LIGHTING EQUIPMENT NEWS

JULY 1991

In brief...

● **The Lighting Maintenance Company** has been acquired by OCS, Britain's largest privately owned group of cleaning, property maintenance, hygiene and security companies. It is now a division of The New Century Cleaning Co and has moved to 2 Sovereign Park, Coronation Road, London NW10 7QP.

● **Crescent Lighting** has moved to larger premises at Unit 8, Rivermead Industrial Estate. Pipers Lane, Thatcham, Berks RG13 4NA.

● **Bradley Lomas Electrolok** has supplied £63 000 worth of emergency lighting equipment to Stanstead Airport.

● **Designplan Lighting** has formed an export division, Designplan International, to tackle new markets.

● **Davis Streetlighting**, now part of Chalmit Lighting: has received approval to BS5750: Part 1.

● **Dernier and Hamlyn**, a division of Montrose International, has transferred its manufacturing plant to the group factory at Enfield, near London. This is due to a 50% increase in sales over the last year. Design and sales offices are now at the group headquarters at 47 Berners Street, London W1, where the showroom will be expanded.

● **Helix Lighting** has been acquired by its management, David McIlroy and Mike Hales, from Electrocomponents. The company, which makes domestic lighting, will continue to operate from Northants.

● **Miyakawa Europe**, supplier of high technology Japanese lamps, has changed the name of its UK operation to Hybec Ltd.

● **Troll Lighting (UK)** has appointed Wholesale Fittings of Docklands as a major stockist and distributor of its Spanish-made lighting.

● **Bernlite** has been appointed main distributor to the wholesale trade of the electronic universal starters made by Lighting Electronics.

● **Elemsystems** is now UK importer and distributor of Vip luminaires by Pandul, Denmark.

● **Emess plc** made a profit before tax of £9 million in the year ended December 1990 compared with £18.7 million in the previous year.

● **Economy Lighting** has moved to larger premises at Electron House, Leeway Close, Hatch End, Middx HA5 4SE.

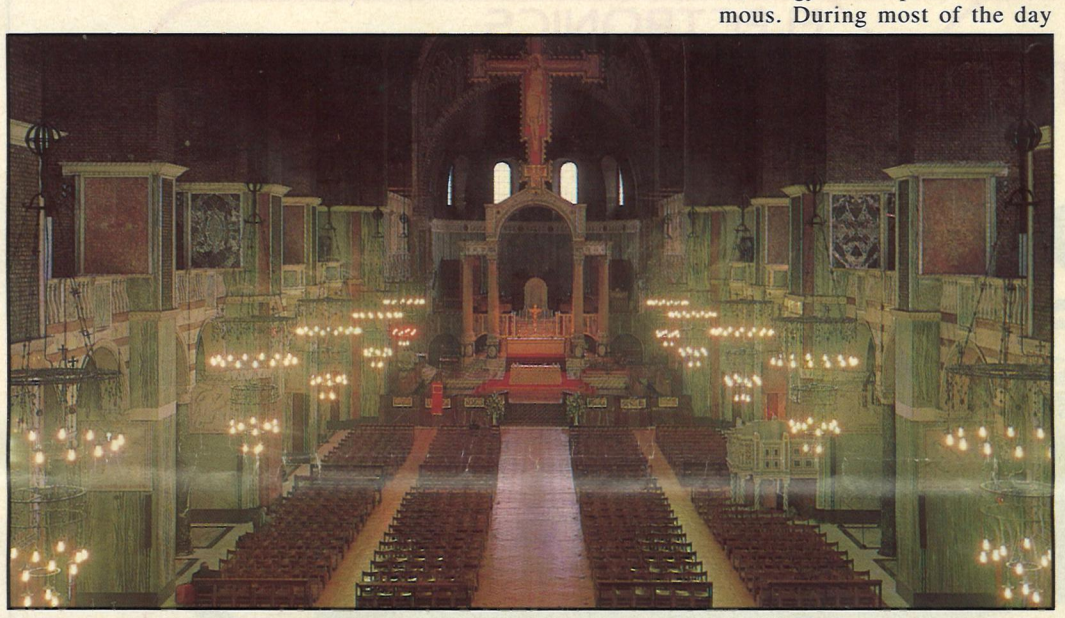
INSIDE THIS ISSUE

Westminster Cathedral cuts lighting bills

Westminster Cathedral reduced its main ambient lighting electrical load from over 30 kW to 5.2 kW, by installing energy-efficient lamps, while improving the cathedral lighting levels.

In addition to creating the right environment, it also enables the public to appreciate the cathedral's intricate carvings and mosaics, which are up to 90 years old. Until energy saving lamps were fitted these were not displayed to their best effect because of lighting costs.

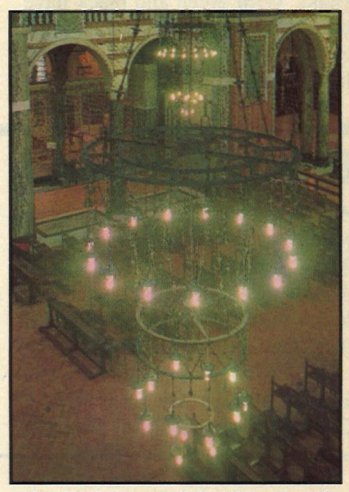
John Coltini, of electrical wholesaler, Medlock Electric, approached the cathedral authorities in April this year, after noticing that the cathedral still used incandescent lamps. His company was subsequently asked to complete the first phase of the change within three weeks in time for Pentecost.



Lighting was to be in keeping with the cathedral as designed by Bentley in 1895, so the scheme demanded a wide range of standard, globe and reflector lamps, and Osram's products were eventually chosen.

The first phase involved replacing the twelve chandeliers in the nave by Delux EL lamps, the thirteen chandeliers in the side aisles with Dulux EL globe lamps.

For cost reasons lighting levels in the cathedral have always been kept to a minimum during the day with extra lights used only for services and special events. Even so, energy consumption was enormous. During most of the day



only the lowest of the three levels of the twelve chandeliers in the main body of the cathedral need be lit, but at high mass all three levels may be illuminated for up to an hour and a half, resulting in a power consumption of over 25kW. The new lamps have reduced this to 4.6kW.

The reredos crucifix had to remain a focal point of the cathedral so it was lit from either side of the nave using Erco eclipse projectors fitted with fresnell lenses and 150W HQI-T lamps. The narrow beam angle of these fittings mean all the light is projected on the crucifix with very little spillage.

Black fittings were chosen to ensure unobtrusiveness and the use of metal halide lamps not only reduced the electrical loading from 1kW to 300W, but also doubled the lighting on the crucifix from 200 to 400 lux.

DLA chooses student designer

The £1500 first prize for the Decorative Lighting Association's annual Student Lighting Designer of the Year Award has been won by Ruth Thoelke, a final year student at Middlesex Polytechnic. The competition, now in its sixth year, attracted around 300 entries from students all over the UK.

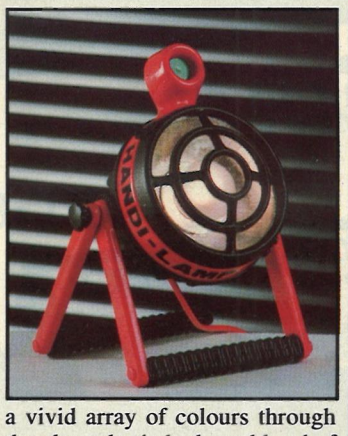
Finger Light uses polystyrene sheet to overlap the fluorescent tube employed as the light source to produce an interesting array of patterns, shades and textures. The design is capable of being produced in a variety of sizes which form the basis for a range of products.

"I saw the striplight as a challenge," said Ruth after her win. "It is a common item around the home in architectural use and in office spaces. I felt it was a particularly unflattering light form and wanted to do something to enhance it."

The judges felt that her concept had the potential for expansion through using different materials and lamp types.

The £750 runner up was Coventry Polytechnic student Steve Mann, who presented an inspection lamp which carried its own integral 9m extension cable (top right). The standard GLS bulb can be focused and the lamp is encased in a plastic assembly. The judges were impressed by the considerable attention to detail on the prototype.

Third place and £250 went to the Royal College of Art's Andrew Hodgin, for a decorative garden light, The Bug (below). This uses fibre optics to transmit



a vivid array of colours through the clear plastic body and head of the beetle.

A commendation was given to Katie Vaughan, of Gwent College of Higher Education, for a tall metal-built planter using low voltage halogen light sources as the 'centres' to the luminaire 'flowers'.

Consultant Gerry Brown, speaking on behalf of the panel of judges suggested ways by which design colleges and the lighting industry could forge closer connections.

Lamp and component manufacturers should provide a flow of information and sample components to design students. This would enable them to understand the subject and incorporate into their work the new technology that the industry offered.

Commenting on the 1991 awards, Mr Brown said it was not the students' fault that they had not really experimented with the new technology available. The lighting industry itself had a responsibility to make designers aware of their products and how they could be applied.

Design talent on show

Britain's brightest and best design talent will be seen at the New Designers exhibition from 11-14 July at the Business Design Centre, north London. The work of 1000 designers from 46 colleges all over the UK will be seen.

Awards amounting to £18 200 will be presented to enable young designers to further their education or career. Among these is the Emess £1000 lighting award for the design of a lighting fitting.

NEWS

Magic Kingdom is lit

R & S Robertson has secured an order to supply all the decorative lighting for the bedrooms and ancillary areas of the prestigious Magic Kingdom Hotel on the Eurodisney development near Paris.

Meanwhile, 1400 luminaires in khaki, Verdi green and black have been supplied by Harvey Hubbell to the specification of Disney Imagineering.

Bullet shaped, diecast aluminium, mercury fittings on swivel knuckle joints are to be found among the foliage and other outdoor displays in Fantasyland, while Adventureland is lit by PAR38 outdoor floodlights with clear lenses.

Down at the old corral, in Frontierland, a variety of fluorescent, trough shaped luminaires with clear lens covers light outdoor signs.

Electrical death warning

An electrician in London died recently when working on a 240V lighting circuit fed by a double pole sub-fuseboard. He had removed only the neutral fuse, leaving the circuit live.

Dr Paul Davies, head of the Health and Safety Executive's Construction National Interest Group, has warned contractors and electricians to take particular care to identify double pole fuseboards when working in older properties – both live and neutral fuses should be removed and effective isolation then proved using a proprietary voltage detector.

LIGS at Richmond

Twenty members of the Lighting Industry Golf Society and their guests played at Richmond Golf Club, Sudbrook Park, Surrey, on 11 June. Despite the good condition of this lovely course, gusting wind made play testing.

In the morning, members played for the LEN trophy, with supporting prizes sponsored by John Butler of Staff Lighting. Guest prizes were sponsored by Rod Flitt of Moorlite.

John Butler won the trophy with second place going to Barry Glazer and third to G Jacobs.

All members and guests were presented with golf balls, card holders and towels by David Proctor representing GE Thorn Lamps, who also gave prizes for the Nearest to the Hole and the Longest Drive.

Prizes for the afternoon Greensomes Stapleford were sponsored by Stephen Haggis of Industrolite. First prize went to John Butler and his guest F Scott, with second prize to Trevor Oram and his guest A Turnbaull.

The next meeting will be on 19 July at Wildernesse.

Managing the environment

Three draft standards on environmental management systems for industry have been produced by BSI and are available for public comment until 31 July.

To order the documents, price £33 (£16.50 to BSI members), contact Customer Information on 0908 221166.

CIBSE

The Chartered Institution of Building Services Engineers

CIBSE seminars for users at Light Fair

Towards the end of last year, CIBSE Lighting Division was approached by Industrial Media Ltd to organise a series of seminars on lighting topics to run alongside their new exhibition, Light Fair '91, at Wembley Conference Centre on October 22, 23 and 24. Industrial Media has been running its own successful *Lighting: the state of the art* seminars for some years.

Lighting Division, aware that the UK lighting community has for some time recognised the need for an event dedicated wholly to its interests, across a broad product/applications spectrum, with no non-lighting distractions to muddy the visitor mix, was delighted to take on this challenge, on certain terms. Pre-eminent among those terms was the need for objectivity and scope in the presentation of all papers, especially product ones, and a completely free hand in the formulation of the programme. In the event, Light Fair has given 100% support for the schedule of seminars the CIBSE team of planners has proposed.

