

LED lighting on the march

LED technology has brought a flood of new suppliers to container ports offering lighting fixtures that promise to deliver long life products that use a fraction of the energy required by "traditional" 1000W floodlights.

Jeff Newman, owner at Global Tec Led, has made open approaches using LinkedIn in *forma*, stating: "Looking for ports that want sustainable lighting with 10 year guarantee. No initial cost." Other suppliers promise a return on investment in just 1-2 years.

Turning, slowly

So far, however, ports do not appear to be rushing to replace high mast lighting with LED systems. There is a certainly a drive to improve energy efficiency and overall lighting quality for safety reasons, but the high cost of LED fixtures means that ports are taking a conservative approach.

Lighting suppliers, however, are expanding their range of en-

LED lighting is gaining acceptance for use on container cranes, but operators are more cautious with regard to high mast applications

ergy efficient fixtures. Acuity Brands claims to be the market leader in North American industrial lighting and last year launched over 100 new LED products, including an LED version of its Holophane brand high mast pole.

CEO Vernon Nagel said that now is "an extraordinary time to be in the lighting industry...Rapid advances in technology, along with the need for greater energy efficiency, changes in public policy, and demand for environmental sustainability, continue to drive profound changes in our industry creating an exciting opportunity."

A key to future

Another leading supplier, Musco Lighting, was relatively late introducing LED fixtures, but now sees them as key to its future. They have now taken hold in market segments such as indoor sports stadia. Global account manager for area lighting, Tom Morrison, said the company has now completed 10 stadium projects and there is no doubt that LED "is viable."

They are installing LEDs because they run lights for 3000-3500h a year and have very specific demands. To host televised events, for example, needs a high minimum level of light requiring many fixtures. The more fixtures the greater the energy savings, and the more viable LEDs become.

The port market, said Morrison, is very similar in that fixtures are on for very long hours, but is at an earlier stage on the adoption curve. There are, he added, some weary customers that

have tried LED fixtures on one or two poles and had bad experiences for various reasons. He is confident though that LEDs can perform and Musco will be confirming several port projects using LED fixtures on high mast poles within the next 12 months.

Musco has also supplied LED fixtures for testing on an STS and RTG cranes at Jebel Ali. At this stage, however, its priority is high mast fixtures for yard and other non-mobile applications.

Lasts longer

The basic LED equation is to save money in the long run by investing more capital upfront in fixtures that last longer and use less energy. With fixtures that have a theoretical life of up to 25 years

that equation is difficult to prove. Manufacturers do not offer such long warranties, so terminals have to take a cautious approach.

As previously reported, Musco has installed metal halide systems in Savannah and T1 in Jebel Ali. In Savannah the system has a 10-year warranty, which Morrison says is really more of a "maintenance package." Musco takes care of re-lamping fixtures and all other maintenance to maintain a specified light level.

When it comes to LEDs, said Morrison, ports should be very clear about what components are covered and they should be looking for a full parts and labour warranty, which should also cover performance as well as operation.

With regard to lighting performance, Morrison said terminals are very focused on safety and are usually looking for a significant improvement on the lighting system they are considering replacing. Very few US terminals, however, actually meet existing standards, which are vague and leave plenty of room for interpretation.

An issue is that standards were designed a long time ago where there were many more people



Phoenix Products will soon launch a new HDL-LED fixture

working on the ground. Today much of the working area is illuminated by lights on handling equipment. How terminals interpret the requirements has a major impact on the lighting system. In some cases, areas could actually be lit with half the fixtures terminals think they need, said Morrison.

Working through all these issues takes time, and Musco is involved in tests that will run for one year or more before the terminal is ready to make a decision. Morrison is confident, however, that ports will install its LED poles, and that numbers will grow quickly.

Prismalence aboard

Prismalence is another supplier of "traditional" lighting that is in-

creasing its range of LED fixtures. The Prismalence CDM (ceramic discharge metal-halide) fixtures are already "energy efficient," achieving high output from relatively low power by using its special prism lens technology with a metal halide lamp.

