HIGHWAYS AGENCY

Safe roads, reliable journeys, informed travellers

The Delivery Hub health, safety and environment Raising the bar 15

Task lighting

Version I - August 2013

Contents

Objective

We are required to have arrangements in place to cover all aspects of health and safety. This includes lighting – which needs to meet the requirements of the Work Place (Health Safety and Welfare) Regulations 1992.

Background

Lighting at work is very important for the health and safety of everyone in the workplace. The quicker and easier it is to see a hazard, the more easily it is avoided. The types of hazard present (and the work being carried out) determine the lighting requirements for safe operation.

This document explains the various types of task lighting available and how that should be considered when selecting lighting form our minimum requirements.

Lighting explained

Terminology

Lux – The measure of light intensity – the higher the lux the brighterthe light

Glare – Discomfort or impairment of vision experienced due to excessive light

Strike Up – The time from start up to full light output

Light types

Halogen – Warm white intense light

Metal Halide – Bright cold white light; strike up time approximately 10 mins

Fluorescent – Warm white light; less intense

Minimum requirements

The following considerations should be considered as minimum requirements when selecting and using task lighting

Choosing lights

There are six key fact ors to consider when choosing temporary site lighting.

What do you need to illuminate?

Both the size of the area to be lit and the conditions of the ground need to be considered – large open areas of for example would require different lighting to a narrow access point.

What type of work activity will be going on?

Different activities require different levels of lighting – more detailed work requires brighter lighting than that required for walking to and from a work site. This is covered in more detail later. Some work will require secondary lighting.

What power source is available?

Some lights come with their own source of power built in. For those that don't, suitable generators also need to be provided. Generally we have two sizes of generator – the 3KVA and the 5KVA. In some cases mains electricity may also be available for use, but **it must always be transformed** down to 110V.

Finally when planning the lighting requirements and prior to installing temporary lighting on site **always** consider the risks of electrocution from **overhead power lines**.

Are environmental noise and light levels an issue?

When temporary site lighting is used adjacent to built up residential areas there will be a need to keep noise levels to a minimum. Similarly, as far as is practical lighting will need to be directed away from residential areas.

This can be achieved by considering placement of the lights and generators, and screening generators to reduce emitted noise levels from the site.

Is the area well ventilated?

Generators should only be used in a well ventilated area, as emissions from these in a confined area could lead to hazardous build up of exhaust fumes – with the associated health risks.

Where the working area does not have adequate ventilation (eg tunnels) the generator should be sited away from the work, and sufficient cable made available and run out safely to power the lights thus avoiding tripping hazards.

Does shadowing and glare need to be considered?

For working environments where shadowing may create problems it may be beneficial to consider lighting that emits a softer diffused light (fluorescent). Lighting should always be positioned to prevent glare. Consideration should also be given to the extent of engineering trains/machinery, proximity of overhanging trees etc.

Vegetation clearance may be required prior to installation of light systems.

In all cases carry out a survey of the site and record your findings.

Guidance on lighting levels

Required by law.

Good lighting whether natural or artificial, is essential to the health, safety and general comfort of our staff at all places of work.

The quicker and easier it is to see a hazard the higher the likelihood of avoiding it. The types of dangers present at work therefore determines the lighting requirements for safe operation.

Providing the correct level of lighting is particularly important when working at night. Consider the diversity of the tasks that our staff perform in the hours of darkness.

Poor lighting can represent significant risks to our business – not only in the form of time off work as a result of accident and injury, but through reduced staff efficiency and productivity.

The Health and Safety Executive specify the following minimum lighting levels in *HSG 38 Lighting at Work.*

Activity	Typical locations / Type of work	Average illuminance (lux)	Minimum measured illuminance (lux)
Movement of people machines and vehicles	Car parks, circulation routes and walking routes	20	5
Movement of people machines and vehicles in hazardous areas; rough work not requiring any perception to detail	Construction site clearance, excavation and soil work, loading and distribution points	50	20
Work requiring limited perception of detail	General factory type work, assembling large components	100	50
Work requiring perception to detail	Electrical work, fine detail carpentry, surveying etc	200	100
Work requiring perception of fine detail	Viewing site plans, fine detail electrical work	500	200

Table based on Health and Safety Executive guidance Lighting At Work HSG38

The **minimum** lighting levels that are therefore **important** for our work are:

5 lux	for getting to and from the worksites
20-50 lux	for general work
100 lux	for activity where a degree of perception to detail is required

It should be noted that the requirement for lux values in excess of 50 lux is to avoid visual fatigue; the illuminance values quoted below this figure are adequate for

general safety purposes.