One of the principal aims has been to make the seminars user-applications led, on the premise that visitors to Light Fair will be interested mainly in how lighting products and systems relate to their own companies' operations, and how they can benefit from them.

Thus, every session over the 2½ days allocated to seminars leads off with the user's viewpoint and requirements. In support of these, there are papers that survey the equipment available, principal design aspects, applications, and selected case studies to illustrate how all these aspects combine to produce successful lighting schemes.

Readers of *Lighting Equipment News* will get the flavour of what's in store for them at Wembley in October from the following summary.

Day 1: Tuesday 22 October

The first full day is devoted to industrial lighting: interior in the morning, exterior in the afternoon. Speakers include Tony Hopkins (Unilever Engineering) and Stanley Lyons (writer and authority on lighting in industry), both putting the user's viewpoint. Product/applications and design papers will be given by Keith Rippon (Holophane Europe), Richard Hayes (Simplex Lighting), Peter LeManquais (Thorn) and Mike Simpson (Philips). Chairmen for the day are Alan Wilson, (chairman of CIBSE Lighting Division) and Robin Aldworth (Thorn).

Day 2: Wednesday 23 October

The morning session on retail lighting will be chaired by Bob Beer, (of consulting engineers Flack & Kurtz), with Marks & Spencer as the major user speaker, and Graham Skeldon (Osram) and Ian Cerfontyne (Siemens) dealing with products and design concepts relating to lighting the retail environment.

In the afternoon, Ted Glenny (Philips) chairs a sequence of papers on commercial lighting, leading off with Phil Davies (FC Foreman & Partners) who will delineate the user's requirements. Brian Mayes (Trend) deals with lighting controls, and Jeremy Ling (Philips) discusses lamps and luminaires.

Day 3: Thursday 24 October

Lighting for leisure and sports concludes the programme, the focus being principally on two major case studies, the new Birmingham International Convention Centre, speakers Bill Graham, (technical manager at the centre), and Kevin Jones (Ove Arup) presenting the lighting designer's case. Paul Blackburn (Kirklees Metropolitan Council) speaks as a large specifier of sports lighting, and John Hugill (Thorn) presents a case study on the Don Valley Sports Stadium, Sheffield.

The afternoon of the third day will consist of a series of specially invited lighting presentations, organised by Industrial Media.

Delegate booking forms for the CIBSE seminars are available from both CIBSE, tel: 081-675 5211) and Industrial Media (0732 359990).

Karl Pike
Secretary, CIBSE Lighting Division

NEWS

How to succeed in the German market

Silvertown Engineering has just delivered the final consignment of 12 000 luminaires for the Messeturm in Frankfurt, an office block that is claimed to be the tallest in Europe.

Securing the order was the company's first major effort in Europe and it was necessary to learn rapidly in order to adapt to European technical standards and German commercial practices. It was also essential at the outset to fully understand the implications of the contractual agreement and be aware of differences between standard terms in English and European contracts.

Extensive testing was carried out to ensure that all the luminaires met VDE requirements. The route taken was to submit them for BSI type testing to European standard EN60598 Part 2.2.

The lighting scheme, which gives an average of 500 lux, had to comply with German standard DIN5035.

For the main office areas a recessed, air handling, louvred fitting was chosen. It has 24-cell, Softlighter-profile, wedge louvres, is 600mm square and uses four 18W fluorescent lamps. Its air handling capacity is 28 litres per second. Electrical loading is 14.4W/m^2.

A special continuous, single-lamp lighting system was provided to brighten the walls in internal areas where daylight is limited.

The commercial operation also had to be tightly controlled, so a special project co-ordinator was appointed to monitor production and liaise with Silvertown's German speaking on-site representative, without whom it would have been extremely difficult to satisfy the exact needs of the German electrical contractor. It was expected that all communication, both verbal and written, was in German.

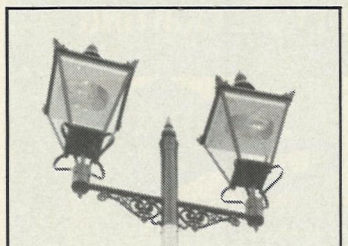
The standards the Germans expected were soon apparent when a delivery agreed for the morning of a certain day was refused because the carrier arrived in the afternoon.

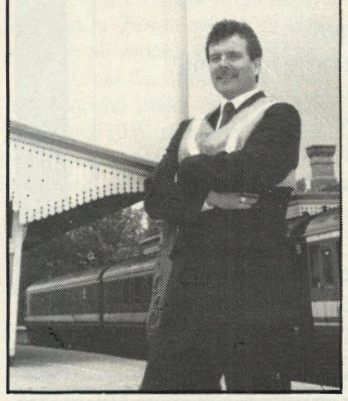
Because the luminaire specification required the inclusion of certain German components, great attention had to be given to production planning to match economic quantities with component availability.

Goods were transported to various floors by an external lift. To facilitate this, deliveries had to be packed on specially adapted pallets which were individually identified, to ensure that each batch arrived at the correct floor with minimum handling.

The company's determination and attention to detail has paid off, because the German electrical contractor, who was originally hostile, has now placed an order with Silvertown for another office project.

Left: the Messeturm office block in Frankfurt





Student lights the way

Hatfield Polytechnic student, Eamonn McNally, who is on a part-time Bachelor of Engineering course in building services engineering, for his fifth year project has produced a report on how he and fellow BR engineers solved the lighting problem at one of the country's 205 listed building stations, Hanwell and Elthorne on the line between Paddington and Reading. The station was built in 1838.

Network Turbo 165 high speed commuter trains will operate on this line and there will no longer be staff on the platform to check door closing, as the driver will be responsible for passengers getting on and off, as well as doing the driving.

Therefore, lighting on these stations has to be just right so that he can see clearly from his cab all the way down the platform at night and in bad weather. Also, when he is approaching the station there must be no danger of him confusing the lighting with the colour of any signals.

The problem is particularly important at Hanwell station because its listed building status means there are strict rules about preserving the Victorian character of the lights. Using Eamonn's designs, British Rail has installed high pressure sodium lights.

COMMENT

Stimulating a wealth of young talent

Luminaire manufacturers in the UK will not prosper if the quality of their design does not meet that of their major European competitors. With a few creditable exceptions – and most of these do not fall into the kind of price bracket that appeals to the domestic consumer – the standard of much luminaire design in this country is fairly low.

This is not due to a lack of young talent coming onto the market. Student competitions such as the DLA Student Lighting Designer and the New Designers Awards, (both reported on Page 1 of this issue), show that the design talent is around, it's just not being taken on board by manufacturers.

We seem to have a continuing gap in the UK between manufacturers and educational institutions such as universities and colleges of art that is less apparent in countries such as Germany, Holland, Belgium and Italy. This is sad, because manufacturers cannot afford to lose out on sources of ideas. To this must be added the fact that much of the industry does not appear to know how to handle new product development to achieve a balance between aesthetics and technology.

Important though competitions may be in introducing the student designer to the potential user of his talents, a plea to make their conditions more realistic was made by on behalf of the judges of the Young Designer of the Year Award by Gerry Brown. It can only be hoped that lamp and component manufacturers take up the challenge to aid entrants with technical expertise and components to enable them to improve their designs. By so doing they would be helping to build up a nucleus of experience that may well benefit them in the future.

Marlin are one of the few companies that have systematically tried to build contacts with the educational world (Concord is another that springs to mind). Design director Michael Jankowski agrees that the link between industry and the student seems to operate more naturally in Germany than here in the UK. He feels that the circle is in place but some of the links are missing.

When Michael Warren of Kingston Polytechnic challenged Jankowski to come and work with his second and third year students he rose to the bait. Students were dispatched to the company's Warren Sreet showrooms for a briefing by the product manager, sales staff expounded the potential of modern lighting and Marlin offered them a design consultancy service. A couple of weeks ago Marlin saw the finished work and were highly impressed. As a result, three or four students will be invited up to the company's headquarters to present their ideas to the board. Among these there are some that with a little development could be exploited commercially, and may well – with the agreement of the student and the college – end up in the Marlin range. What better encouragement could a young industrial designer have than to see his or her ideas go into production?

The essential feature of this exercise is that it stimulated a two way traffic of ideas, and was not just a form of industrial charity. The company too had benefited from the students' ideas.

On yer bike!

Lighting has many and varied uses, but one of GE Thorn Lamps' must surely be counted amongst the more unusual.

The Revolution Mountain Bike Club, pioneers in night time woodland riding, have developed an ingenious way of lighting up their routes at night. Club member Stuart Falshaw applied 35mm Lightstream halogen mirror lamps to cycle helmets, providing sufficient illumination for riders to hack through the forest at a staggering 40mph, as by daylight. "The lamps shed a beam of light similar to a car headlamp," said Falshaw. "In that way, we don't have to slow down, even in the winter months."

Considerable experimentation demonstrated that while the low voltage 12W lamps were ideal for cruising, the 35W versions were more suited to the fast rides. It was better to have both lamps mounted on the helmet to avoid creating shadows and to maintain a high intensity of light.

People in brief

- **Phil Reddiough** has joined Absolute Action's project management and sales team from Lighting Design Partnership.
- **Kieran Sturrock** has been appointed head of production at Absolute Action.
- **John Bradford** is now export sales manager at Chloride Bardic.
- **Vic Lines** has become area sales manager, based at Reading, of Fenton Plant Hire, which specialises in access platforms.

Light Source wins ballast contract

Light Source has been appointed sole UK and Ireland agent for the ERC range of ballasts and associated products.

ERC is a leading Italian producer of ballasts and is approved to BS5750 / ISO9000. It produces its products to meet the majority of international specifications.

LIGHTING EQUIPMENT NEWS

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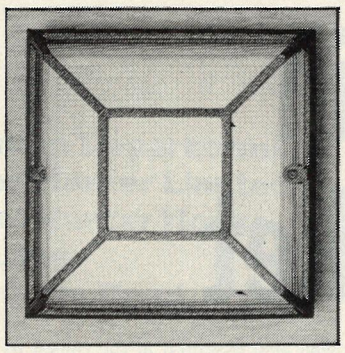
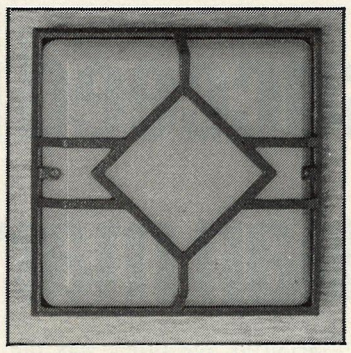
NEW PRODUCTS





Miniature bulkheads

Designplan Lighting has introduced a range of miniature, square, bulkhead fittings which use either 21W, 16W or 10W 2D lamps, or 7W or 5W PL lamps. Two of the models have decorative cast aluminium grilles.

The clear or opal prismatic diffusers are made of injection moulded polycarbonate. Ingress protection rating is to IP55 standard.

Control gear and lamps are on a removable tray with plug-and-socket fused connector block. A photo-electric cell can be included if required.

There are surface mounted, recessed and semi-recessed versions, as well as a model designed for wall mounting at an angle of 45°. These luminaires are also being launched as bollards, mounted on low columns.

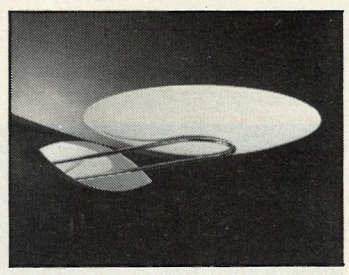
The range is available in red, green, yellow, blue, black, white or grey.

Reader Service No 151

Elegant uplights added to range

A free standing uplight and matching wall light have been added to the Gino range by Zon International. Both accept mains voltage tungsten halogen lamps up to 300W.

The shallow bowl reflectors, 520mm in diameter, are made of white-finished steel while the



steel tubes are chromium plated. Safety glass shields cover the lamps.

The floor light is also available with a dimmer switch.

