

When Did Quality Become a Tertiary Function?

01/05/2014

LED lighting has been with us for some time now and with it has brought some great achievements and some excellent lighting installations. It is a well-established light source and another weapon to a lighting designer or manufacturers' arsenal. But has it improved lighting for the real end user, the employees, pedestrians, drivers and residents? In many cases I fear not.

One of the big advantages of LEDs is that they are very efficient, with chip efficacies over 140lm/W even when run at a reasonable forward current. They are also very small - as near to a theoretical point source as we can get, which lends itself to the efficient controlling of the light output and the production of efficient optics. But these factors have also become the downfall of LED.

There is a mad rush for LED lighting. End users are specifying LED lighting because they want to save energy and it is this saving of energy that has become the key driving force behind the uptake of this new technology. Installations are being designed with payback periods opposed to in depth, thought out specifications that focus on the application and task in hand. Considerations on colour quality, maintainability, reliability, glare and so on take a back seat because the spreadsheet states ROI=3.68years!

Let's put the quality issues aside for a moment and focus on the ROI calculation. Using a return on investment is important to understand the financial feasibility, but the calculation is only as good as the information put in and experience of the operator. A major problem that arises when designing with payback and energy saving is the luminaire cost plays an important part. In a simple ROI calculation, if you double the cost of the fixture you double the payback period. As a crude rule of thumb, but by no means incorrect, the cheaper the fitting is, the lower the quality.

Luminaire costs are affected by all manner of inputs into its manufacture, but savings can be taken from where they shouldn't be. The painting preparation could have been compromised, or the driver could be down-rated to squeeze every last Watt out of it. Has the contact of dissimilar metals been eradicated throughout the fixture? Will the integrity of the IP rating last the lifetime of the luminaire? Items that are cheap are cheap for a reason. Quality and reliability can be heavily compromised by going with the cheapest option and you may not see your return on investment because 50% of the luminaires have already failed.

The ROI model also favours the use of the most efficient luminaire available. The more lumens there are per dollar, the more effective it is. It is common knowledge that for an LED, the higher the colour temperature the higher the efficacy. So straight away, the best option even with what might be a good quality luminaire is the option using 6000K. Then there is the mounting of the LED. Because the LED is directional, it shines the light in the correct direction anyway, so you can mount it on the surface with a small plastic lens to control the light and not worry about having to use reflection. But this results in each luminaire being extremely glare and visible from

any angle, whether you're directly under the fitting or not. There is a reason why highbay luminaires use a recessed lamp. Consideration should be given to the maximum shielding angle or cut-off angle in order to reduce glare, but using an LED with surface mounted chips does not lend itself to good controlling this respect. There is, in fact, no shield at all! The coating on a HID lamp isn't always to improve colour quality, it can also be there to reduce glare or for a different photometric distribution.

So if you follow the design principles of the ROI and opt to go with the cheapest and most efficient product, you are very unlikely to end up with a good quality, comfortable and reliable system.

Experience shows that this is not to the fault of designers and consultants, but more a problem of the blind, or greedy, leading the blind. End users with little knowledge into lighting equipment are being sold stories by people who know just a little more, but enough to sound convincing and enough to be dangerous. We come across many potential clients who do not want to hear about LED because they've tried that and it looked terrible, was glary and uncomfortable or didn't last for 1 year, let alone the 50,000hours they were promised.

A good lighting installation should be designed around a suitable performance specification that will ensure the final installation is fit for purpose and conducive to the task at hand. The selected products should be specifically designed for that application so they will perform as expected for the designed lifetime.

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