

This article describes various emergency lighting solutions that satisfy legal requirements

Emergency Lighting Options

by Stirling Marais, Cosine Developments

As the old saying goes "there are many different ways to skin a cat". This is particularly true in providing an emergency lighting solution with the vast array of products available in our local market. On the one hand the lighting designer is faced with the financial constraints and specific needs of the client and on the other hand has to provide a solution that satisfies minimum legal requirements. The chosen lighting system must of course satisfy the performance requirements of SABS 1464 part 22 and the safety provisions in SABS 598-1. This usually precludes the use of off-the-shelf D.I.Y. types of dubious eastern origin that may dazzle with fantastic specifications, multiple personalities and, probably most eye-catching of all low price but end up providing the service life equivalent of a pop-up toaster. Besides, it is in everyone's interest to use products with a history of good service backup and support - qualities now demanded by experienced lighting manufacturers after costly and painful lessons still fresh in recent memory. In the past emergency lighting installations were grudgingly provided to appease authorities and were only really required to operate once - during building commissioning. Thereafter nobody cared and so the vast majority of emergency lighting installations have fallen into disrepair. However, that is all about to change... The Occupational Health and Safety Act (Act 85 of 1993) stipulates that emergency lighting systems must be kept in good working order and tested at least every three months. This places the onus on the building owner to ensure that the emergency lighting will indeed



operate during a power failure - thus system maintainability and support have also become important considerations. As building owners we need not only fear the wrath of our local fire chiefs through non-compliance, a power outage and subsequent injury to one of our staff or clients could prove to be financially onerous through litigation. Also, we should be mindful that the forthcoming soccer World Cup will attract hordes of legally enlightened revellers who may just be unfortunate enough, whilst basking in an inebriated bliss, to experience one of our frequent power outages.

In order to comply with the OHS Act the emergency lighting system generally needs only provide a very low illuminance of 0,3 lux or so called "orientation" lighting i.e., the working staff or public need only enough light for safe egress. A common knee-jerk reaction has been to install motor-generator sets or UPS systems. However, these systems are usually more expensive than a self contained emergency luminaire based solution and, more importantly, they



may not respond to failures of individual lighting circuits.

Listed below the building owners can obtain a clearer picture by examining the various modes of emergency escape lighting giving solutions of types of emergency gear available.

Emergency escape lighting

SANS 0114-2 divides Emergency Escape Lighting into three groups: Escape Route Lighting, Open Area Anti-panic Lighting and High-risk Task Area Lighting. Emergency lighting can, in most cases, be unobtrusively integrated into the existing lighting. The three modes of emergency lighting operation are maintained, non-maintained and sustained. Maintained operation requires both a permanent live and a switched live feed to the luminaire. The luminaire can thus be used to provide normal lighting and emergency lighting. Non-maintained operation only requires

a permanent live feed to the luminaire. In this case, however, the luminaire can only provide emergency lighting. Sustained operation also only requires a permanent live feed. Here the light will be permanently switched on and during a power outage the luminaire will automatically revert to emergency operation. The emergency escape lighting must, in all cases, be activated within 30 seconds.

Escape route lighting

SANS 0114-2 describes Escape Route Lighting as: "That part of emergency escape lighting that is provided to ensure that the escape routes can be effectively identified and safely used at all times". The emergency luminaires must therefore be positioned along the escape route to an exit door.

Principle types of emergency lighting systems are "self-contained" or "centrally fed". In a "self contained" system, each emergency luminaire has an on-board battery and charger unit. A central battery system operates on the principle that the luminaires are fed, via sub-distribution, from a single supply source.

The systems suitable for this task include:

Self contained emergency controllers for fluorescent lighting.

The modules (emergency control units plus battery packs) can be fitted inside recessed and surface mounted luminaires including CFL bulkhead fittings. Various models are available. Caution is advised against trying to cram emergency gear into tiny bulkhead fittings because the high temperatures will severely degrade battery life. Combo systems are now available. The Combo is a cost-effective way to convert small bulkhead fluorescent fixtures into emergency lighting and gives the OEM's the advantage of installing a single unit in the luminaire that offers emergency power and power saving features simultaneously with improved reliability, performance and reduced cost and alleviates the problems of cramming gear into tiny bulkheads.

Central battery emergency systems.

A central battery system (CBS) is essentially a large set of batteries at a single central location. These are the most "maintenance friendly" of all because the batteries are easily accessible. Where the benefits of central control and maintenance are desired in small premises, the central battery system provides a competitive solution. The compact wall mounted cubicle can

be unobtrusively mounted in non-public areas, in buildings such as restaurants, pubs and community centres. Batteries are more accessible for maintenance.