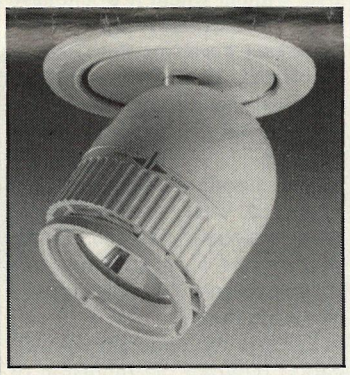
Reader Service No 152

Multi-position spotlight

Compact by Troll Lighting is a low voltage spotlighting system that offers fixed and adjustable luminaires.

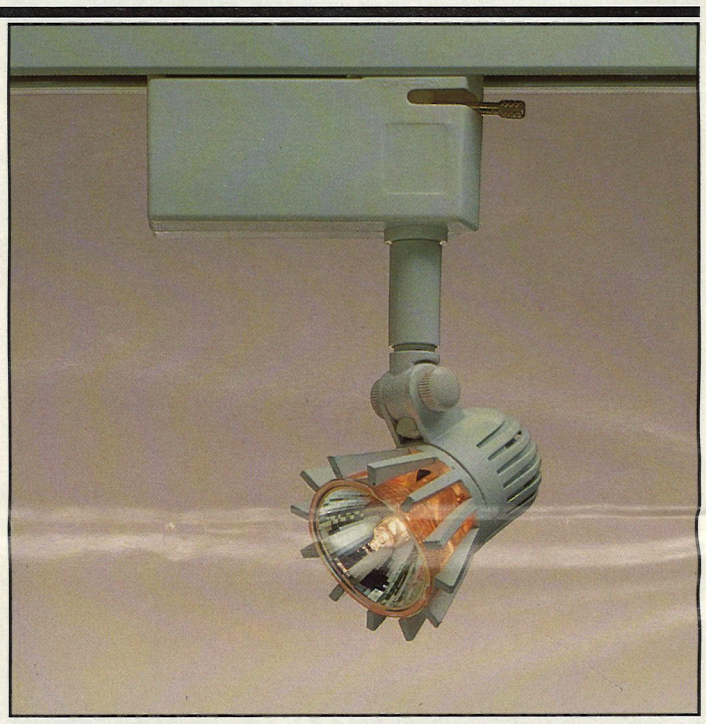
The neat spotlights can be fully recessed, or slid down into either a semi-recessed or "below the ceiling" position. When fully below the ceiling they can be adjusted vertically and horizontally.

Dichroic lamps are used with a choice of wide or narrow beam



light distribution . Finish is either black or white.

Reader Service No 153



More explorer spotlights

Lumitron's Explorer range of low voltage spotlights has been extended by the addition of new shapes. These include the model illustrated, another with flared cowl, one with vertical ribs and one with horizontal ribs.

All versions are finished white and use dichroic, 12V 50W tungsten halogen lamps.

The electronic transformer is housed in the track adaptor, enabling the spotlights to be used on mains voltage lighting track.

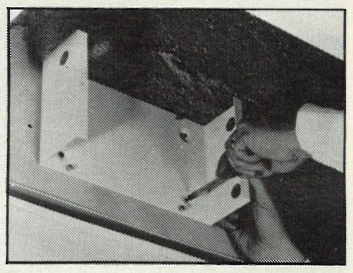
Reader Service No 156

Luxline 65 extended

Lumiance has introduced an emergency lighting facility into its Luxline 65 tubular lighting system. It provides maintained lighting using either a 36W or 58W fluorescent lamp.

Battery pack and inverter are housed in a 1.25m structural section for mounting next to the lamp. **Reader Service No 154**

Transformers on sub-plates help installers



A range of transformers from Intram Barwell has the main transformer assembly mounted onto a sub-plate, enabling the back box to be fitted first and then the sub-plate attached by means of key-hole slots. This makes the initial fitting both simpler and quicker and is more convenient for maintenance.

A further advantage of the boxed and fused, toroidal units is the low weight-to-size ratio. Small outer dimensions also present a low profile. Weight is 5-5.7kg and the dimensions are 282mm long x 174mm wide x 87mm high. Combined with the benefit of the sub-plate, this means installing in difficult, overhead locations is made considerably easier.

Because the transformers have individually fused wirings, should one lamp fail, the supply to the others remains unaffected. The capacity of the range, currently 200W, 300W and 400W, will be enlarged with the introduction of 500W and 600W units shortly.

Reader Service No 157

High wattage candle lamps

A choice of clear or frosted, 25W 240V, E10 cap, candle lamps is available from Chandelier Specialist Lamps.

By using these higher wattage lamps, luminaires can now give sufficient general lighting to make further lighting fittings unnecessary in some interiors.

Reader Service No. 155

For more information on any of the products listed, circle the enquiry number on the free reader reply service card.

Emergency kit for LV lights

Accent Lighting has introduced an emergency lighting conversion pack for low voltage luminaires.

The Integrity pack can be used with either existing or new installations. Connection is by plug and socket with the battery pack remotely mounted.

Maintained emergency lighting is provided using the luminaire's existing 20W, 50W or 75W tungsten halogen lamp. Units are totally sealed for security and ease of maintenance.

Reader Service No 158

NEW PRODUCTS

Uplight for outdoors

An exterior, recessed uplight is available from Lightscape Projects Ltd, a new subsidiary of Light Projects. It is small and adjustable and has been designed specifically to discreetly highlight landscape features such as shrubs and small trees

The luminaire is waterproof (rated IP67) for flush mounting in the ground. Suspended by an internal collar, it provides subtle illumination using a low voltage tungsten halogen MR16 lamp with dichroic reflector. There is a choice of beam widths.

Made by Hydrel, USA, the fitting is cast in either aluminium or bronze, with a bronze, baked enamel grille complete with tamperproof screws.

The 50W version can be supplied with a Perspex lid for locations where leaves or twigs could collect.

Reader Service No 159

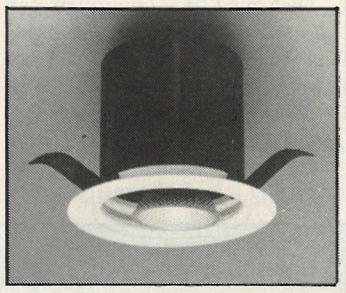
Downlights in cans have advantages

Environmental Lighting has launched the Caché range of low voltage downlights, each of which is enclosed in a can. The compact housing has advantages for both users and installers.

Light spill from the main housing and around the edges of the bezel is eliminated. Three location springs strategically placed secure the fittings to the inside of the can.

Dichroic lamps up to 75W are used. Heat is dissipated through a maze type air gap.

The Caché range includes a low brightness model with black baffle, a wallwasher that is easily adjusted, for example with a pen, and fittings with decorative glasses such as a cone, wellglass, clear fluted tube and an edge-lit tube.



To avoid problems with cables, installation is simplified by the use of a dedicated modular plug and socket system which attaches to the outside of the can and connects each fitting to its transformer. **Reader Service No 160**

Spotlights are versatile

Glamox Electric has a range of spotlights for shops and offices. They accommodate various lamp types from linear tungsten halogen and metal halide to low voltage tungsten halogen giving a 7° spot beam.

Designed for ceiling, wall or track mounting, the 2000 series has a rectangular profile 210mm x 76mm which is common to all models in the range.

Optional barndoors are available for the linear tungsten halogen and 70W metal halide versions. The metal halide model also has a heat resistant security glass and ultra-violet filter.

A fuse is incorporated in each spotlight and an LED illuminates should the fuse blow.

The 2000 series has been developed to integrate with other ranges of Glamox luminaires such as the Lumilink suspended lighting system.

Reader Service No 161

Asymmetric floodlights

Abacus Municipal's latest floodlights are for use either on their own in residential or small commercial applications, or as part of a larger floodlighting package. They have asymmetric reflectors and toughened front glasses. The design includes quick release side clips for easy lamp replacement.

Optional extras include a visor, vertical louvres and a wire guard.

The AM530 series is available in three versions: AM531 for use with 200W-500W tungsten halogen lamps, AM532, fitted with the same lamps but with a passive infra-red detector for automatic switching when a heat source enters the detection zone, and AM533 for use with 70W metal halide or high pressure sodium lamps for energy efficiency coupled with long lamp life. **Reader Service No. 162**

Dimmer fits standard wall box

Spectral IV is a dimmer introduced by Richmond Lighting that fits into a 16mm deep, standard wall box.

There are four small buttons on the front plate which light up to indicate which of the lighting levels has been chosen. The two middle levels are adjustable by removing the front plate. A smooth five-second fade takes the lighting from one level to another.

Up to either 400W of mains voltage tungsten lighting, or 300VA of low voltage lighting is controlled.

The unit is protected during normal current surges by the company's special surge bypass which removes the need for a fuse.

Front plates are finished either white, gold or silver colour.

Reader Service No. 163

LIF LINE

Single European Market

In January 1992 the UK takes over the presidency of CELMA, the Committee of EEC Luminaire Manufacturers' Associations, which it will hold for one year.

The UK president wil be Mike Lippold, LIF council member with responsibilities for 1991 issues. The secretary general will be Graham Samuels, company secretary of the Decorative Lighting Association.

CELMA was first formed in 1989 at a general meeting in Paris at the International Lighting Exhibition. The meeting was attended by five countries – Germany, France, Britain, Italy and the Netherlands.

In May 1990 the Committee of the EEC Lighting Manufacturers Associations was formally constituted and a master agreement was signed in the presence of ten countries. Italy held the first presidency in 1990 and the current presidency is held by the French. Jaques Vidal, president of the International Lighting Exhibition in Paris is president of CELMA. The secretariat is run jointly by the delegates general of France's commercial and decorative trade associations – SIERT and SNFL.

The British motives for taking on this challenge in 6 months' time are partly political and partly commercial. 1992 is shorthand for the concept of the single European market. It seems appropriate, therefore, that LIF and DLA should take on the CELMA mantle in that year. The two organisations are looking at 1992 and CELMA as another option to create business opportunities for their members.

There is but a handful of British lighting companies large enough to think in terms of continental acquisitions. The vast majority will be looking to add a European dimension to their company by entering into some form of liaison with a European partner. It is here that, in the British view, CELMA has a major role to play – through reciprocal trading partnerships – where companies, particularly smaller and medium sized companies, communicate and develop contacts with continental partners of a similar size and a similar market within the EEC. LIF, under the direction of Mike Lippold, will, therefore, push CELMA in this direction to achieve the best results in the interests of its members.

To achieve this communication channel, a 'getting to know you' symposium will be organised. The framework has not been finalised yet but at some stage in 1992 it is the intention of LIF and DLA to hold a conference, the format and purpose of which will be to facilitate some sort of rapport and trading relationship with European companies similar to that which exists between LIF's member companies.

Already the French in their year of presidency are making good progress on priorities they have identified. These cover a single European mark for luminaires which is now being discussed in the CENELEC Marks Committee, a common nomenclature for internal and external trade which is being pursued with Eurostat, and a fairs and exhibitions policy.

In its first year of existence, CELMA has shown that there are many common issues which bind the lighting community together, not just within national borders but also within European frontiers. The 'esprit de corps' is developing rapidly and augurs well for business in the future.

Lighting controls are the key to both user comfort and energy saving in buildings. They can be as simple or as sophisticated as needs demand. *Hugh King* of Thorn Lighting explains the options.