Four head metal halide lighting tower

Power	N/A
Power source	Integral generator
Mast height	9 metres
Weight	1050 kg

This unit provides up to four times the light capability of traditional tungsten bulbs.
It is a road towable lighting tower that features four metal halide bulbs to produce bright, white light for a variety of applications.

- Lights can be arranged in various configurations
- Rotating mast head reaches up to 9 metres in height
- Unit is self powered diesel and can run continuously for up to 60 hours
- Quiet running @ 63 dB(A)

This lighting solution is best suited for renewals and larger maintenance sites.

Linkable lighting towers

Power	1600 W
Power source	3 KVA generator (min)
Mast height	7 metres
Weight	226 kg

This unit is a linkable tower lighting system that allows up to four units to be connected together and powered by one single point generator or mains connection.

- Link towers are very compact and around twelve units can be transported on a transit type flatbed truck
- Lighting is provided by four metal halide bulbs
- The linkable lighting towers provide a coverage of approximately 5 lux at a 25 metre radius. Obviously the lighting level significantly increases the closer you get to the source with 50 lux being achieved at a 15 metre radius

This lighting solution is best suited for larger renewal sites. Although it is easily transportable by road it is not best suited for short duration work on the infrastructure due to the logistics problems of getting the units to the worksite.

Flourescent link lights

Power	72 W
Power source	3 KVA generator (min)
Mast height	2 - 2.4 metres
Weight	7 kg

Light output is achieved from 2 x 36 W fluorescent tubes, each unit is mounted on an adjustable mast and supported by ballast baskets. Up to 32 units can be powered by a single 3 KVA generator.

The recommended spacing for these lights is 8 metres.

Using this spacing typical lighting levels achieved at 2 metres from the source along the line of lights is between 20 and 50 lux. At 4 metres from the source the lux level diminishes to between 10 and 15 lux. This should be taken into account when planning to utilise these lights for certain maintenance tasks.

This type of unit is particularly useful when working in tunnels as separate brackets are available to fix the lamps to the tunnel sides and roof therefore maximising space and minimising tripping hazards.

The lights are easy to assemble and link together but adequate time will be required when planning the job for setting up a long run of these units.

They are however a relatively cheap and effective way of lighting a lengthy work site and should definitely be considered for access lighting where we have large numbers of staff on site for longer duration/multi shift tasks.

This type of lighting is primarily used for illuminating long work sites and access lighting.

Rechargeable K9 superlight

Power	3x18 W (300 W equiv)
Power source	Integral rechargable battery
Mast height	up to 0.3 metres
Weight	15 kg including charger

PICTURE © HSS

The K9 superlite is a professional personal work light which allows the user to direct light at the optimum angle for the task being carried out.

The light source is from multiple triphosphor electronic flood lamps operating from a 12 V power source.

- Can be switched between high and low power to extend duration
- Flexible work position to direct light at optimum angle
- Can be used as a high power flood beam torch
- Telescopic mast
- Duration – 5 hours high output, 14 hours low output

The light produces 135 lux at 1 metre and 25 lux at 2 metre directly in front of the source.

This light is not for use as a primary light source other than for personal use when walking. It does however have many secondary uses providing additional illumination for detailed work.

Rechargeable lantern

Power	26 W
Power source	Integral rechargable battery
Mast height	N/A
Weight	6 kg including charger

PICTURE © HSS

This unit produces 360 degree brilliant white light, the equivalent of a 130 W bulb having a duration of up to 20 hours.

Used as a personal 'tilley' work light suitable for use in tunnels and all open spaces. The light is also suitable for providing secondary lighting where 'shadow contrast' is a problem.

