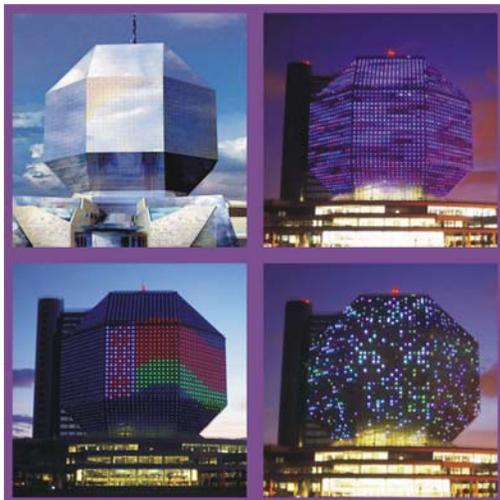




The 20th annual LIGHTFAIR International is North America's premier lighting industry event for architectural and commercial lighting products and services. Manufacturers show off their latest and best innovations in lighting and everywhere I looked there were LEDs.

We are used to seeing LEDs in advertising displays and large video arrays. And they have been in our cars for many years as well. But in a lecture at LIGHTFAIR on the advances of LED lighting, the lecturer announced the demise of the incandescent lamp within the next 5 years.

The LED has made tremendous improvements since its birth over 40 years ago. It was originally used for watch displays and indicator lights in TV remotes. But this same technology is about to make the leap into practical general illumination and even high output devices for theatre, TV and architectural lighting.



Architectural lighting design has traditionally been the domain of the architect. The results by many of these structural wizards have been from bold to boring with the latter being the more common. I went to a LIGHTFAIR panel discussion with the founding members of the International Association of Lighting Designers (IALD) where an interesting consensus was alluded to by their membership.



When an audience member asked what young architectural lighting students could do to improve their skills and abilities, the answer was unanimous: “Go join a theatre company and volunteer to create their lighting!” They all felt that you cannot learn HOW to use light without actually working WITH light. Books and mathematical formulas for optimum lighting effect are insufficient. Theatre is THE best place to learn about lighting angles and the use of color to affect mood

or accent time of day. The fact that theatrical lighting designers are appreciated by architectural lighting designers was a pleasantly surprising confirmation of my own beliefs.

Over the past year I have written many articles about lighting designers and their creations for theatre, dance and concerts. What I have left out of these articles was that many of these same designers have also been illuminating architecture. This is the reason why I am writing this article. My fellow designers need to be kept up-to-date about all the latest trends and technologies in all fields of lighting.



I was lucky to be in New York when LIGHTFAIR opened. By my being there for you, I have saved you a lot of money in airfare and accommodations. But more importantly, I saved your feet from the many miles of hard concrete floors that are in the Jacob Javits Convention Center! I will try to give you a sampling of what you missed,

however; the countless catalogs of new lights (high tech and low tech), row after row of isles packed with manufacturers’ products and salespeople, plus all the free give-away items! Some of them useful like a free LED key holder. Others were just silly like a flashing LED ice cube that really can be placed in your drink.

I also returned to the city of my birth for theatre, food, family and friends. I got enough of each on this latest trip. As always, I had many more things to do than

I had time. But I also interviewed a couple of Broadway designers who will be the topic of future articles in the months ahead.



As I walked through the isles of industrial manufacturers, I came across a company that I recognized from my years in theatre; Altman Lighting.

They recently expanded into architectural lighting and have a few ideas that should be looked at. For example, Altman's new track lighting system incorporates a DMX control line in the design. And all of their equipment can be mounted using a track lighting connection.

For those devices too heavy to be mounted on the track, there is an adaptor box that clicks into the track providing power and DMX. Altman was also showing off their new line of LED Cyclorama lights, whose sales propaganda was, "...they are built tough enough for Disneyland to want them." There really was nothing more to say. I have worked for Disney. And if Disney buys them, the cyc light must be good. I'm also sure that Disney didn't pay retail prices either. Rosco was another theatre based manufacturer at the convention. They were featuring glass gobos and projectors for architectural applications. Rosco's custom work on gobos and slides is excellent. Their prices may be a little high but their quality is even higher.