A matter of control

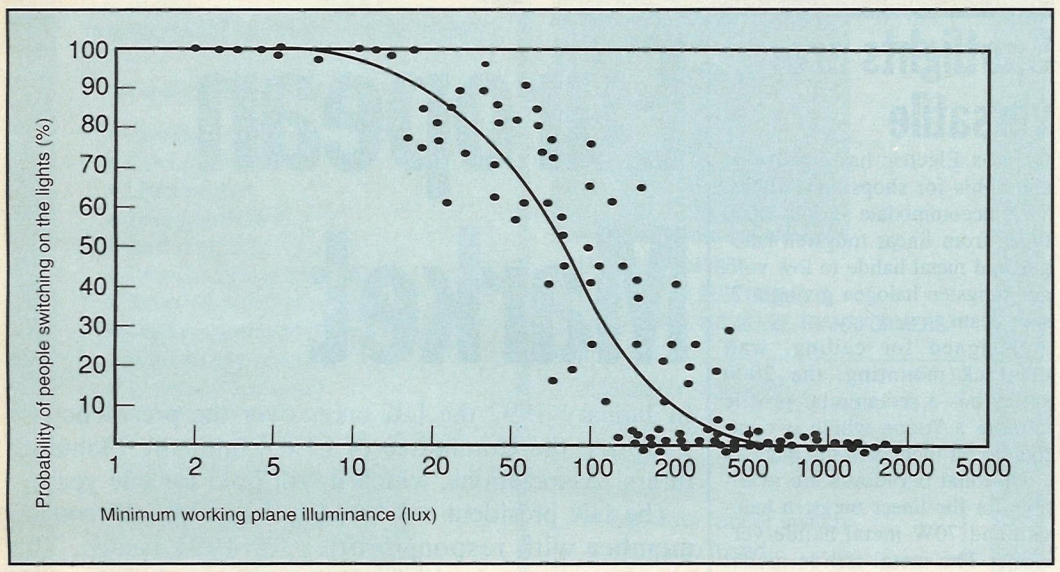


Figure 1 shows for the UK how the probability that lights will be switched on varies with time of day and the degree of daylighting.

Lighting is often thought of as if it is something a building needs. But it isn't. Lighting is there to be an asset which helps the occupants do their job. Without lighting they cannot see, but without them, there is no need for the lighting to be on. The aim of good lighting control is to ensure that all occupants have exactly the lighting they want when they need it, ie to ensure that all unwanted use is eliminated.

Most lighting control systems fall into one of the following categories: switch control, dimming, controllable ballasts, mainsborne signalling or self contained 'intelligent' luminaires. This article examines each type and then reviews with practical examples typical usage. Frequently a combination of systems is used, dependent on the particular application.

Switch control

If the building receives adequate daylight for part of the day, then artificial lighting is not required and could be switched off or dimmed. The simplest, and most common, method of control is to encourage people to switch off unwanted lighting. This is not usually very effective but self-adhesive labels, reminding people to turn off unwanted lighting, are always a worthwhile investment.

Daylighting and switching

Figure 1 shows (for the UK) how the probability that lights will be switched on varies with time of day and the degree of daylighting.

If the occupants of a typical office commence work at 8 o'clock then, on average throughout the year, they will tend to turn on 50% to 60% of the lights – and they will normally stay on through the day, probably until the cleaners depart.

If, however, we could trigger the lights off when the occupants are at lunch, then only about 20% would be switched back on because they will feel that there is enough daylight. Lighting will gradually be turned on as the daylight fades, but there will be a major saving in energy.

Of course we could keep on turning the lights off through the day, but this would be very annoying, save little extra and probably make people develop a 'switch on habit', so a lunchtime switch-off would be best.

We can also trigger the lights off after business hours. Anyone still working can switch them on. Infra-red, ultrasonic and other forms of remote switch can help to provide more flexibility and are becoming popular. These allow individuals or small groups to control lighting in their part of the office and help to stop switching more than they need.

Combined daylight and artificial lighting systems can be designed in which the available daylight is topped up by the electric lighting. These can be automatic or manual, with the rows of fittings near the windows being switched off or preferably dimmed as bulk switching annoys many office workers – when there is sufficient daylight.

Controllable ballast

A system which dims up and down is better than one which switches on and off. There are two reasons. Firstly, the savings are much greater and secondly dimming is less obtrusive. We could use conventional dimmers to achieve this but a better method is offered by controllable high frequency ballasts which adjust the light output from fluorescent fittings in response to management commands. Typically such ballasts are directly controlled by instructions from intelligent controllers which would use inputs from time switches, clocks, photocells or presence detectors. However, an important element not to be overlooked is the local swtich or dimmer control which gives the occupant the ability to override any setting.

The most obvious application of the controllable ballast is to reduce the light output of the luminaires when daylight is available. Instructions to the ballasts within the luminaires are based on information from a photocell that monitors the light level on the task. As more daylight arrives on the work plane from the windows so the output from the luminaire is smoothly reduced. This control avoids any sudden changes in illuminance and can save more energy but, of course, it is more expensive than the switching arrangement. We can see from Figure 2 that if the daylight factor at the desk is 5% and we want to provide 500 lux, then a controllable ballast dimming system linked to daylight levels could save 70% of the lighting energy during the working day. It is these potential savings that explain the renewed interest in daylight design and daylight penetration into buildings.

The photocell control will also monitor and maintain a large installation at a constant illuminance. In a conventional installation more illuminance is provided to allow for the dirt and depreciation that will take place. This waste is avoidable. Initially the lamps will be dimmed down to give the design light output. But as the light losses (caused by aged and dirty lamps and reflectors) mount over a period the power to the lamps will be gradually increased automatically and raise the light output to cover the losses and maintain constant illuminance. Maximum power will only be called for when maintenance of the scheme is due, rather than all the time.

With controllable ballasts it is possible to install one type of luminaire throughout but the output of luminaires in various areas may be set to provide the required illuminance. When changes in the use of the area occur, and these days offices are reconfigured regularly, the illuminance level is simply adjusted by reprogramming to match the new use for the space.

Dedicated time controllers can be used to programme the lighting to switch on or off and change illumination levels to match the different activities that occur during a normal day. These range from normal office work, to cleaning and security. For instance, an office worker switching on a light in the day might get 500 lux, but the same switch could give a security guard 250 lux for his patrol.

Such systems give great flexibility and control to the occupants which increases their efficiency and effectiveness. In addition, there are sound physiological and psychological reasons why people work much better when they like their environment and can control it. People must always be able to override the system if they wish, otherwise they will not work well and will deliberately try to defeat the system.

Building management

Lighting controls can be linked into a central control system to control the lighting of a complete building and the other services in the building or site. This considerably extends the scope of energy management with facilities for load shedding or phased switching to avoid excessive maximum demand charges. The control signals for the system maybe distributed by twisted pairs of wires, coaxial cables or be injected into the mains cabling system. The signals in the luminaires are decoded by the receiver which may be an addressable micro-chip driving the electronic ballasts.

Any system of control needs a channel to carry the signals. In a conventional system this is the switch 'drop' which carries the live conductor from the mains to the switch and then to the luminaire. More sophisticated signalling systems use extra low voltage cable, coaxial cables and so on. There are two problems. First, these control circuits have to be installed in the first place and usually the installation work is more expensive than the cables. But, since they are a substitute for conventional wiring of switches, this is not normally a problem. But the second snag is that any change to the layout calls for the cables to be re-wired. The low voltage control system of some lighting management products are easier to reconfigure than conventional wiring, but they do have to be reconfigured.

The perfect solution would be to use some existing communication channel. We could, for example signal through the air by infra red radio or ultrasonics, but these can be unreliable and have other problems. There is however, one channel which is already wired into each luminaire without fail – the mains and we can use this.

Mainsborne signalling

Mainsborne signalling systems are becoming more popular and use the mains wiring to the building in order to transmit high frequency coded signals from selectively located transmitter units to the luminaires. It is simple and inexpensive to install or retrofit because no expensive signal wires are required. The receivers are located either in individual luminaires or in separate boxes to control a group of luminaires. Each receiver can respond to many codes, allowing luminaires to be addressed independently or in groups. Changing this address is easily done, by a series of coded switches on each receiver, allowing amendments to the switching pattern without alternation to the wiring. These systems offer tremendous flexibility of operation and their use will continue to grow.

A final approach, is the self contained 'intelligent' light fitting. These modular luminaires contain a pre-set photoelectric cell and passive infrared detector. The light output is adjusted according to the amount of daylight available but is only provided if someone is actually working underneath in a zone around the luminaires. The fitting will detect an absence of 10-15 minutes and switch itself off, switching on

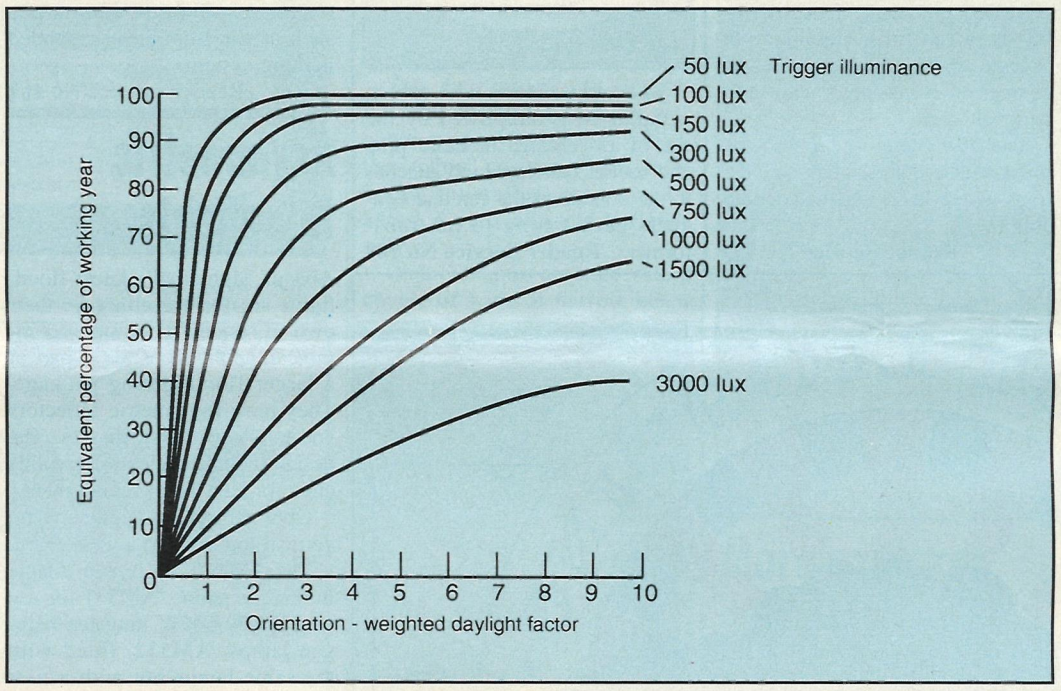


Figure 2: Percentage of a normal working year during which luminaires would have to be switched off in order to ensure the same energy saving as dimming (top-up control).

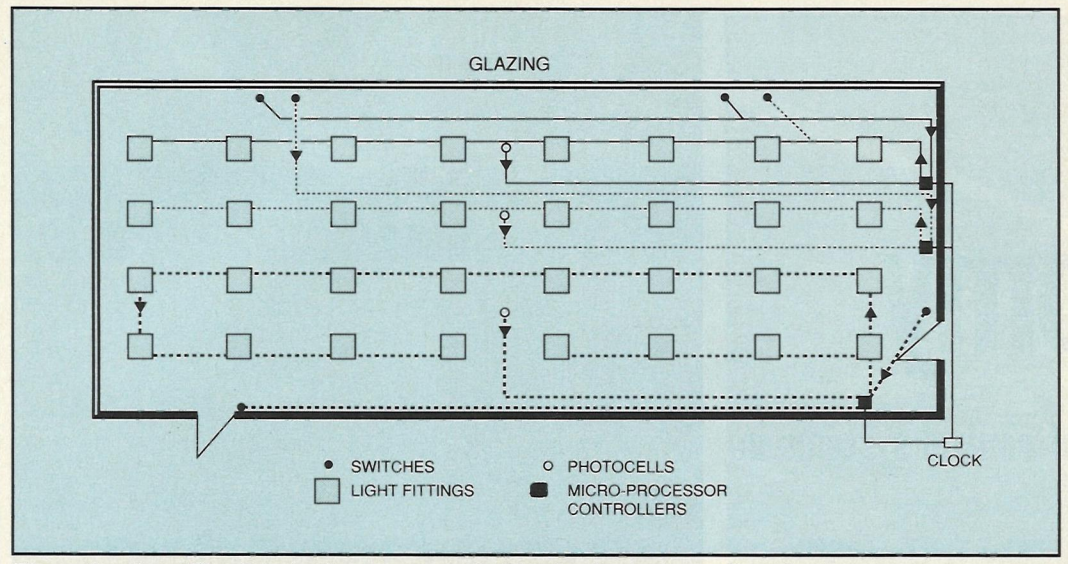


Figure 3: sales office. Luminaires are controlled by the three photocells and microprocessor controllers via low voltage wiring.

again immediately it detects the presence of an approaching person. Additionally, because it is totally self contained and is connected directly to the lighting ring circuit, it has no need for further wall switches or links to remote control systems. Installed at the correct spacing the fittings need not be repositioned or added to if the office area is reconfigured, thus saving on cost, time and disruption.