The lantern is fairly robust and can be used at any angle. It produces an average illuminance of 20 lux at 1 metre from the source.

Inflated balloon lighting

Power	180 - 4000 W
Power source	Integral rechargeable battery/ generator, mains plus transformer
Mast height	3.5 – 5.5 metres
Weight	8 - 20 kg

Balloon lighting offers safety benefits through reduced glare and shadow by distributing brightness of the light source over a larger area than traditional lighting methods. They are available in a range of sizes and provide a portable, lightweight and compact alternative to traditional lighting. An inflated flame retardant envelope containing a halogen/metal halide lighting system provides Lux levels ranging from 50-400. They have been successfully trialled on a number of Highways Agency maintenance works.

Lux values at a glance

	Power (W)	Power source	Mast height (metres)	Weight (kg)	Description
Four head metal halide lighting tower	N/A	Internal generator	9	1050	This road towable lighting tower is suitable to light a variety of locations from large multi shift work sites to site compounds and major access points.
50 LUX @ 50 metres					
5 LUX @ 100 metres					
Linkable lighting towers	1600	3 KVA generator (min)	7	226	These lighting towers can be linked together to give large light coverage ideal for renewals and extended work sites. Total coverage in excess of 1300 square metres.
50 LUX @ 15 metres					
5 LUX @ 25 metres					
Tripod type twin head halogen floodlight	1000/600	3 KVA generator (min)	1.5 to 2	7	Used to light up relatively large areas with very few lights. Adjustable in height supported by three leg tripod arrangement for stability.
50 LUX @ 4 metres					
5 LUX @ 6 metres					
Inflated balloon lighting	180/4000	Integral rechargable battery/generator, mains and transformer	3.5 to 5.5	8 to 20 (excluding generator)	Portable and self powered. Can be used to light a wide range of access/work areas.
50 LUX @ 3 metres					
5 LUX @ 8 metres					
Trackside flourescent link lights	72	3 KVA generator (min)	2 to 2.4	4	Fluorescent lights that can be linked together. Up to 32 units can be supplied from one power source and span up to nearly 200 metres.
50 LUX @ 2 metres					
5 LUX @ 6 metres					
Rechargable K9 superlight	3 x 18 (300 W equiv)	Integral rechargable battery	up to 0.3	15 (including charger)	Portable self powered light. Ideal for secondary lighting where attention to detail is required.
136 LUX @ 1 metre					
25 LUX @ 2 metres					
Rechargable lantern	26	Integral rechargable battery	N/A	6 (including charger)	Portable self powered light. Ideal for personal use as a tilley light.
20 LUX @ 1 metre					

Task lighting requirements

General guidance

The table below gives some guidance on the minimum level of lighting required, and how this can be achieved using the units we have available. This is by no means definitive, and the person responsible for organising any work must include as part of their risk assessment/method statement consideration for the requirement for temporary lighting to carry out the task safely and efficiently.

Type of work	Types of lighting
Pedestrian access to/from work site, access along or between sites	• Hand/head lamps • Fluorescent link lights • Inflated balloon lighting
Site access points, loading/distribution areas, and tracking machines on/off site	• Metal halide lighting towers • Single link tower • Tripod type twin head halogen
Localised work using small plant	• Tripod type twin head halogen • Inflated balloon lighting
Large worksite multiple task linkable lighting towers	• Fluorescent link lights • Metal halide lighting towers • Inflated balloon lighting
Perception to detail required	• General background lighting • Supported by secondary lighting eg K9 superlite, various portable lamps

Additional information

HSG38 – *Health and Safety Executive Guidance, Lighting at Work*
http://www.hse.gov.uk/pubns/books/hsg38.htm

If you need help using this or any other Highways Agency information, please call **0300 123 5000*** and we will assist you.

This document is also available on our website at **www.highways.gov.uk**

If you have any enquiries about this publication email **ha_info@highways.gsi.gov.uk** or call **0300 123 5000***
Please quote Highways Agency publications code PR74/13
Highways Agency media services Bedford S130278

* Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls. These rules apply to calls from any type of line including mobile, BT, other fixed line or payphone. Calls may be recorded or monitored.