Prismalence has now launched an LED version of its Stella fixture for heavy duty applications, including container cranes. The water and shock protected fixture has a powder coated aluminium body and the "electronic ballast" is contained in separate, quick release water safe casing (IP66). The ballast is built with SELV (safety extra low voltage) for enhanced personal safety and LED circuit has open loop protection.

Bright sparks

Bright Light Systems has signed up more terminals to test its Light Emitting Plasma (LEP) fixtures. As previously reported (*WorldCargo News*, September 2013, p27) Ports America plans to install Bright Light LEP fixtures at its Outer Harbor terminal in Oakland, but the roll-out has been delayed for the time being.

Meanwhile, Bright Light is installing its 140 BLP1000 fixtures at a terminal in Puerto Rico and is awaiting approval for a project at a cruise terminal in Seattle. □

Shedding light on it

In previous coverage of the lighting market, terminal operators have raised the issue of how to measure the output of LED lights, and in particular whether lighting suppliers should use a different light meter for measuring light output from LED fixtures. *WorldCargo News* asked Yazzi Fletcher, chief technical officer at Phoenix Products to address this question and he replied as follows.

"When a new technology is introduced - LED lighting in this case - the topic of proper light level measurement needs to be addressed. The quality of traditional light meters varies widely; prices range from US\$100 to US\$3500. All traditional light meters are generally calibrated to a CIE standard tungsten halogen lamp operating at 2856 degK and using filter technology. However, when measuring other light

sources (such as fluorescents), uncertainties increase due to their spectral distribution. Traditional light meters that take the light source into consideration are preferred, but do not always solve the problem of inconsistency.

"With the acceptance of LEDs' "whiter" light, designers and manufacturers have been increasingly asked to measure and compare LEDs to conventional lighting fixtures. This has been an issue with lighting installations especially for exterior applications with low light level requirements. The Illuminating Engineering Society (IES) released a document called TM-12-12 that considers the effects of the light source at Mesopic (less than 3cd/m2 roughly equating to less than 30 lux) light levels.

"Many mistakes can be made when taking light meter readings. A light meter calibrated to NIST standards and proper reading techniques are essential to achieving accurate results.

"A traditional light meter, when properly used, can do an excellent job of measuring light levels in a traditional environment. New LED light meters combine sensors for filter detection and spectral data allowing the user to gather more data and compensate for the shortcomings of traditional filter light measurement. The acceptance of new LED light meters into the industry will allow users to gain a better understanding of light levels and the comparisons with each technology." □

Phoenix Products' Yazzi Fletcher



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The LED Stella is available in 122W or 232W options and produces 100 lumens per watt. The Prismatic lens produces multiple rectangular light pictures with low glare. Primalence has rated its lifespan at 60,000 hours to L80 (most fixtures are rated to L70 - meaning the lifespan for which it will continue to produce at least 70% of its rated output).

The Stella follows an LED version of the Polaris, a smaller 38W fixture that Primalence launched earlier. Coming next is an 80W LED version of its Mamba fixture for walkways, guardrails and other low-height applications.

International sales manager Daniel Björk said the company continues to evaluate LED technology and develop its LED range, but unlike some suppliers does not believe LEDs will replace CDM fixtures completely.

LEDs, said Björk, have many advantages such as instant-on capability, but the cost is still too high for many applications. On paper, LED fixtures generate fantastic returns when compared to 1000W high pressure sodium floodlights, but when compared with a modern CDM fixture they can be a more expensive option. LED fixtures have got progres-

sively larger to meet the needs of floodlight applications and can use as much as 350W of power, more than a Primalence CDM fixture. Primalence believes LEDs will find applications as high mast fixtures in container terminals in the future, but each application, added Björk, has to be considered on a case by case basis and LED will not always be the winner.

For now, however, all Primalence's port customers are sticking with CDM for their yard lighting. The company is now finishing London Gateway and T3 in Jebel Ali for DP World, which both use Stella 315W fixtures on

30m masts. T3 will also have LED Mamba fixtures mounted at 4.5m for roadway lighting.