Having reviewed the various lighting control systems available how are they used in practice?

Case study

The new Thorn Lighting North West Regional Sales office at Didsbury was designed to illustrate the latest lighting control techniques – mainsborne signalling, controllable HF ballasts with various automatic sensors and self-contained 'intelligent' luminaires.

The reasons why each system is used in particular areas will become clear as each work space is examined in turn.

Situated at Didsbury, about 4 miles south of Manchester city centre, the green glass Pavilion style office, nearly 1000m^2 in area, houses 28 people: management, lighting engineers and office staff.

Reception

This area has exposed trusses which naturally led to an uplighting solution. Four quarter-sphere metal halide uplights were installed. Highlighting is achieved by corner mounted metal halide spotlights fitted with louvres. Two of the uplights are left on permanently for security and aesthetic reasons. The remainder, together with the spotlights are switched off by mains signalling at the end of each working day.

Sales office

Modular 600mm square recessed fluorescent luminaires with 16 cell VDT reflectors complying with the CIBSE VDT lighting guide, are used to provide the accurate optical control required in this computerised office. Each luminaire has two 40W bi-axial compact fluorescent lamps, operated by controllable high frequency ballasts. The luminaires interface with various sensors. The scheme has been designed to allow a maximum average illuminance of up to 700 lux at desk height, although 500 lux is more appropriate for an office such as this.

One of the benefits of this system is the facility to pre-set the illuminance below 100%. On this occasion a pre-set allowing only about 70% power consumption produces a corresponding illuminance of around the 500 lux needed. This may seem like over-lighting but the initial illuminance on any scheme must allow for dirt and depreciation. In this case we are saving that wasted energy. The extra theoretical capacity of the installation will only be used as the installation gets dirty and the lamps age.

Because two of the office walls are glass it was logical to install photocell control to maintain illuminance by dimming the lighting as the daylight contribution increases. This is achieved by using three zones (see Figure 3) each with a photocell measuring working plane illuminances. Light output varies smoothly between 25% and the 70% pre-set value, with resultant savings in energy consumption. In fact experience to date (November 1990 – May 1991) shows that most luminaires are off or operate at lower output until late afternoon when natural light begins to fade and light output from the luminaires is automatically increased.

Local micro-processor controllers address groups of luminaires in response to control inputs from either photocells, a programmable time controller or any of the several four button switch plates within the office. The local four-button switch plate allows the occupants to select their preferred level of illumination, though the photocell will not allow any selection that would exceed 500 lux.

This stand-alone system is controlled by a programmable time controller (PTC). Unlike the timer within a conventional building management system, the PTC can reduce and increase light levels any number of times per day. The PTC is programmed to 'send down' signals at 5.30pm, repeated at 30 minute intervals. A 'down' signal changes the lighting status from its current level to the next lower setting, ie preset to 40%, 40% to 25%, 25% to off. In practice, the first 'down' signal at 5.30 will normally reduce the lighting level to 40%, but if people are working late they simply restore maximum via the local wall switch. If there is no response subsequent 'down' signals will eventually turn all the lights off.

Sales managers

Sales managers are often out leaving their offices unattended during normal working hours. They can also be in long after most office staff have left for home. Either mainsborne signalling or a controllable ballast system could have been introduced with regular off signals programmed throughout the day, accepting the inevitable complaints when lights extinguished while the office was occupied. Alteratively, signals could have been sent off only after normal office house, hoping that they would switch off their lights if they went out part way through the day, but neither solution would have been ideal. Instead, self-contained lighting management luminaires were chosen. With 600mm square 16 cell louvres, their appearance is almost identical to the fittings used in the sales office, but they incorporate a presence detector and a photocell. Each luminaire operates independently without any external switch and simply detects presence, or lack of it.

The controllable high frequency ballast is regulated by a photocell which measures working plane illuminance and if an office is empty for more than about ten to fifteen minutes the luminaires switch off. Foolproof, though we doubt that the sales managers will apreciate the description – they prefer to call them intelligent luminaires!

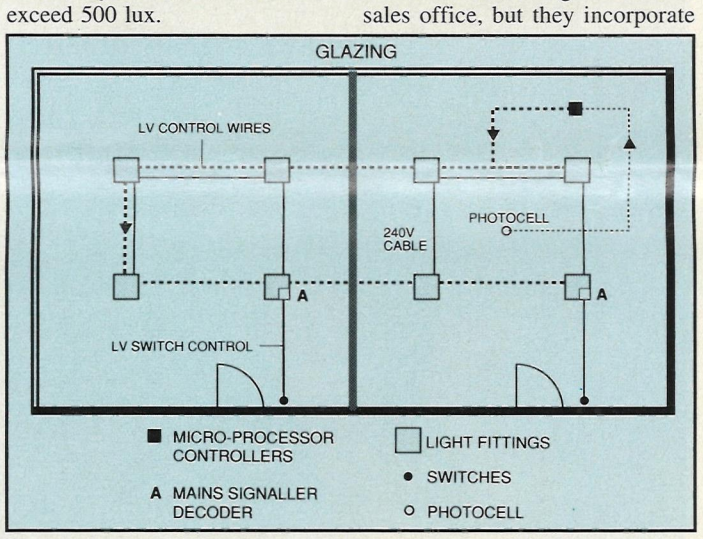


Figure 4: Plan of lighting control for the secretarial offices.

Secretarial area

These offices have large areas of window, so photocell-controlled high-frequency luminaires were chosen. To install a local microprocessor controller and a photocell in each office to control perhaps only four fittings could be considered extravagant, if not uneconomic, so a compromise was reached. One micro-processor and photocell is used to control the luminaires in several small offices. Of course they all have different daylight factors but locating and setting up the cell in the darkest offices means that the others must have adequate illumination (See Figure 4).

Ordinarily the microprocessor would switch all luminaires on the circuit, which would have meant that separate offices could only be controlled from a central point. At times this could be inconvenient and wasteful, so in these offices the microprocessor is used only to interpret the photo cell requirements, not for switching. Introducing a mains signalling decoder into each office, linked to a local momentary action wall switch restores, individual control. Lights respond conventionally to the switch on the wall and staff are unaware of the light output variation – it just shows up in the lower electricity bills.

Lighting engineering department

Architectural design and internal office layouts have resulted in this office having less natural light than those previously described. In consequence, photocell control has not been used in this area. To retain appearance the theme of using 600mm square, 16 cell louvres, with compact fluorescent lamps and electronic high-frequency control gear has been followed. For switching purposes there are two circuits with alternative luminaires providing a 50% illumination level. Each circuit is connected to a mains signalling receiver, mounted in a luminaire, and programmed to respond at different times. In this way the office is not plunged into darkness with each off signal, just to half lighting. Anyone working late simply restores full illumination via the wall switches.

For demonstration purposes the office is also equipped with free standing metal halide uplights so that the quality of light produced by the two schemes can be compared. In practice the engineers prefer the uplighting solution. A mains signalling receiver had been fitted in each uplight. One of the benefits of using mains signalling is that the uplights can be plugged into any of the floor socket outlets and still be controlled by the building management system. Control is arranged so that only half are switched with each off signal.

Each uplight has its own switch for local override and for convenience the standard wall mounted light switch has been replaced by a mains signalling injector.

Coffee shop

The area is intended for relaxation and has three indepedent lighting solutions to create different atmospheres. The mainsborne system is programmed to switch off all lights after coffee breaks and lunch hours.

Showroom

Variable lighting is provided for different functions. House lighting within the showroom comprises of concealed variable output fluorescent fittings, and low voltage tungsten halogen downlights. The tungsten halogen and fluorescent luminaires are each connected to a dimmer, and the dimmers are linked by a common wall switch. In fact, the switch is a four button plate, and each button introduces a pre-set scene.

Commissioning

With two energy management systems and relatively new technology it was initially thought that commissioning the installation and setting up of the various components such as micro processors and photocells would be difficult. In practice commissiioning was achieved in a couple of hours.

Winning through efficiency and economy

Prize winners in this year's EMILAS awards show the importance of control systems in efficient lighting installations. *LEN* reports on the best schemes.

Atrium at the Thorn corporate headquarters at Borehamwood. This scheme won the commercial award.

Low energy lighting could save Britain 700 million a year and prevent about 15 million tonnes of carbon dioxide polluting the atmosphere, said Lord Graham of Edmonton, introducing this year's EMILAS winners. The competition reflected the lower levels of work in the lighting industry in attracting only 124 entries compared with last year's total of 146.

He went on to observe that, for too long, people in Britain had been prepared to think that energy conservation was the business of others. Nowadays, there was an increased consciousness of the need to use energy well, and even government departments had officials earmarked for the task.

One key point in this year's entries is the importance of lighting control systems in achieving the declared aims of energy efficiency, and the use of these is being extended to cover ever more applications.

Few entries demonstrate this fact better than Thorn's corporate headquarters at Borehamwood. Here, the new lighting replaced an original system which provided a massive 900 lux with an installed load of 50.2 kW. The new installation has reduced this to 12.8kW, representing a 74% saving in energy. Efficiency has increased correspondingly from 2.7 to 1.9 W/m^2/100 lux.

The aim in designing this lighting scheme was to provide an average of 500 lux at desk level. The effect of the high levels of daylight and the luminaires is often to provide more light than is necessary for the normal office environment, and the provision of a Thorn C-VAS lighting management system means that substantial savings can be mad by dimming down or switching off the surplus artificial lighting.

Office areas

Recessed modular fluorescent fittings, 600mm square, with low brightness 16 cell louvre attachments, were selected for general office areas. The luminaires incorporate high frequency electronic control gear and use two 40W 2L 3500K linear compact fluorescent lamps.

The HF ballasts dim down or switch off the artificial lighting on the basis of signals received from a series of microprocessors which respond to information from photocells, wall switched and mainsborne signals which reflect the building's occupancy patterns. The system is centrally controlled from a Thorn Security BMS computer.

Luminaires are dimmed up or down between 25% and 100%, or are switched off to maintain the design illuminance level at desk level by the central controller. Local wall-mounted controls allow a manual override for dimming down only or switching off luminaires. The switch plate is the usual way of turning on office lighting at the start of normal office hours as the central controller is not programmed to switch the office lighting on.

Although the majority of the luminaires are controlled by the photocell, local wall plate and central controller, there are small groups of luminaires without photocell control in areas where daylight penetration is poor. In all instances photocell commands overide local wall-mounted controls.

Highly commended awards in the commercial section went to the refurbishment of a marketing department in GUS Catalogue Order, the refurbishment of Peugeot Talbot's headquarters, and a lighting installation in the gymnasium at Llanederyn High School.

Problem shadows

The open plan office at Gus Catalogue Order was originally lit by 160 surface mounted luminaires with opal diffusers, each using twin 75/85W white colour 35 MCFE fluorescent lamps, giving an illumination level of 300 lux and a total installed load of 30.4 kW. A problem in this area was the fact that 1.1 m high screens were used to section off various work stations and, with the old lighting installation, these created problem shadows.

The offices were refurbished using 180 Philips' TBS 300 recessed luminaires each with GBS controllers and twin high frequency colour 84 lamps and gear plus M2 low glare mirror. This gives good colour rendering with an illumination level of 750 lux – representing a 54% improvement. The total installed load has been reduced by 34% to 19.98 kW which, with an average usage of 300 hours per year, gives a payback period of 4 years. In addition to saving on operating costs. the new installation creates a much pleasanter work environment.

The refurbishment of Peugeot Talbot's Aldermoor House replaced a 1960s installation with an electrical loading in excess of 92 kW by a high-performance recessed modular fluorescent system from Thorn with luminaires fitted with low brightness louvres and electronic starting devices to ensure instant start. This has produced a 63% reduction in the lighting load together with a 54% improvement in illuminance levels. Overall, efficiency has improved sixfold to 1.6W/m^2/100 lux.

