The Sports and Play Contractors' Association

Technical Guidance Leaflet: No. 5

Tennis Floodlighting: Effective System Management

The British climate poses a serious problem for the game of tennis, as it is a predominantly outdoor summer sport. Floodlit courts provide greater opportunities to play throughout the winter period, where indoor provision is not available. Floodlit courts increase the playing time by some 35%.

Floodlighting encompasses more than just the illumination of a tennis court. To make the most of a floodlighting scheme it is important to be aware that technology may provide opportunities that fulfil the often difficult management issues faced by tennis clubs, local authorities and other tennis venues. **Tony Hill of Ayrlect Associates looks at the innovative use of floodlighting technology to provide the ideal solution.**

Light Sources

For conventional systems, there are essentially two different types of light source: incandescent and high intensity discharge lamps. The tungsten halogen lamp is an example of the first type and contains fine wires that radiate bright white light, just like domestic lighting.

The two principal types of high-pressure discharge lamps are metal halide and high pressure sodium. Sodium lighting has a yellow tinge and therefore has inferior colour rendition characteristics, whereas metal halide lamps emit a brilliant white light.

Operational features

Each of the high pressure discharge types require a warm-up time to achieve full output (15 to 20 minutes) and the immediate reinstatement of power to hot lamps will adversely affect the overall lamp life to a significant extent. It is essential, therefore, that the number of on/off cycles per session is minimised to avoid "re-striking" hot lamps and hence protect their life.

Maintenance

Maintenance of the lighting system is one of the most important issues to consider when cost plans are being prepared for the installation and operation of floodlighting. Apart from replacing lamps, the reflectors have to be kept

clean and allowance should be made for a regular inspection and maintenance of the associated electrical installation.

Site Safety - courtesy and egress lighting

As an aid to the safe usage of the facilities, after the floodlighting is switched off, a system of tungsten or sodium lighting is usually installed to illuminate the areas between the courts and the clubhouse/changing rooms, but care is needed to ensure that this does not distract from the playing conditions.

System Management

The function of management systems can be grouped as follows to:

- monitor the usage of the installation and the operating cost;
- control the day-to-day switching of the floodlighting;
- minimise the running and maintenance costs; and
- to provide safe access and egress to and from the courts.

Master control – As it is usual for the planning authorities to impose a cut off time for the floodlighting, an automatic timeclock is introduced into the control system to ensure compliance. The clock should be provided with battery back-up to ensure time keeping in the event of power failure.

Timed day-to-day switching - The most common form of time control is the application of token meters where pre-paid periods of court time are purchased by the users as and when required. A card reader system can be provided in place of the token units and may be a simpler system to administer. These systems reduce the inconvenience and interruption of having to feed a coin meter.

Visual Warning - To minimise the possibility of the court lighting switching off at a critical stage of play, a warning system is often installed which alerts players on a court-by-court basis, by means of a coloured or flashing lamp, to the fact that the lighting will shortly cut-out unless more time is purchased. Experience shows that this system is well used, as players do not like to have their game interrupted and lose playing time waiting for floodlights to regain operational illumination levels. A substantial benefit to the club/school arises from the fact that this keeps the number of switching cycles to a minimum and protects the working life of the lamps.

From the above, it is evident that system management can:

- monitor the usage of the courts and the associated costs;
- increase the quality of playing time by minimising disruption;
- increase lamp life;
- increase value for money;
- reduce potential damage through security lighting; and
- increase safety through courtesy and egress lighting.

The system management features described relate to a typical club or school scheme where the tennis courts are close to the clubhouse or school buildings and are usually met by the application of electro-mechanical controls.

When space for controls is restricted it is possible to meet these requirements by the utilisation of modern control systems, in which the various management functions are combined into a Programmable Logic Controller (PLC) to simplify monitoring and control of the installation. This system provides control, either manual or timed, from a small central display unit at the control position, linked to a central controller adjacent to the lighting switchgear by a two-core data cable.

Through a set of operating levels, password protected, the various elements of the scheme can be accessed. For example:

Level 1: The duty staff select the courts to be lit.
Level 2: The hours run, electricity cost and similar management information is displayed.
Level 3: Restricted to service access for adjustment of charge rates, delay times for egress lighting, master timeclock setting, etc.

The application of PLC control is valid for sites controlling multiple courts (four upwards) and minimises the space required within the Clubhouse for the control equipment.

However there are many instances where the courts are remote from the main accommodation and the impact for clubs, local authorities and schools is the need for further automatic systems to offset the problems of remote location.

Some of the factors to consider are:

- Central control from a common location (e.g. sports hall reception)
- Disruption of existing paths, driveways etc. between courts and the control position.
- Operation at a distance and the restrictions on wiring of the control functions.
- Maximum operational distance.
- Reducing manpower to operate the system at a distance.
- Prevention of the need for players to travel a long distance from courts to where the central control box is located before and during play.
- CCTV cameras to monitor the correct switching of the lighting and provide increased security for the remote site.

If any of these factors apply, and particularly if the final control position is a considerable distance from the courts, a radio modem link(s) could be included in the performance brief, to avoid the need for any hard wiring of data cable to the club/school premises.

Costing

Whilst the final choice of system and all the associated features will impact on the final budget, it is possible to indicate **typical** overall costs for court floodlighting to the current LTA standards. The system management features account for approximately 8% of the capital cost in this example.

Item	
Capital cost per court:	£7,500
Replacement lamp cost:	£1,750
Replacement frequency:	4 to 5 years
Suggested charge rate:	£4.00 - £5.00 per hour per court

Note: These costs are based on the following assumptions

- Based on a 4 court floodlit scheme with full system management.
- No provision for security/courtesy lighting.
- 300 to 400 hours usage from October to March.
- 2 club nights each week and weekend play.
- Hourly rate of floodlit court inclusive of a fund to replace floodlights in future.
- Adequate power supply already on site.

Optional extra costs include:

- PLC control of multi-court system: £1,000.00
- Radio modem link to PLC: £2,500

Conclusions

In this article the various issues associated with management of floodlit courts have been identified. At first view it is a simple matter to provide facilities to sell time on court but as it has been demonstrated there is a need to consider cost for the other features that will ensure maximum safe and economic usage of the courts when enhanced by the introduction of floodlighting. By looking towards technology, sporting opportunity, the quality of time spent by the users, the safe usage of the facilities and the containment of operating costs will all benefit from evaluating the possibilities for system management at the inception of a floodlighting scheme.

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