

In April 2013, Philips, the world's biggest lighting maker, reported a 38% jump in first quarter LED sales from a year earlier. LED lights are becoming the norm for replacing the old light bulb in households but how does it fare in the ports industry? Sheila Moloney reports...

We have covered the use of Light Emitting Diodes (LED) lights in the ports industry in *World Port Development* on several occasions but what we didn't anticipate was how fast the market would respond to the use of LED lights compared to the traditional 1000W high pressure sodium lights (HPS). LED lights are pricey but the long-life and energy-efficient bulbs are an excellent alternative to HPS lights. Apart from consuming a lot of electricity, the drawbacks of using HPS lights are obvious - they have poor durability, create a lot of light pollution and generate light of poor colour for night vision. In 2012, Sean Pearce, CEO at Yilport explained at the Ports & the Environment seminar that the Turkish terminal operator implemented a terminal lighting project and compared the use of more traditional terminal lighting (including HPS and SON-T) with LED lights. Their conclusion was that the 1000W SON-T lamp (18 lux) consumed around 336.000 kWh of electricity a year and produced 201 tonnes of CO² a year of emissions. Compared to the new [LED] system - by using an eco-friendly 210W UCD lamp (25 lux) - they experienced a reduction of 80% in lighting costs by using 'only' 67.200 kWh of electricity a year producing 40 tonnes of CO² emissions annually. What was very interesting with this example was that the payback period on the investment of transforming all of their lighting to LED lights was only 15 months. With such enormous savings on both electricity and emissions it is obvious that terminal operators are looking at transforming their terminals to the use of LED lights and manufacturers are reporting some interesting news stories.

Saving money

One of these success stories comes from US-based Musco Lighting, the company that provided DP World with their 'Green Generation Lighting' solution at the Jebel Ali Port Terminal I in the United Arab Emirates. With more than 175 hectares of cargo movement and storage, and operations taking place 24/7, DP World and its Jebel Ali Port Terminal I were facing the kind of lighting challenges most corporations can barely



Photo courtesy of Musco Lighting

The LED lighting revolution

imagine. Energy consumption was very high while spill light and glare were excessive. Replacing lamp outages and maintaining the vast lighting equipment was expensive and time consuming. DP World needed to reduce costs, lessen its environmental impact, and refocus its belief in green technology, without sacrificing the uniform, consistent light levels necessary to maintain a safe and efficient operation. The previous lighting system created hot spots, dark spots, and potential safety issues for workers. By using the existing 30-50m tall poles, Musco created a lighting solution that saved DP World money in the initial stages as well as in the long term. Musco engineers designed, fabricated, and built a custom hangar bracket that allowed the new LED lights to be installed on the existing poles' original design. The custom bracket maintained the flexibility of the lighting equipment and the ability to raise and lower it as needed for maintenance. The custom-designed system utilised existing poles for capital cost savings, and with over 230 poles used in the final lighting design, executing this customised approach and integrating the new lighting into the facility's existing infrastructure was critical in keeping the cost of the retrofit low for DP World. Musco improved the overall uniformity, or smoothness, of lighting to allow better visibility throughout the port and create a safer work environment during crucial twilight hours. The system also provides the ability to evenly reduce light levels when operations are inactive or in areas used only for the storage of containers, creating additional savings for the port. The newly installed lights

also reduce glare and redirect previously spilled light onto the working surface. Throughout the entire installation process the Jebel Ali Port Terminal I stayed operational. According to Musco, the terminal used 3935 kW of electricity before the green solution was implemented and afterwards it witnessed a drop of electricity usage to 1121 kW - a savings of 2814 kW (72%) or USD1.356 million a year in energy costs savings.