Along with the new equipment the company has introduced a group lamp changing and regular cleaning schedule, to maintain the efficiency of the installation.

The final award winner in this section is a scheme for Llanedryn High School, initiated by the local authority's energy conservation unit, which comprises 12 low bay Thorn fittings with 250W high pressure sodium lamps.

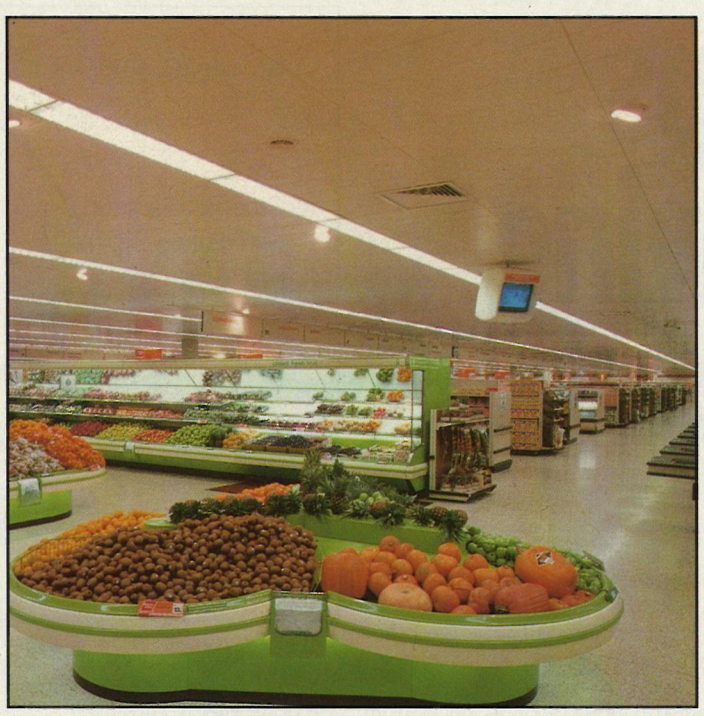
As a result, the installed lighting load has fallen from 14kW to 3.3kW while illuminance has increased from 200 lux to 600 lux. Added savings are achieved by the use of photocells which switch the lights off when there is enough natural light. A sensor has also been fitted which switches the lights on when someone enters the gymnasium and turns them off when it has been empty for a set period. The new lighting is brighter and safer; and both the school governors and local authority are pleased with the energy savings which promise to have a payback period of less than 18 months.

Industrial lighting is one application in which massive savings may be made by installing an appropriate installation. With the outright winner of this section, the installation for the Hughes Tool Company in Belfast, the payback period is in the region of 3 years.

The main production area in this factory is used for metal working. The factory was originally lit by 375 starterless trough reflectors each with twin 85W colour 35 white fluorescent lamps, giving an illumination level of 250 lux with a total installed load of 77.25kW.

The new installation, using Philips' equipment, comprises 525 trough reflectors, each with

The shop floor at the Hughes Tool Company in Belfast, winner of the industrial section.



Highly commended installation at a Sainsbury's supermarket shows that quality lighting can produce savings for the high street.

two high frequency 50W colour 84 fluorescent lamps and gear. this gives good colour rendering at a level of 500 lux – twice the previous illumination level – for a total load of 58.27 kW. This represents a reduction in energy consumption of over 24%.

The installation is divided into ten zones. Each zone is controlled by a light sensor for automatic high frequency regulation and daylight linkage to give further savings in energy.

Highly commended winner in the industrial section is M I King, a joint venture between Mitsui and William King. The company is a multi-million pound steel stockholding business which also manufactures steel blanks which are sold on to customers like Nissan for conversion into components.

Here, 57 high bay luminaires with 400W high pressure sodium lamps replaced 51 mercury reflector lamps in fittings with a patchy distribution. Despite a 33% reduction in the installed loading to 26.6 kW, illuminance improved 150% to 300 lux. This is vital to enable visual inspection of the product at every stage of the operation. Efficiency is up from 4.7 to 1.3W/m^2/100 lux.

Employees have commented on the brighter, warmer working environment which resulted from the changeover from the cold, white merucry to the golden light of SON.

Service centre

Finally in this category, British Coal was commended on a new scheme at the Mine Service Centre at Tursdale near Durham. This division, which refurbishes electric motors, ventilation fans, panel switches and pumps for collieries throughout the UK, also assembles coal face installations to ensure compatibility before they are tansported underground.

The original luminaires were replaced with 400W high pressure sodium lamps. This halved the electrical load to 45.8 kw and increased the illuminance 150% to 500 lux. Efficiency improved dramatically from 7.4 to 0.9W/m^2/100 lux. The new installation also requires substantially less maintenance, and the company anticipates a payback period of 18 months.

This reduced lighting load, together with changes in working patterns enabled the company to move to a more favourable electricity tariff option, thus saving an addtional 15% on electricity charges.

The new lighting schemes section of the awards covers the whole range of new buildings. This year's winner is the scheme for L'Oreal's beauty products factory at Llantrisant in south Wales.

The lighting has been designed to provide a constant 400 lux. Output is adjusted from 25% to 100% according to natural daylight levels across the various shifts. High frequency ballasts control the lamps via microprocessors which respond to information received from photocells and programmable clocks, and the system is centrally controlled by a Thorn Security computer system. This will eventually be linked into a building management system to control the whole Llantrisant site. This scheme, which was described in detail in the September 1990 issue of *LEN*, is achieving an efficiency of 2.3/m^2/100 lux. Should the use of the area need changing at any time the lighting installation is flexible enough to allow for reprogramming.

The one new scheme to be highly commended – a new Sainsbury's supermarket at East Feltham in Middlesex – shows a trend towards increasing quality in the non-luxury retail business field. The supermarket sales floor, approximately 4000 sq m in area, is illuminated using fully recessed 1500 mm twin, high frequency luminaires fitted with low brightness widespread mirror attachments and 50W high frequency colour 83 triphosphor lamps.

The luminaires are specials, and provide an average measured horizontal illuminance of 110 lux at 900 mm above floor level. The scheme combines a pleasant warm light with instant start and good colour rendering.

A computer controls sales floor lighting in three zones and works on the principle that lighting needs vary across the working day. Lighting switches from 20% to 60% shortly before the shop opens and comes on to 100% just before customers are admitted. At closing time the system switches down to 60%, and a further 40% reduction in lighting occurs one hour after closing. The final 20% is switched off manually by staff on leaving the premises.

High frequency

By using 50W high frequency instead of conventional 58W switch start luminaires, an energy saving of 19.90 kW is achieved over the sales area, resulting in an annual cost saving of £2952, with an estimated payback period of only 2 years. Results of this order are achievable in any shopping complex of this kind.

As a footnote to the day's proceedings the future of the awards came into debate – in this highly competitive world even competitions come under review. So, LIF is now looking at the future of both the EMILAS and NLA awards and will be contacting both sponsors and the lighting community as a whole to seek their opinions as to the future of these competitions.

Compact lamps and energy saving

Criticisms have recently been made of energy saving claims for compact fluorescent lamps. Here, *Robin Aldworth* gives the Lighting Industry Federation's answers.

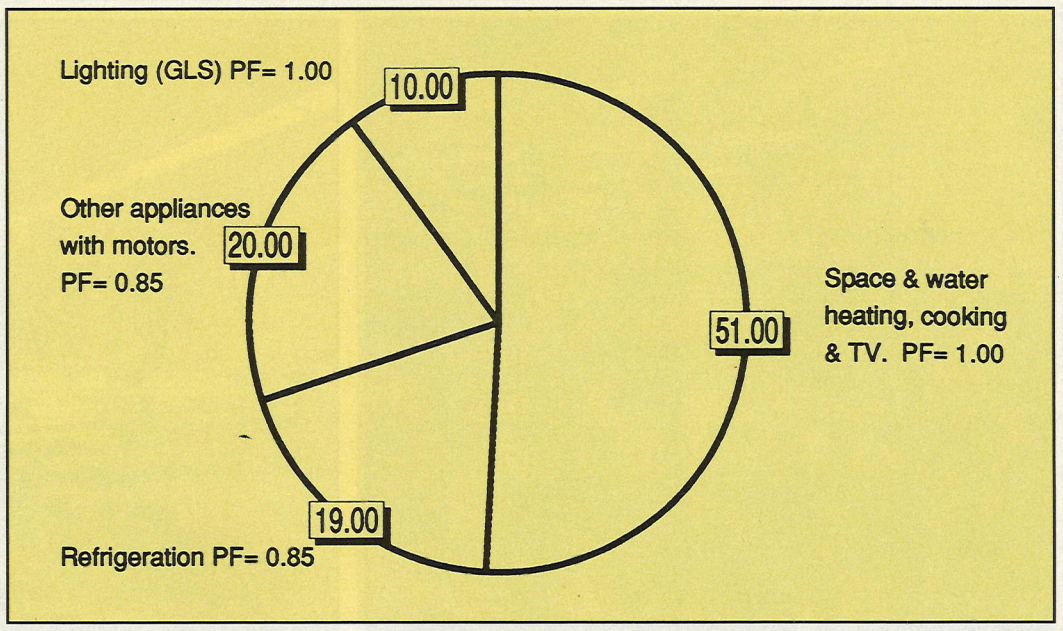


Fig 1: Typical mix of loads for domestic consumers.

The power factor of energy saving compact fluorescent lamps (CFLs) has been the subject of much attention recently in some technical and electrical trade journals. It is true that these CFLs do operate at a low power factor, and this will be explained later. It is, however, not true to say that replacing ordinary tungsten (GLS) lamps with CFLs does not provide the energy saving claimed by the manufacturers.

In fact, the truth is that the energy savings are even greater than those claimed, because the reduced line current means that distribution losses are also reduced.

Generation/distribution

About 80% of all electrical power is generated using heat produced by burning fossil fuels (causing pollution in the process). Electricity is then distributed to the consumer via the national grid. The electrical energy generated is then either converted to some other form of energy, such as heat, light or sound, or is stored in the distribution system as electric and magnetic fields.

Power conversion not only takes place where the end user is using an electrical appliance, it also takes place in the distribution system. The distribution losses on the national grid represent some 7% of all energy consumed.

Power consumption

The rate of conversion of electrical energy into other forms of energy is measured in watts. This is a measure of the rate of loss of energy from the electricity generating/supply system. At the same time there are distribution losses which are proportional to the square of the current being drawn.

Any appliance or device that reduces current also reduces the distribution losses. So that anyone replacing a GLS lamp with a CFL not only saves on their electricity bill but also provides savings through the supply system from the power station to their meter.

With commercial tariffs, which include maximum demand charges, the reduction in the installed load is also significant; this could be 19% of the total saving.

This is the basis of "least cost planning"; the capital costs of buying low energy light bulbs is cheaper than the capital cost of buying power stations.

Manufacturers of CFLs can give only the values of energy saving at the point of use. Energy saving in the distribution network depends on the length and efficiency of the lines, and whether the distribution is at low voltage or high voltage. In areas where the distribution lines are very long and operate at low voltage, substantial savings in the distribution losses can be made by using CFLs.

The true savings can only be calculated by the electricity supply companies and these calculations should be made public for different parts of the UK. Even without this information a reasonable estimate could be an additional 10% on top of the power saved by the user.

Power factor

The nature of power factor is far more complex than authors of the recent articles in other publications appreciate.

For those who are not electrical engineers, one way to think of power factor is as an indication of the interaction between the voltage and the current flowing in the electricity cables. When the power factor equals 1 then the voltage and current are working together (in phase) so that: voltage x current = power consumed in watts.

When the power factor is less than 1 (eg when there is a choke in circuit) the voltage/current interaction is "out of phase". The effect of this is that the current is increased for the same power. A domestic meter reads watts and therefore the consumer's electricity bill is unaffected by the power factor.

Out-of-phase voltage and current, however, is only part of the story. Some electronic circuits cause waveform distortion (harmonics) which also effectively lowers the power factor and increases the current for the same energy consumption. Once again the domestic meter reads the "true" watts figure which is not affected by power factor.

Important differences

An ordinary light bulb provides light by heating the tungsten filament. Typically it provides 12 units of light (lumens) for every watt of energy consumed.