The CBS have a 48V nominal output, with different output rating options to suit a wide range of applications and is capable of driving up to 30 luminaires. Available with 1 or 3 hour duration and non-maintained or maintained operation, all units are supplied with maintenance lead acid batteries. Offering reliability and non-disruptive maintenance, a CBS offers a viable alternative to "self contained" emergency lighting.



Emergency Exit Signs

OHS Act requires that "each exit route be adequately lighted so that an employee with normal vision can see along the exit route". Emergency routes and exit signs shall comply with SABS 1186. Building owners must ensure that Signs complying with the Signs Directive are located at all emergency Exits and along Escape routes. Where direct sight of a sign is not possible a directional sign or series of signs must be used. There should be no ambiguity as to which direction the escape route follows. Many models are available such as the dual-function self-contained emergency luminaire that combines a powerful downlight with an evenly illuminated exit sign, both served from the same light source.



Self testing Emergency Controllers

These are self contained units for fluorescent lighting. These modules

have built-in microprocessors that autonomously conduct regular tests in order to ascertain the condition of the batteries, lamp, etc. Testing constitutes another significant code requirement. Emergency luminaires with emergency ballasts must be tested every 30 days for 30 seconds. When used in an application, these emergency ballasts are installed in selected fluorescent luminaires in a facility and usually do not light all the lamps. For battery-powered units, a 90-minute annual test is also mandated. Emergency lighting units must be functional for the duration of testing (30 seconds or 90 minutes), and written records of test results must be kept and records kept of inspections and test results. Some models are available with self-testing/self-diagnostic capability that automatically performs the monthly and annual testing required by codes and warns users of problems. Self-testing and self-diagnostic battery operated emergency lighting equipment are exempt from the 30s monthly test, but not annual tests, provided visual inspections are done at 30-day intervals. This feature significantly reduces scheduled functionality check effort.



Central Monitoring System

This is a remote zone monitoring panel for self testing controllers. One CMS will monitor up to 50 x Self test Emergency control units connected via a dedicated link. The CMS will issue a warning - both visually and audibly - to indicate when any of the luminaires within the loop are faulty. The location and type of fault is signalled at the luminaire itself. The CMS can also be interfaced to building and fire management systems (BMS) via no-volt contacts.

Remote Control Testing

These are self contained emergency controllers for fluorescent lighting with infra-red remote control facility.

To ensure that emergency lighting is functioning properly OHS Act requires



periodic testing, visual inspections and written records of test results for all emergency lighting. Cosine Developments' remote control testing emergency ballasts provide a simple testing alternative for emergency lighting. By pointing the handheld remote control transmitter toward the infrared receiver and pushing a button, end-users can test emergency ballast operation from up to 10 m away permitting users to point-click-and-test without climbing on ladders or using extension devices.

Standby emergency controllers for fluorescent lighting with features.

These types are particularly useful for unmanned substations and telephone exchanges where battery power may be exhausted by the time personnel arrive or during extended power failures when battery power has to be conserved.

Open area anti-panic lighting

SANS 0114-2 describes open area anti-panic lighting as: "That part of emergency lighting that is provided in an open area to avoid the panic that can be brought on by darkness and to provide illumination that will enable people to reach an escape route". These areas include shopping malls, sports stadiums and factories. The same solutions for the escape route lighting may be suitable including:

- High light output emergency controllers are self contained for fluorescent lighting. Emergency light outputs of 50% and 100% are available for lamps up to 65W. The higher light output enables higher luminaire mounting height.
- Flood-lights emergency controllers using fluorescent lamps which are self contained. These offer a very attractive solution because fewer luminaires are required.



- Halogen spot-lights emergency controllers which are self contained for operating at 100% light output



in emergency mode with self test and infra-red remote facility. This feature is particularly useful with high mounting height and hence less accessible luminaires.



High risk task area lighting

SANS 0114-2 describes high risk task area lighting as: "That part of emergency



escape lighting that provides illumination for the safety of people involved in a potentially dangerous process or situation and that enables proper shut-down procedures for ensuring the safety of the operator and other occupants of the premises". The requirement of 10% of the normal lighting level or 20 lux usually precludes the use of those systems mentioned in Escape Route Lighting. The best solutions would be high output fluorescent based or halogen spot-light types as detailed in Open area Anti-Panic Lighting.

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