Chapter 21: Lighting maintenance

21.1 The need for lighting maintenance

A lighting installation starts to deteriorate from the moment it is first switched on. Maintenance keeps the performance of the system within the design limits and promotes safety and the efficient use of energy. Maintenance includes replacement of failed or deteriorated lamps and control gear, the cleaning of luminaires and the cleaning and redecoration of room surfaces. Detailed advice on lighting maintenance can be found in CIE Publications 97-2005 and 154-2003.

21.2 Lamp replacement

There are two factors to be considered when determining the timing of lamp replacement, the change in light output and the probability of lamp failure. The relative weight given to these two factors depends on the light source. Mains and low voltage tungsten filament and tungsten-halogen lamps usually fail before the decline in light output becomes significant. Therefore the replacement time for these lamps is determined by the probability of lamp failure alone. All other electric light sources show a significant reduction in light output before a large proportion fail. For these lamps, both the decline in light output and the probability of lamp failure are important in determining the lamp replacement time.

For the majority of lighting installations, the most sensible procedure is to replace all the lamps at planned intervals. This procedure, which is known as group replacement, has visual, electrical and financial advantages over the alternative of 'spot replacement', e.g. replacing individual lamps as they fail. Visually, group replacement ensures that the installation maintains a uniform appearance. Electrically, group replacement reduces the risk of damage to the control gear caused by the faulty operation of lamps nearing the end of their life. Financially, by having the lamp replacement coincide with luminaire cleaning and doing both at a time when it will cause the minimum of disturbance, the cost of maintenance can be minimised. Group replacement is an appropriate procedure for routine maintenance and the frequency with which the procedure is carried out will have a direct bearing on the installed electrical load. However, in any large installation, a few lamps can be expected to fail prematurely. These lamps should be replaced promptly on an individual basis.

For many installations the most economic time for group replacement is when the light output of the lamps has fallen below 80% of the initial value and the lamp failures are becoming significant to the loss of average illuminance. The latest time for group replacement is when the designed 'maintained illuminance' has been reached.

As light source development proceeds there is a temptation to replace one light source with another that is superficially similar but of higher luminous efficacy. However, it is essential to establish that the replacement light source and the existing control gear are compatible physically, electrically and photometrically. Before replacing any discharge light source with another of a different type or the same type but from a different manufacturer, advice on compatibility should be sought.

21.3 Cleaning luminaires

The rate at which dirt is deposited on and in a luminaire depends on the amount and composition of the dirt in the atmosphere, and on the type of luminaire. Over the same period and in the same location, dust-proof (IP5X) and dust-tight (IP6X) luminaires and open reflectors with slots in the top will collect less dirt than louvred luminaires with closed tops, or luminaires with unsealed diffusers (see Sections 21.7 and 21.8).