Energy saving fluorescent lamps produce light from a gas discharge which causes the phosphors covering the glass to "fluoresce" giving about 50 lumens of light for every watt consumed. These are, however, more complicated devices which need a starter to "strike" the lamp, together with a means of stabilising the current flowing in the circuit.

The cheapest way to provide this stabilisation is to use a choke, which has the disadvantage of being relatively large and heavy and produces a power factor of about 0.4

The alternative method is to start and control the lamp electronically. By operating the lamp at high frequency the choke is reduced to about one-tenth the size and weight. The combined unit, although more expensive, (the circuit must include lamp failure protection and meet radio interference limits), is more efficient and much smaller in both size and weight. With this type of circuit, waveform distortion is mainly responsible for a power factor of about 0.5

	GLS	CFL
Power	100%	25%
Current (or volts x amps)	100%	50%
Power Factor	1.0	0.4-0.5

The use of compact fluorescent versus ordinary tungsten (GLS) lamps.

The table shows the changes that occur if filament lamps are replaced by typical compact fluorescent lamps giving approximately the same light output (and an eight times increase in lamp life).

It will be seen that the lamp power (watts) goes down by a factor of four. (Power losses in the distribution system go down by about the same factor.) The fuel consumed and the amount of emission from the power station also goes down by a factor of four. The reading of kilowatt hour meters in domestic premises also goes down by a factor of four.

In many industrial and commercial premises a small part of the electricity charges results from the use of "reactive power" metering so that the electricity bill *is* affected by power factor, but this only reduces the saving by around 6%; hardly a major disincentive.

It may be practical to use power factor correction devices in the lighting units, which means

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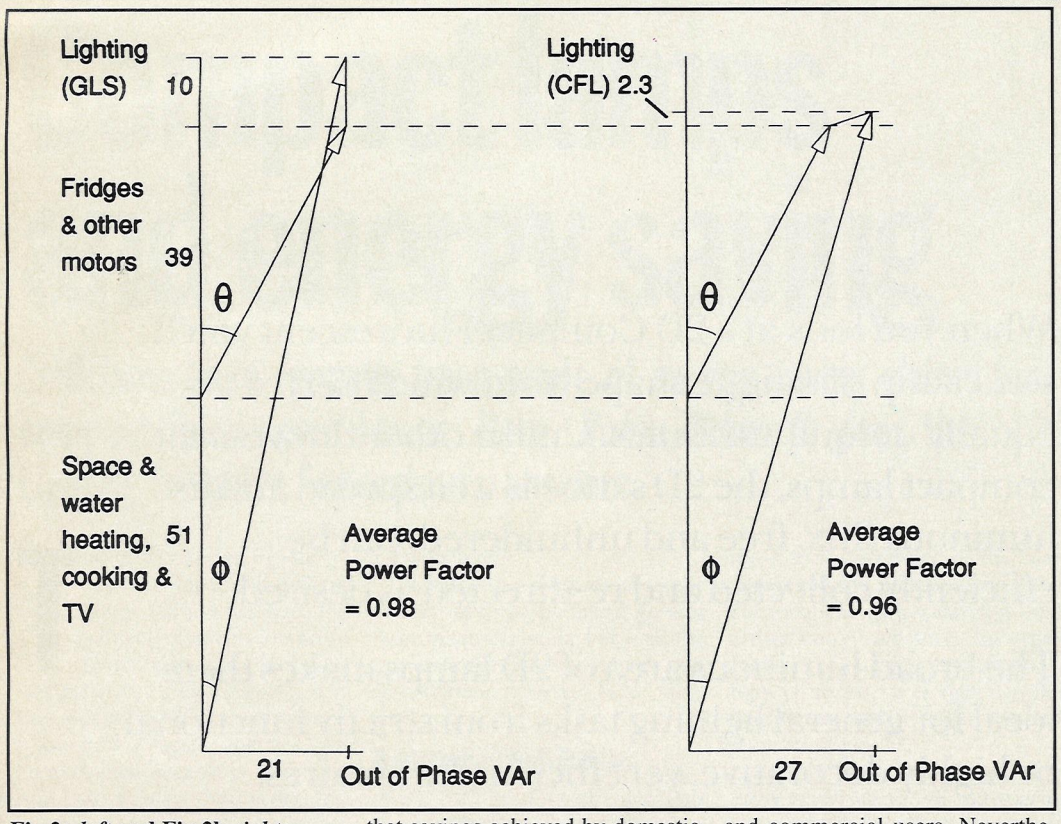

Fig 2a *left* and Fig 2b *right*: Power factors of typical domestic loads.

that savings achieved by domestic users with kilowatt hour meters can also be realised by industrial and commercial users. Nevertheless, from the following, it would appear that the justification for power factor correction of CFLs is, at least, questionable.

Because some writers associate lower power factor with increased current they have assumed that the current in the system with compact fluorescent lamps is greater than with filament lamps. *This is not correct.*

The simple fact (see the table) is that where an incandescent lamp is replaced by a compact fluorescent lamp with comparable light output, *the power goes down by four and the current goes down by two.*

The same authors have also made the mistake of considering CFLs in isolation from the rest of the domestic load. Fig 1, based on Electricity Council 1988 statistics (with typical power factors), gives the approximate mix of loads for domestic consumers.

The power factor of such a mixed load shown in Fig 2a would be 0.98. Even if all the GLS lamps were replaced by uncorrected compact fluorescent lamps (PF=0.4), the power factor (Fig 2b) would only decrease to 0.96.

Because compact fluorescent lamps are such a small proportion of the domestic load and the rest of the load has a good power factor, the effect of their low power factor is only marginal.

A selection of compact fluorescent lamps on the market

The electricity supply companies, as stated earlier, do make additional charges for industrial and commercial users who have a load with a poor power factor, however, this charge does not apply until the "average" power factor drops to 0.9.

From this it is clear that the whole issue of power factor is a red herring raised, no doubt, by the supply companies who see CFLs as a threat to electricity sales. This appears to be in contravention of their duty under Privatisation legislation which requires them to "promote energy saving".

In comparing the energy saving potential of CFLs against GLS lamps the figures quoted by manufacturers are for "equivalent light output".

Unlike a GLS lamp, the lighting performance of a CFL is affected by temperature and lamp operating position. A CFL used to replace a GLS lamp in a small, unventilated shade may overheat and give less than the quoted light output measured under test conditions. The same applies to lamp orientation, ie lamps burning with cap up or cap down. The influence of both effects depends on lamp type and detailed information on the effects is available from manufacturers.

Nevertheless, for the casual domestic user, who does not want to do the research, a typical reduction could be in the order of 25% in fairly adverse conditions. In this case, the energy saving is three times instead of four times and the current is still reduced by a factor of two. This is a significant saving for the user and, perhaps more important, a significant reduction in fuel use, emissions and transmission losses for the electricity supply companies.

Conclusion

Energy cost savings made by replacing GLS lamps with CFLs are substantially as claimed by lamp manufacturers. There are further savings to be made from the reduced distribution losses due to the reduced line currents. When the proportion of lighting, as part of the total load, is taken into account, the effect of low power factor is insignificant.

Compact fluorescent lamps offer lower electricity bills to users and "green" advantages such as reduced use of fuel and reduced pollution. Misunderstandings about their characteristics should not be allowed to stand in the way of their wider use.

In Holland, Denmark and Sweden electricity generating and distribution authorities are actively promoting the use of compact fluorescent lamps, for example, by supplying them at cost. It seems particularly perverse of the UK generating and supply authorities that they cannot understand a simple energy saving story and the concept of "least cost planning" which is readily appreciated by their continental counterparts.

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An enthusiasm for lighting

When GE took over Thorn's light sources business, *Andrew Osmond* moved to the new company as managing director for western European sales. Here he talks to *LEN* about GE Thorn and his role in it.

Andrew Osmond is a happy man. His move from Thorn to GE Lighting to head up their European commercial operations was, he has no doubts, the right move for him. "It's a super company," he enthuses. I'm an optimist by nature and see the best side of things. I was always fascinated by lighting, so it's a product I have a great deal of enthusiasm for".

When GE purchased the lamps side of Thorn Lighting it formed a joint venture with Thorn, GE-Thorn, to try and make the transition as smooth as possible. It's effectively a phased take over with Thorn bowing out after three years.

Prior to this move, GE had about a 2% share of the lighting market in Europe, mostly operating through distributors. Last year saw the acquisition of 56% of the Hungarian company Tungsram, and its integration into the GE fold. It is by far the largest investment by a western company in the eastern bloc, and the company is delighted with its acquisition. In brief, it brought GE the largest manufacturing company in Hungary with lots of good machinery (they build their own over there), excellent technology and a broad product range. What Tungsram really needs is the injection of capital and western management expertise.

This year's purchase of Thorn's lamps business makes GE the world's largest light source company and brings it into an honourable third place in the European lamps market with a market share in the region of 20%. In terms of Europe, GE's aim is to become number one or two in the market, in fact company policy dictates that GE only remains in a business if it can command a major slice of the market.

So, GE now see themselves to be seriously in the light sources business. The company is impressed at how good some of Thorn's technology really is – 2D for instance is to be extensively marketed in the USA – and excited about owning the leading UK domestic brand in Mazda.

The possibilities for European expansion are currently limited, as the economies of most countries are fairly depressed. These include France , Spain, and most of the Nordic countries. The German economy is still growing but unification is proving more costly than anticipated, and ultimately there will be more opportunities in eastern Europe as a whole. On the whole Osmond feels that, in such a depressed market, the company seems to be keeping up its market share.

Asked whether the Japanese still posed a threat to the European lamps market he refused to be drawn. "I believe in fair competition. GE is a well run company and can market its own products competitively." As a result he had absolutely no objection to Japanese operations set up in Europe. Tungsram's costs were low but not everything that came out of Hungary would necessarily be cheaper. GE's American operations were also extremely cost effective. At most GE Thorn were building a temporary cost advantage.

New markets

Market growth is not as strong as he would like to see it, but there are lots of opportunities to widen the market and the company is looking to take a share of new and growing markets rather than cutting into existing ones.

Looking at current opportunities, for instance, environmental consciousness and the green movement offered one such possibility. It has brought about a demand for economy that has tremendously stimulated the compact lighting market. The 2D lamp was launched 8 years ago to comments that there would be no real demand for it. Now all that had changed and GE Thorn simply couldn't make enough of them.

But Osmond maintains that markets can be encouraged: in the industry as a whole, effective parliamentary lobbying had greatly increased the market for street and community lighting. In his opinion, the campaign led by LIF and the British Parliamentary Lighting Group was probably the most effective parliamentary campaign spearheaded by any industry.

He is also very positive about the future of the home lighting market. "This is the big undiscovered area and Thorn was in here at the start. Our Mazda brand name changed domestic lighting. We convinced them how easy it was to go home with a new light bulb. But per capita spend on domestic lighting is still very low. We need to make it easier for consumers, to show them how to use lighting as a decorative element in interior design. There is also confusion over how to install new technology lighting. In this respect an innovative retailer can help a great deal."

Following this spate of acquisitions the immediate need is for a period of consolidation before looking to future expansion, and the company now has its new management structure more or less in place. Sales administration is shared with Thorn but, working on the principle that it is unfair to expect any employee to serve two masters at once, the company has set up its own dedicated sales force.

A major force for the company's success, he believes, is the corporate culture. People are seen as a major asset. GE has been able to build a powerful team both in the UK and in Hungary by bringing in people from the lighting business in the USA and much of the reason for this success is the stress the company places on career development.

Technology was considered such a vitally important area for the company that the head of technology and engineering for the GE Thorn operation was appointed at vice president level. The person appointed in this key role is Alan Chalmers, a former lamp research manager with Thorn Lighting.

In the longer term GE plans to develop three technology centres, in the USA at its head office in Cleveland, in the UK and at Tungsram's Budapest plant. So, far from running down its UK research capacity, GE is actively looking to build it up. In fact, within the group as a whole, research and development represents nearly 10% of sales, and lighting is not atypical in this respect.

Finally, when asked to say what particular strengths his company brings to the lamp market, Osmond paused briefly to reflect. "We are a lamp company through and through. Our business is making sure that the fittings companies have the lamps they want. We also understand how to make the best product sell and how to market it properly and we are prepared to invest in technology for the future. And GE is very keen to learn."

