

Guidelines on Industry Best Practices for External Lighting Installations

The guidelines below suggest some best practices on external lighting installations that Government departments and the private sector should observe.

Introduction

1. External lighting in Hong Kong exist in many different forms and some typical examples include signs (either internally illuminated or externally illuminated), lighting for facades and features, lighting outside buildings (including those for shops), lighting for sports fields and playgrounds, external video structures (e.g. video walls, display panel).
2. The guidelines in this document aim to outline some general good practices on design, installation and operation of external lighting for the reference of lighting designers, contractors, owners and users with a view to minimising the adverse impacts arising from external lighting.
3. The guidelines are not intended to cover road lighting maintained by Highways Departments (HyD), which should comply with the Public Lighting Design Manual issued by HyD. In addition, the guidelines are not intended to cover traffic signals, variable message signs, and other traffic/transport facilities with lighting installation managed by the Transport Department (TD), which should comply with relevant traffic regulations or design guidelines issued by TD.
4. For easy reference, the guidelines are grouped under the following sub-headings: operating hours for lighting, automatic controls for lighting, light nuisance control measures, energy efficiency measures, lighting project design planning, glare prevention to road users, and advertising signs.
5. The good practices stipulated in this document are not exhaustive. Relevant professionals, such as experienced practitioners and consultants in the lighting field, should be consulted for further advice if necessary.

Operating hours for lighting

6. Limiting the use of external lighting after a specified time at night could reduce the possibility of light nuisance and energy consumption and in turn foster a good living environment for everyone. It is advisable to :
 - (a) Switch off the external lighting when not needed or after business hours.
 - (b) Switch off the external lighting after certain time at night (say, after 11p.m. as recommended by International Commission on Illumination (CIE))¹ .
 - (c) Maintain only essential lighting (e.g. lighting for safety and security) at the acceptable level as required.
 - (d) Feature lighting serve to enhance a particular feature/building/structure may be subject to even more stringent control as to their lit time.

Automatic controls for lighting

7. Automatic controls could help reduce adverse impacts of external lighting by optimising the use of the external lighting. Examples of such measures include :
 - (a) Incorporate automatic control (e.g. timer switch) to switch off the external lighting when not needed or after business hours, or when concerned premises are not in use, or after certain time at night (say, 11p.m. as recommended by CIE).
 - (b) Incorporate automatic control (e.g. photo-sensor for maximising daylight utilisation) to switch on the external lighting only when necessary.
 - (c) Incorporate occupancy sensor control (e.g. motion sensor or passive infrared sensor) to switch on the external lighting from off or dimmed state where applicable.

¹ International Commission on Illumination (CIE), an international professional body on light and lighting, suggests curfew at 11p.m., unless otherwise specified, after which stricter requirement for control of obtrusive light will apply.

Light nuisance control measures

8. Measures to reduce light nuisance impacts (e.g. light overspill, light trespass, glare and sky glow) arising from external lighting include :
 - (a) Avoid over-illumination of signs, facades, shop fronts, video walls and facilities with lighting. Over-illumination will increase possibility of light nuisance.
 - (b) Position and aim the lighting properly to avoid overspill of light to outside the area being lit up.
 - (c) For lighting up vertical structures (e.g. signs & façade), direct the beam to the structures and avoid overspill of light.
 - (d) Use lighting with appropriate shields, baffles, louvers and cut-off features to prevent light overspill to nearby residence and into the sky, and glare from the light source. Where necessary, consider to use luminaires with appropriate cut-off classification. To avoid imposing additional wind load which will affect the structure of the existing lighting columns and foundation, please consult relevant professionals in the design of shields, baffles, louvers, etc. for retrofit works.
 - (e) Switch off the lighting when it is not operationally required or dim down the lighting when a high illumination level is not essential (e.g. after business hours and where the lighting devices are not for security purposes).
 - (f) Avoid using video walls or signs with flickering, colour changing or movement effect in cases where the video walls or signs are facing directly at residents (e.g. when the lighting device and residential premises are on the opposite sides of a road or street). Where unavoidable, reduce the video wall or sign illuminance, the period of operation and/or the flickering rate.
 - (g) For signs with light emitting diodes (LEDs), use suitable type of LEDs (e.g. LEDs with baffles, louvres or optic diffusers to control light distribution) to reduce sign luminance and light overspill and to prevent glare from direct view of the light source.