Typical of this type of show, a majority of manufacturers offered lighting fixtures for office and other commercial buildings. There were also a few that manufactured custom designs and special services like laser cutting and etching in metal and glass. A majority of the home and outdoor lighting products favored 21st Century high tech LED designs and futuristic shapes. Prices for these items ranged from moderate to outrageous, with the cheapest items inevitably being the more generic lighting from Asia.



Approximately one third of the convention floor was covered with manufacturers of LED replacements for standard incandescent lamps. Everything from standard screw-in lamps to MR-16s had their LED replacements. Many of these retrofit lamps were being made and sold by companies from China, Japan and

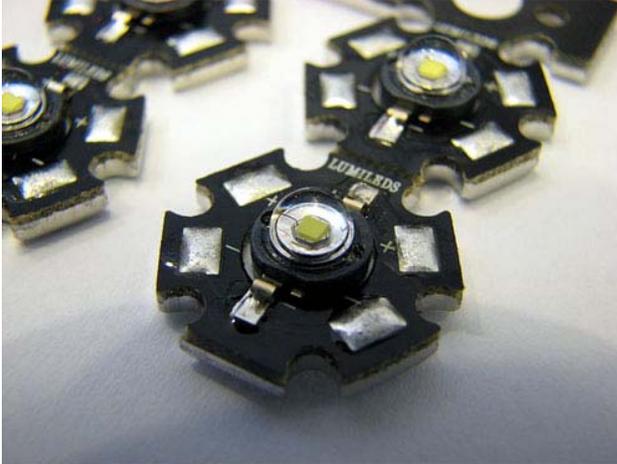
Korea. On average, the prices were not low and the quality was not high. But there were some products that I did find interesting, like a ribbon of LEDs less than 2cm wide and available in 3 meter lengths and available in several colors. These ribbons can be cut to length and they contained all the electronics embedded within the flexible plastic covering. Some styles included an adhesive backing for instant mounting on a smooth surface. I am still waiting for their catalog to arrive but when it does, I promise to write a short follow-up on this product. It has so many possible applications, including being sewn into costumes!

I have so many catalogs that I need to go through. And many more that should arrive by mail soon. One manufacturer that I will be writing more about in the next few months has extraordinarily powerful LEDs. I played with one of their models that projected a tight, bright beam of white light more than 30 meters across the lighted open convention room and onto the ceiling of the Javits Center. It was bright. It had a cool beam. The light could be dimmed from full off to full on smoothly. No bumping on or blacking out. And the lighting unit was hardly warm to the touch even after an hour of being on! If this is an example of the near future of LED technology, the incandescent WILL be gone in five years.

Thomas Edison, move over. Your light is about to be buried with you.

AVERAGE LAMP LIFE IN HOURS

- ▶ Incandescent lamps: (Household style) 750-2,000 hours
(Halogen-theatre/TV) 250-500 hours
The principal behind these lights hasn't changed in more than 120 years. They give off 80 percent heat and only 20 percent light.
- ▶ Compact Fluorescent Lights: 8,000-10,000 hours
CFLs are more efficient than incandescent but still contain small amounts of mercury.
- ▶ High-power white LEDs: 35,000-50,000 hours
The U.S. Department of Energy estimates that 25 percent of the electricity in the United States is used for lighting, costing \$50 billion per year. The agency says new LED technology could reduce lighting energy use by 50 percent.



I'd like to share with you some of what I heard in the various lectures offered at LIGHTFAIR. I am very grateful that, as a journalist, I did not have to pay for these lectures because they were not cheap. I was interested in quite a few but I only had a few days to hear them AND see the hundreds of manufacturers with their products.

Until recently there was no standard way to measure either the light output or the longevity of these new light sources. In August 2008 this changed when formal language and testing methods were approved to standardize the industry (LM-80-08). But until those new tests are performed, documented and approved, each manufacturer has devised its own methods to present the LED data on paper.

For example, one method used to measure the light output of LED include a lumen measurement taken at a light burst of 25 milliseconds. Why someone would use this type of measurement becomes clear once you understand that the light output of an LED declines as it heats up. So a short burst of light does not raise the temperature of the LED or its housing. But I like my light to be on for more than 25 milliseconds at a time. Don't you?

And LEDs do get warm. Some get absolutely hot. So the creation of a good LED lighting unit needs to be designed to draw off the heat from the LEDs or you loose light output and the lifetime of the light also goes down. The myth that LEDs give off no heat is NOT TRUE except that the beam of light does not feel warm.

