

Neil Skinner is Lighting Director at Design International, a unique leading boutique multi-disciplinary retail design consultancy who designs very successful retail and leisure developments globally. He oversees the concept, development, specification and site implementation of all lighting schemes produced by the London and Milan studios. His skilled specialist design team are from theatrical, architectural, interior, and product design backgrounds. Neil has a BA Hons in Product Design and an MSc Light & Lighting from University College London. Here, he gives us an insight into the world of the LED.



LED

LED, as most of us know, stands for 'Light Emitting Diode'. This light source, like it or not, is slowly taking over our lives and is now here to stay. LEDs are a solid state light source and 'predictions' are that they should last longer than any other light source! Well, hmmm, in theory yes, but there is a lot to understand first. To summarise, these light sources have no moving parts, no fragile glass shells, no toxic materials and no delicate filament. Unlike traditional light 'bulbs', LED 'Light Sources' are not necessarily subject to sudden failure or immediate burnout. As time moves on we are seeing virtual monthly development of ever-better LED solutions used in every type of lighting application that touch our lives. LED sources are already here that beat compact fluorescent technology. Within our practice we have not specified a compact fluorescent source in over 18 months! (*Bulbs are planted in the garden!)



Protecting the Environment

LEDs are reasonably eco-friendly and contain no burning gas or filaments. The fact that there is no easily damageable filament also means that they are more durable. If an LED lamp is broken, it contains no toxic chemicals to pollute the environment. Therefore, LEDs produce less waste compared to other disposable light sources, which, when finished, are sending materials such as plastics, metals, glass, phosphors and Mercury back into the environmental chain. As already mentioned, because they have a longer life and lower energy consumption than alternative forms of light source, by replacing existing lights with LEDs, a company can reduce its carbon footprint dramatically.



Colour

The consideration of the 'colour' of light is so important for any task or user. As light is very subjective, the user and their needs need to be taken into consideration. There are two key things to consider; colour rendering and colour temperature. Firstly, colour rendering is sometimes referred to as the 'CRI' number and states its measured ability to show colours of the spectrum to their best, rated from 0 to 100. At present, the three best light sources for this are the sun (not available in the UK during April 2012), the incandescent GLS filament 'light bulb' and the tungsten halogen lamp. Two of these will eventually be phased out by European Bureaucrats – sadly. But, our old trusty, lovely, but environmentally unfriendly incandescent and tungsten lamps remain the best light sources as they have a rating of up to 100. In my view they will always be the best for tasks where fine colour assessment work is critical, for example, art galleries, restoration and high quality print colour analysis. Fluorescent, compact fluorescent and metal halide all got close, but never close enough. LED is catching up but is not there just yet. In reality though, for the majority of regular user tasks, a CRI 80-90 is perfectly adequate. At present most LED light sources reach this level of colour performance. Secondly, colour temperature – otherwise described by many as 'how warm or cool' a light source might feel. This is described numerically as a 'Kelvin' number or just 'K'. As mentioned above, incandescent and tungsten actually burn quite warmly at 2,700k to 3,000k. LED at present can actually be manufactured to create anything from 2,400k (very warm white) right up to 6,500k (very cool or daylight white).



Sustainability

The fast development of LED technology now makes this a very sustainable light source. Compared to traditional light sources, which will generate a large amount of heat through Infrared IR within the emitted light as well as heat from the lamp, LED light, in the main, only generates heat through the equipment itself. This positive impact on a building naturally reduces the need for greater air conditioning and reduces risks of fire to buildings. When specified correctly in a suitably designed luminaire, an LED light source can be perfect. Apart from energy efficiency, LED sources claim very long life. Long life claims need to be treated with a little caution as their life is directly related to ambient temperature as well as the operating voltage of the luminaire. Regarding temperature, LEDs love the cold! If they went on holiday it would be Norway, not Dubai. Most reputable manufacturers quote 50,000 hours life, which sounds great and if run for 24 hours a day will last for 5.7 years. However, what 'Life' means is described by different manufacturers in very different ways. The industry has been adopting an informal use of the L70 code. This means, for example, that their product life after 50,000 hours would still be running but at 70% of the original light output at a particular temperature. To be noted!



Directional Light and Optical Control

LED light sources have created a unique challenge for luminaire (or lighting fixture) designers and manufacturers in that the light they emit is uncontrolled and wide. As the LED is electronic chip mounted, the distribution of light is effectively a very wide 150 degree arc. This very wide spread of light, combined with their often tiny sizes, makes designing reflectors and lenses a challenge. However, once properly harnessed they can be a very effective lighting tool, as is demonstrated in the Z-Bar.



Cost Effective

LED lighting is now a proven cost effective lighting solution. The initial purchase of the equipment may well be more but it is being proven that the payback works. Our recent projects at Design International have proven to clients that the savings come from the following: Reduced overall energy use compared to comparative light sources; Lower maintenance labour costs; Reduced down-time of the scheme (ie. lost revenue due to closure or disruption); Zero lamp cost for replacements; Dimming of LED lighting when linked to daylight sensing or presence control; Overall extended life.



Around the Workplace

LED continues to evolve for a multitude of applications and, in particular, in many workplace environments. Workplace lighting is usually left switched on for a large part of the day, so LED lighting can bring great benefits, as mentioned above. Many studies have proven the benefits of environmental lighting control for workplaces and how these have a massive positive impact on the productivity of working staff. For an individual task lighting situation, LED provides the immediate benefits of quality light with obvious energy and cost savings, minimum maintenance and sustainability, no heat, no flicker and easy dimmability for user brightness comfort control. As a great example of this, I have recently been using the ERGO KONCEPT Z-BAR task light.