- (h) Avoid directing light at glass curtain wall, shiny shop front display panel, or light colour fabric materials (e.g. used in shade structures in parks, amphitheatres or piazzas) etc. to prevent light overspill and nuisances caused by reflection of light.

Energy efficiency measures

9. Measures to enhance energy conservation and energy efficiency of external lighting include :

- (a) Avoid over-illumination of signs, facades, shop fronts and facilities with lighting. Over-illumination will consume more lighting energy.
- (b) Use more energy efficient lighting equipment, e.g. T5 fluorescent light, compact fluorescent lamp (CFL), ceramic metal halide (CMH) lamp, metal halide lamp, LED lamp, and electronic ballast.
- (c) Dim down lighting as applicable and switch off lighting when it is not needed (e.g. after business hours) by automatic or manual control.
- (d) Incorporate sectional controls such that the sections of lighting not operationally required are switched off or dimmed down as appropriate.
- (e) Clean up the external lighting (as part of regular maintenance) to reduce lumen depreciation due to dusts and wastes on the lighting. Adequate provision for easy access and/or appropriate facilities should be allowed to facilitate regular cleaning of external lighting.

Lighting project design planning

10. Good design planning for an external lighting project could help prevent occurrence of adverse impacts from the lighting installations. Design and planning measures include :

- (a) Assess the impacts of external lighting as part of the lighting design development process before firming up the lighting design for installation. Some aspects to be considered may

include critical or sensitive locations² that the lighting may affect, ambient brightness condition, orientation and positioning of external lighting, types of external lighting, lighting energy consumption, and importance of light nuisance impacts.

- (b) Review whether the external lighting will have the possibility of shining outside the area it intends to light up, affecting neighbourhood or the sky. If so, refine the lighting design, consider re-positioning the lightings and adjusting the mounting height and the aiming angles, and choose luminaires with suitable light distribution characteristics (e.g. light pattern, beam spread, cut-off angle) or light control devices (e.g. shields and baffles) as appropriate.
- (c) For floodlighting, ensure the beam angle of the lighting from the vertical is not excessive and the lighting is fitted with shields and cut-off features to control glare, and if possible, use lower intensity lamps to reduce glare from the light source.
- (d) Whenever there is residence nearby, use lighting with appropriate shields, baffles, louvers and cut-off features to prevent light overspill, and glare from the light source. Where necessary, consider using luminaires with appropriate cut-off classification.
- (e) For sports lighting, use luminaires with double asymmetric beams as appropriate so that the front glazing is kept nearly parallel to the surface being lit to minimise overspill light. The light output should be adjustable to different illumination levels to meet different purposes (e.g. training/competitions). For floodlighting provision, adverse effects to nearby residents due to light nuisance such as glare should be thoroughly assessed before the installation of the lighting and suitable measures should be taken to minimise the impact to a level acceptable to nearby residents. Consideration should be given to take into account the physical environment of the facilities to be provided with floodlighting with a view to reducing the light nuisance as well as to provide suitable light-breaker to reduce the glare if necessary. Special care should also be taken to avoid over-concentrating the floodlights on a few lighting

² Such as habitable room within a dwelling that is normally occupied by people for extended periods, especially at night, e.g. bedroom, study. Dwelling refers to building in which people normally reside, especially during the hours of darkness, e.g. residential building, hotel, hospital.

towers/columns which could cause light nuisance or glare problems to nearby residents.

Prevention of glare to road users

11. Glare from external lighting may affect road users resulting in safety concerns. Measures to reduce such glare impact include :
 - (a) Ensure the external lighting is appropriately positioned, aimed or shielded so that illumination of nearby roads will not be adversely affected.
 - (b) Ensure appropriate type of lighting is used (e.g. lighting with suitable light distribution pattern, or appropriate cut-off classification) to reduce glare impact on road users.

Advertising signs

12. Advertising signs should also comply with the advice and guidance on safety, health and related issues stipulated in the *Practice Notes for Authorized Persons and Registered Structural Engineers APP-126* and the *Guide on Erection & Maintenance of Advertising Signs* issued by Buildings Department.

Environment Bureau
Environmental Protection Department
Electrical and Mechanical Services Department
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