Another issue that makes LEDs different from standard incandescent lights is how to determine its lifetime. With a light that uses a filament, it is easy to tell when the light needs to be changed. A break in the filament means change the lamp! But LEDs are solid state devices like a computer processor chip. There are no parts to wear out. Of course, LEDs are fragile and will break if dropped; but then, so are incandescent lights. So, the way to judge the lifetime of an LED is by its brightness. When the output drops below 70% of its initial light output it should be replaced. And with an average life of 50,000 to 100,000 hours (5 to 10 years of continuous burning) you will not be changing them often.

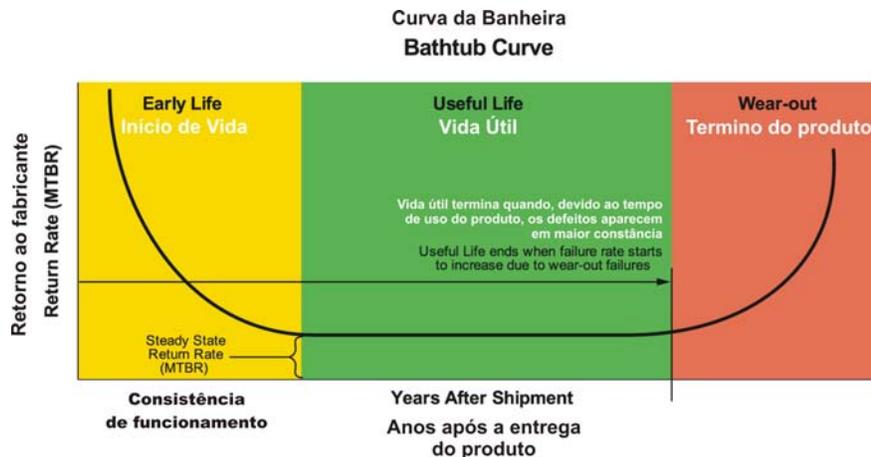
But LEDs are just one component of an LED lighting unit. And your light will only work until the first piece of electronics fail. There are two critical components that power an LED light and both work together to supply smooth low voltage power. The driver, formerly known as the transformer (lowers the voltage) and the

capacitor (regulates that voltage). Abuse or hostile environments can damage an LED device. For example, the driver can be destroyed by applying 220vac into a light designed for 120vac. And capacitors are extremely sensitive to heat which bakes the water out of them causing the capacitor to fail.

The final aspect that should be looked at when considering the use of LEDs is their color temperature. They come in a wide variety of colors of course. You can get the industry standard of RGB, RGBA or RGBW combinations and mix your desired color using a DMX control system. In a situation where you use a single source white LEDs you have to be very aware of the Kelvin temperature because they vary from warm white (2700°K) through cool white (6500°K). And many LED manufactured lights use a combination of these color temperatures to achieve a balanced white.



Do you need to know the manufacturer of all these components? Are they from reputable companies? Or are they cheap copies? Certainly parts from multinational companies like Philips or GE are better tested and more reliable than a generic part from an unknown Asian company. The better the parts, the more reliable the end product will be. And price should not be the only reason for buying a product. Guarantees from a manufacturer are just as important. If the product you are interested in buying has a rated life of 50,000 hours but the manufacturer only provides a 90 day guarantee, I would suggest you find a different product. If the manufacturer does not trust it past 90 days why should you? Manufacturers use the “Bath tub Curve” as a basis for their guarantees. The graph shows that if a product survives its early life without failure, its longevity is assured through its expected lifetime. As LED technology improves the guarantee period will also lengthen.



"Celebrating the History of the Independent Lighting Designer" by the founding members of the International Association of Lighting Designers

Hosted by Addison Kelly

Howard Brandston. studied theatrical illumination at Brooklyn College and began his career in lighting in the New York theatre.

Ray Grenald, an architect, won international recognition for his lighting designs.

David A. Mintz, architectural lighting designer, also began his career in theatre, graduating from The Carnegie Institute of Technology (now Carnegie Mellon)

Sonny Sonnenfeld, architectural lighting designer, began career in theatre

William Warfel, M.F.A., Professor Emeritus of Theater Design: Yale

Addison Kelly, lectured at Harvard University Graduate School of Design