Constanza retrofit

Primalence has also completed a retrofit project for DP World's Constanza terminal where it replaced all the crane and high mast lighting with CDM fixtures. The 400W fixtures on the RTGs were replaced with 150W Polaris CDM fixtures. On the cranes and high mast poles 1000W fixtures were replaced with larger 315W Stella CDM. After Constanza, Primalence has won retrofit projects in Gothenburg and for SSA Mexico in Manzanillo. In each case LED was evaluated, but modern CDM technology came out the winner.

The crane equation

When it comes to container cranes, Phoenix Products Company, Inc of Milwaukee believes LED fixtures are gaining acceptance faster than in high mast applications. Ryan Hertel, global manager for the container crane market, said Phoenix has spent considerable time and effort working with crane OEMs, consultants and end users to introduce the technology and is now starting to see an increase in crane specifications that call for LEDs.

LEDs arguably have a more compelling case on quayside cranes than in yard applications. In the case of ASCs, LEDs' no warm up, instant-on/instant-off capability means the crane lights can be switched off when the cranes are working over the stack and turned back on immediately if required. Hertel said crane OEMs and end users have different views on how many fixtures are needed and where they should be located, but acceptance of LEDs in this application is now near universal. Phoenix has supplied LED floodlighting for over 150 ASCs in the last 18 months.

On manned equipment the use of LEDs is increasing, but the reasons to adopt the technology are more complicated than the cost considerations that dominate yard lighting. Hertel said there are some areas of the world where high electricity costs are driving interest in LEDs, but terminal operators are typically more concerned about providing a quality light system in the operational area because it directly affects productivity and safety.

Maintenance is also a more



Close-up of a Primalence 315W Mamba XL LED 230W fixture

important issue with crane lighting. Unlike high mast poles where light rings can be lowered and fixtures changed on the ground, crane-based lighting must be serviced on site and in difficult-to-reach areas such as the trolley. The appeal of LEDs is their more consistent light quality over time while achieving energy savings. Terminal operators typically want to test that the fixtures are fit for the high vibration marine environment and often start with the trolley application to gain confidence in the technology.

Evolution

Hertel said that as LED technology moves on and gains wider acceptance, terminals are becoming more interested in LEDs for the full range of crane applications, including walkway, machinery and electrical house lighting. Here Phoenix sees terminals taking more care to design systems that project light into the right areas, such as inside electrical cabinets, while being easier to maintain.

In fact machinery house detail can often be overlooked. Putting fixtures on the roof is relatively easy when the crane is being built, but servicing fixtures over large components such as the main hoist drum is extremely difficult as there is no practical ladder access from below.

While these points are getting more attention in some markets, there is still enormous variation

in lighting requirements across applications. Phoenix has seen average lighting level requirements inside the machinery house ranging from 200 lux to 540 lux. These can, however, be met with the one fixture and Phoenix has developed a new HDL-LED "heavy duty linear" style fixture that will be launched in the coming months.

The HDL will feature Phoenix's marine grade construction, potted driver and an IP67 rating. It will be available in 30W, 60W and 90W options with customised optics to minimise fixture quantity and shadowing from equipment. Power options include ac, dc and energy backup power.

Phoenix has a full range of shock and vibration proof fixtures and now believes it can cover all container crane requirements with six base models.

One possible exception is a spreader-based fixture, which has been supplied by Germany's ABH Lighting for the ASCs at APM Terminals' new Maasvlakte II terminal in Rotterdam. Hertel said Phoenix has not, however, ever been asked for a spreader-based fixture.

It is supplying LEDs for the new ASCs at Global Container Terminals in New Jersey, where the fixtures are mounted on the main girder and the trolley and will be programmed to illuminate only when necessary. The ASCs at Long Beach Container Terminal will utilise a similar design. □

Phoenix ModCom Hi LED floodlights on an STS crane trolley



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