LED floodlights

The use of LED lights is not restricted to the terminal yard alone. Operators have also discovered that changing from 'yellow' to 'white' lights on container handling equipment - and in particular on container cranes and RTGs - provide not only the crane drivers with excellent vision during operations but also leads to increases in both safety and productivity in operations as it improves the perception of distance and therefore the speed of approach to the loading and unloading area. In October, TCV Stevedoring Company, a container terminal in Valencia [Spain] belonging to Grup TCB, reinforced its commitment to its environmental policy by purchasing and implementing the first STS Super Post Panamax crane in the world, lit entirely with LED technology. This solution was developed and provided by Ingeniería de Aplicaciones Energéticas (EDAE). The new Super Post Panamax equipment is lit by LED floodlights at several power ratings up to 400W, located at various heights up to 68m, depending on specific lighting needs. It also has 10 and 22 watt LED tubes with vibration

damping technology for transit areas and technical rooms on the crane. Each High Flux LED floodlight, with various different power ratings, replaces one of the 250, 400 or 1000W High Pressure Sodium Vapour lamps of the original project, providing the lighting levels required at the terminal, improving light uniformity and achieving energy savings of 66% with respect to the original design. After pre-testing and the decision to adopt this solution for the STS crane under construction, TCV has also built it into other STS cranes, in their spreaders up to 40m, to improve the availability of container operating capacity, and to avoid the drawbacks and cost overruns caused by

premature failure of the 1000W bulbs due to vibration during movement of the vehicle carrying the container. So far TCV has installed 58 units of 400W floodlights, as well as others with lower ratings of 210W and 180W. These 58 floodlights provide annual savings in CO₂ emissions of 94 tonnes. At the beginning of December, news arrived that US-based Phoenix Products Company provided their most innovative LED fixtures to illuminate Rubber Tyre Gantry (RTG) cranes for terminals in Houston, Texas, USA as well as Lomé, Togo in Western Africa. The company supplied its ModCom 300W LED floodlights for eight RTGs now operating at the Barbours Cut Terminal at the Port of Houston. Each girder

requires only three ModCom Hi's with customised spot optics while two of the same ModCom Hi's are mounted on the trolley. The Port of Houston Authority also took advantage of Phoenix's recently introduced EcoMod LED floodlights, engineered specifically for the demands of port handling equipment. A second shipment of three RTG cranes will be delivered to the Bayport Terminal in early 2014 and will be among the first RTGs operating with EcoMod fixtures installed. Halfway around the world, Lomé Container Terminal in Lomé, Togo will receive twelve new RTG cranes illuminated with the EcoMod floodlights. On each crane, there will be twelve EcoMod 150W's installed – four on each girder and four on the trolley. In addition to the durability, reduced maintenance and repairability of Phoenix designs, Lomé Container Terminal expects reduced energy usage over the previously used 400W HID fixtures. "We are proud to partner with the Port of Houston Authority and Lomé Container Terminal to support their pursuit of operational efficiency and greater sustainability. LED technology has opened up a lot of doors for terminal facilities like these and allowed them to maximise their resources," said Ryan Hertel, Global Manager for Ports & Terminals at Phoenix. The company already installed a complete crane LED package on Ship-to-Shore cranes and automatic stacking cranes supplied by ZPMC at the Long Beach Container Terminal and at the Port of Miami they installed walkway lighting and floodlighting on several STS cranes. LED floodlighting was also installed on the automatic stacking cranes supplied by Konecranes at the Global Container Terminal and at the DPWorld London Gateway terminal [these cranes were supplied by Kalmar]. In 2013, Phoenix introduced several new fixtures designed for container and bulk handling equipment. They are all engineered for the corrosive marine environment and can easily be incorporated into any port facility. Among these are the EcoMod Series, which is a modular LED floodlight delivering up to 25,000 lumens. The EcoMod Series can be used on STS cranes, RTG cranes, ASCs, and various other container handling equipment. The LEDLT Series is an LED linear tube light that offers up to 50% energy savings when compared to 17W linear fluorescents. The LEDLT provides an efficient, instant-on option for port walkways, while the Areis Series is best suited for straddle carriers and portable maintenance lights offering a compact design and numerous optical packages. 



TCV Stevedoring Company, a container terminal in Valencia [Spain] belonging to Grup TCB, purchased and implemented the first STS Super Post Panamax crane in the world, entirely lit with LED technology



The Port of Houston Authority took advantage of Phoenix's recently introduced EcoMod LED floodlights