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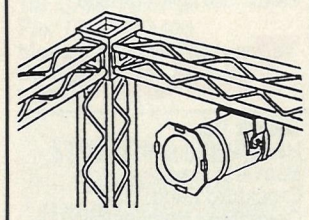

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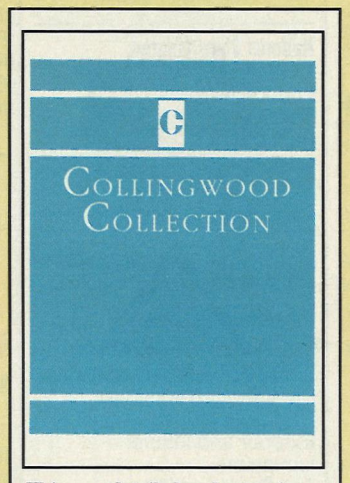
CATALOGUE DIRECTORY

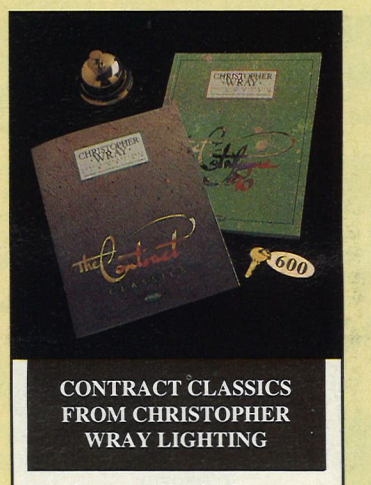
081-975 9759

Acorn Lighting are pleased to annouce that the BJC product range has been added to their portfolio of products. BJC offer a range that includes street & amenity lighting, industrial lighting, floodlighting & lighting for security. The whole product range is manufactured to the highest quality standards: circle 90

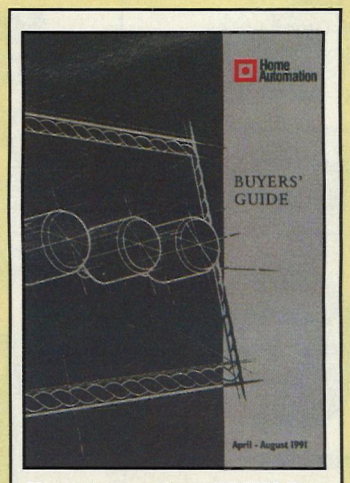
Channel Safety Systems Ltd announce the launch of 'Couturier', a new concept in emergency lighting for the nineties. An inovative range of emergency luminaires designed to present an opportunity to break away from the stolid conventions of the past and apply refreshing creativity to this sector of the market: circle 91



This new detailed and extensive catalogue from Collingwood illustrates many hundreds of components and accessories for use in building decorative luminaires. Product information includes dimensions, materials, temperature wattage and voltage ratings, approvals, interchangeability and compatability: circle 92



The Contract Classics from Christopher Wray Lighting is a 64-page full colour supplement to the company's Catalogue Number 10 especially designed for the contract market. With full technical information and advice on energy saving systems, The Contract Classics highlights the enhanced service Christopher Wray Lighting offers from each of thirteen outlets: circle 93



Home Automation a BS5750 Pt 1 Approved Company, have just introduced their new A5 sized Buyers Guide which has replaced their previous catalogue. It has been designed for ease of product selection and features their entire range of products, along with line illustrations and trade prices. Products range from lighting and security controls, low voltage dimmers, timers, brass electrical accessories etc: circle 94

Entries in the LEN "Where to Buy Directory" and "Catalogue Directory" featured here offer advertisers an efficient, cost effective route to increase sales.
For further information telephone Alastair Moyes on 081-975 9759 Ext. 2033 NOW!

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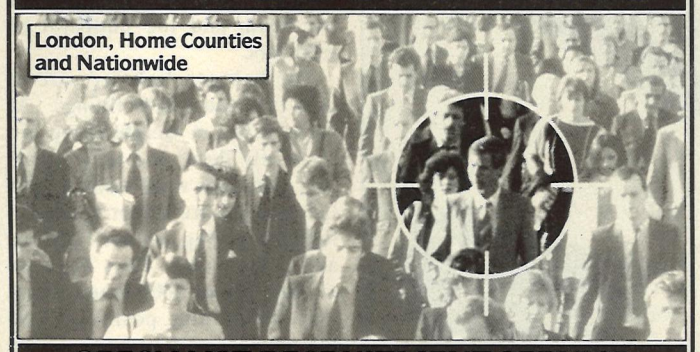

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Apply to Box No. 1503, Lighting Equipment News, Maclean Hunter House, Chalk Lane, Cockfosters Road, Barnet, Herts EN4 0BU.

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CATALOGUE DIRECTORY

Every year companies spend huge amounts of time developing catalogues and one of the biggest problems they face is publicising and distributing them to specifiers. If you have a catalogue, printed or in production, which is targeted at lighting specifiers then this section can help you.

Contact Alastair Moyes on 081-975 9759

Recession? What Recession?

Ex-Or are enjoying unrivalled growth in the sale of our specialist Presence Detecting Lighting Controls in spite of the current economic climate. To further build on our success and ensure future market domination, we are looking to recruit three sales professionals.

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Your role will be to secure and develop presence detection lighting control systems within the specification marketplace. Aged between 30 and 40, you will have an electrical qualification with a minimum of three years' successful selling to consulting engineers at a senior level. Most importantly, you will have the desire "to win" and be able to prove a successful track record in the specification marketplace, in lighting controls or a closely related business. This is a key position free from any territorial restrictions with very high earnings potential.

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Please apply in writing enclosing full CV to

The Managing Director, Ex-Or Limited
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Astrotek.

A New Company
Astrotek Ireland Ltd.
has started business in Dublin

Martin Stapleton has recently resigned from his position as Sales Director of EWL in Ireland of which he was a founder member. With others, he has started a new company named ASTROTEK Ireland Ltd. which will be involved in the marketing and sale of industrial, commercial and decorative lighting equipment in the Irish market via specifiers and to distributors and users. A computer aided design service will also be available to their clients. Martin and his colleagues are well known and respected in the industry in Ireland and they have over 20 years experience each. They are also technically qualified and highly motivated.

ASTROTEK is currently searching for sources of supply and it is interested in hearing from any manufacturer of lighting whose products are NOT being actively promoted and sold in the Irish market. Interested companies should contact:

Martin Stapleton
ASTROTEK Ireland Ltd.
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Reply To

21st February 1991

For the attention of
Mr Jim Hughes
Lighting Equipment News

Dear Jim

I am writing to inform you of the excellent response our advertisement received in the November issue of Lighting Equipment News. We received literally hundreds of reader enquiries, from architects, designers and other lighting specifiers.

I will certainly include Lighting Equipment News in all future advertising promotions undertaken by CONNECT Lighting Systems.

Yours sincerely
CONNECT LIGHTING SYSTEMS LIMITED

Richard Smith
Managing Director

WE HAVE . . . TO ADVERTISE
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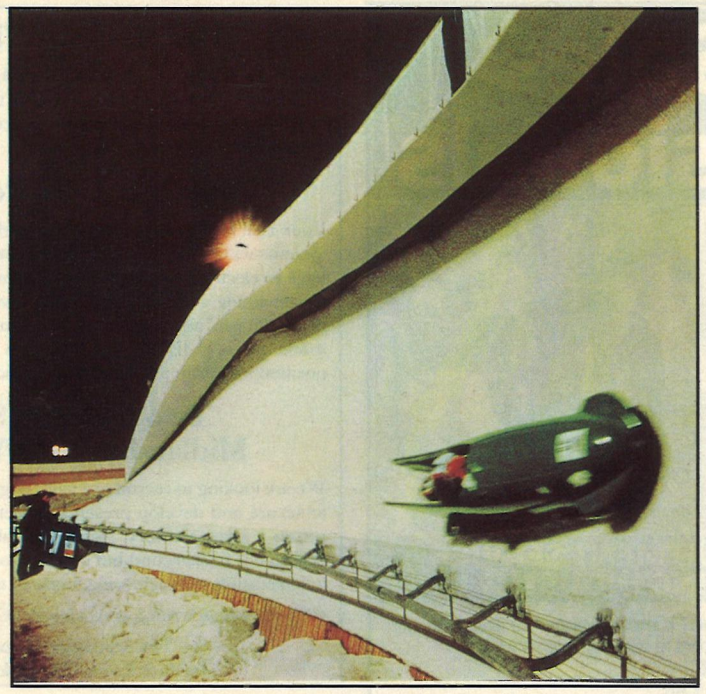
Lighting in the fast track



Lighting a bobsleigh track presents a number of technical problems. These include potential glare on the ice, the bends, curves and inclines of the track; the need to choose mounting positions carefully so that the bob drivers are not disabled by glare from the floodlights; finally, the needs of colour television cameras must also be considered.

So, when Thorn Europhane were asked to carry out a preliminary design study for lighting the combined bobsleigh and sledging track at La Plagne in France, which is to host the 1992 Winter Olympics, it is not surprising that this phase of the project alone took three months to carry out.

The major problem was to device a reference plane that would permit a realistic calculation method. As the angle of the track varies throughout its length, traditional two dimensional plotting methods were inadequate to describe its profile and the design team had to develop a three dimensional approach which utilised height, orientation and inclination. A lighting grid which divided the 1.7km track into 5m sections was then adopted.

The specification asked for a uniform illumination of some 200 lux along the reference plane, for safety reasons and to allow practice sessions to be followed and recorded on video.

The 305 spotlights were mounted on 40 steel masts varying in height from 7 to 18 m. Steel was chosen because of its greater resistance to the salt laden atmosphere than concrete and its greater ability to accept the eccentric loading due to the positioning of some of the spotlights. Exact location of the masts was determined by the needs to avoid glare to competitors and to limit the shadows caused by the profile of the track on the surface. The suitability of the ground for the actual installation of the masts was also a major determinant.

The choice of light sources was equally critical: it is essential to have good colour rendering, a task made more difficult by the surface of the ice. To ensure an uninterrupted power supply two lighting circuits were used: one comprised halogen lamps and the other metal halide lamps, both of which are suitable for a white, snow covered environment. The metal halide lighting uses 400W and 1kW lamps with an average life of 6000 hours. It requires a running up time in the order of 15 minutes and a hot restrike time of 20-30 minutes. The main reason for the choice of this system was the photometric flexibility of the spotlights, an important consideration given the geometry of the track. Each luminaire has four photometric compartments and permits both defocussing of the beam and the addition of reflectors.

The halogen lighting circuit uses 1kW and 1.5kW fittings. At about 6.2kg in weight these are relatively light, and their small size minimises wind loading. The lamps used are linear tungsten halogen giving instant lighting and hot restrike. They have an average life of 4000 hours whatever the burning position, and the advantage that their colour temperature remains constant throughout the life of the lamp.

Commissioning of the lighting system on such a difficult site took three lighting engineers a period of seven days and five nights. First the lights were adjusted for height and direction to a computer designed plan; this first theoretical adjustment of the spotlights was then corrected by visual aim, giving a tolerance of 0.8 lux. Although invisible to the eye, this adjustment was needed to meet the requirements of the specification.

Osram's Wembley factory to close

Final stage of rationalisation at Osram is the closure of its Wembley factory and the transfer of technical services, including quality assurance, to its Shaw factory near Oldham. This will lead to a reduction of 332 employees during the next six months.

Wembley's production, mainly of tungsten lamps is no longer competitive and investment in new machinery is not an economic proposition, says the company.

The Wembley rationalisation follows the loss of 248 jobs at Shaw in April.

This completes Osram's reorganisation, leaving the company with a reduced UK workforce of about 900 employees.

The company's head office and distribution centre will remain at Wembley.

IN YOUR NEXT ISSUE

The August issue of *LEN* takes to the great outdoors. Weather permitting we will be looking at new public lighting, especially for historic buildings and town centres. Sports grounds also come under review and we hope to have an update on the issue of lighting and crime.

A final feature looks at a market driven approach to selecting display lighting for shops.