1 (ratio 3) and the relationship between horizontal and vertical toward camera illuminance should ideally be no greater than 5:1 (ratio 2). Therefore for example, ensure the camera is not aimed so that dark black sky is the background. Vertical illuminances at head height on the three sides of the head should not exceed a ratio of 3:1 between themselves (e.g. right to left, right to front and left to front.). Cameras should not be directed toward any bright light source.

Finally always ensure the lamp used has good colour rendering capabilities to aid in discriminating colour of garments, etc.



**Fig. 6.43** CCTV images taken using different lighting systems