

Improved Lighting Technology Supports Port Sustainability

By Ryan Hertel

EACH SEAPORT – NO MATTER the location – has a unique set of geographic, political, community, operational, and financial circumstances that shape and define its environmental initiatives. Within the United States, there are numerous acts, regulations, and initiatives aimed to reduce the impact from port activities, thus increasing the ever-important focus on sustainability.



Ryan Hertel

The American Association of Port Authorities (AAPA) recently implemented a task force to examine port sustainability issues, and it encourages ports to implement the concept of sustainability as part of standard business practices for both short and long-term planning.

Seaports and Energy Consumption

Energy consumption and costs can account for up to 60 percent of a port's operating expenses – a fact not lost on terminal and port operators. To address some of these costs, ports are turning to the installation of Light Emitting Diode (LED) lighting fixtures on cranes. The specification of energy-efficient LED floodlights onto container and bulk handling equipment dramatically reduces energy consumption and moves terminal operators closer to global goals of long-term sustainability and profitability.

LEDs and Container Handling Equipment

Automating terminals also presents new opportunities to reduce maintenance expenses and environmental impacts. Automated equipment

LED lighting, such as this installation at the Port of Portland, Oregon, can reduce power consumption by up to 75 percent. All photos courtesy of Phoenix Products Company.





New optic technology can distribute a very even light over a wider target than traditional lighting options. This means that fewer lighting units are required and exterior units can be mounted lower.

lighting requirements are different from standard equipment; less lighting is needed overall, but it is still required to be available on-demand for remote control and maintenance operations. Furthermore, LED lighting is instant-on, as opposed to many traditional lighting options that require an extended warm-up time. This allows for lighting to be turned on only when necessary. There is a strong trend to outfit Automated Stacking Cranes (ASCs) with LED lighting which significantly reduces energy costs, minimizes downtime, and puts that particular terminal on the path to sustainability. Lighting is often perceived to be a fixed expense; with LED technology, however, power consumption from lighting can be reduced by up to 75 percent.

New optic technology can distribute a very even light over a wider target than traditional lighting options. This means that fewer lighting units are required and exterior units can be mounted lower. Light pollution is also reduced as the light output is focused only where it is needed. The reduction of fixture quantity using LED technology offsets the additional costs and allows for a reasonable two year payback period.

Container crane light fixtures are subject to extremely high vibration, and they have very frequent failures. The use of LED floodlights can eliminate constant maintenance in this abrasive environment and reduce the ground personnel entering the automated terminal. Just as crane manufacturers have engineered revolutionary advances, so too have LED fixture manufacturers, making these lights ideally suited for the harsh, corrosive environment in which container cranes operate.

RTG Electrification

In their drive to achieve environmental targets, terminal operators continue to transition to electric Rubber Tired Gantry cranes (E-RTG's). Most major crane manufacturers now promote E-RTG's as cranes that operate more efficiently. Surprisingly, LED lighting

LED fixtures, (top) installed on a crane with a mounting height of 125 feet with the goal of improved lighting into the vessel hold, increased light levels by nearly 55 percent. LED lighting is instant-on (bottom), which allows for lighting to be turned on only when necessary, and is bright enough to be seen even in direct sunlight.





Four 300-watt LED floodlights illuminate all the way to the bottom of a cargo hold, and replace four 1,000-watt HID floodlights.

Come Aboard With Us!

 **Kirby Offshore Marine** 

NOW HIRING QUALIFIED ENGINEERS!

KIRBY OFFSHORE MARINE IS CURRENTLY SEEKING QUALIFIED ENGINEER CANDIDATES!

QUALIFICATIONS:

- 2+ YEARS EXPERIENCE, COASTWISE PREFERRED
- VALID MMC WITH DDE 1000 HP OR GREATER ENGINEER'S LICENSE
- VALID TWIC CARD

MUST ADHERE TO COMPANY SAFETY POLICY AND PROCEDURES, ENVIRONMENTAL RULES AND GOVERNMENTAL REGULATIONS. OPERATING OUT OF WEST COAST, ALASKA, GULF OF MEXICO, AND HAWAII.

All qualified applicants please apply at:
www.kirbycorpjobs.com
EOE/AA

We offer:

• SERVICE RECOGNITION	• COMPETITIVE PAY
• EQUAL TIME ROTATIONS	• 401(k)
• MEDICAL, DENTAL, VISION	• LIFE INSURANCE
• PRESCRIPTION DRUG PLAN	• ADVANCEMENT TRAINING AVAILABLE

**As We Grow Our Fleet...
GROW YOUR CAREER!**

has not yet been included as a standard feature of these electrified RTG's. A traditional RTG with fourteen 400-watt fixtures consumes 6,150 watts of power when all fixtures are illuminated and ballast losses are included. Conversion to LED floodlights reduces power draw to only 2,100 watts – nearly one third of the energy. The design of LED floodlights onto a standard or E-RTG crane also opens the possibility of reducing illumination levels during idle time with the use of dimming technology. This lowers energy consumption further and therefore reduces the emissions of the equipment. As terminals convert to or purchase E-RTG's, upgrades to LED lighting are being considered as a means to achieve even greater energy efficiency and cost savings.

LED Fixtures in Action

Based on the premise that growth and environmental improvement are mutually attainable goals, the South Carolina Ports Authority (SCPA) has an ongoing sustainability program that includes upgrading technology and equipment. To ensure that this southeast cargo hub keeps its place as a top ten US port, the SCPA has laid out measures that will keep them on track to achieving its goals, including investing in newer, more efficient equipment.

Recently, LED fixtures were installed on a STS crane with mounting height of 125ft with the goal of improved lighting into the vessel hold. After the upgrade, light levels increased by nearly 55 percent.

Durability and Versatility

Another important advantage to LED technology is its inherent durability. LEDs are solid-state light sources that contain no moving parts, filaments, or fragile glass. This dramatically reduces the risk of damage during transportation, installation, and operation, even in the toughest environments. The durability of LED fixtures allows terminals to reduce the hazardous waste from broken lamps. A standard STS crane is lit with up to fifty 1,000-watt HID floodlights and over 150 fluorescent walkway fixtures. Due to vibration and corrosion, broken floodlight lamps often require numerous replacements each year and are discarded to the environment. Conversion to LED fixtures will eliminate this hazardous waste stream to the environment while reducing both disposal and maintenance costs.

LED technology also offers a great deal of versatility to improve operational light while limiting wasted light to the surrounding environment. A modular design of LED fixtures allows for customization for specific crane heights. The directional nature of LED light allows for improved light penetration at the bottom of the vessel hold and improved operator viewing conditions. Manufacturers on the forefront of this technology take into account the variety of lighting requirements for port equipment when designing optical packages. An LED fixture can incorporate an array of point sources that direct light precisely where it's needed with very little scattering or loss of light to the surrounding environment. Effective fixture design can translate to lower optical losses and an even distribution of light across the target area.

Ready for Prime Time

The question has been raised as to whether LEDs have adequate lumen output. As US terminals on all coasts and some of the largest European

LED lights are resistant to vibration, making them less prone to failure in industrial applications.

terminals have begun to embrace LED lighting solutions, however, concerns have been quelled. Crane operators especially appreciate the color of light and improved visibility into the vessel hold while maintenance staff values the elimination of lamp & ballast replacements. Incorporation of LED technology is a decision that moves a terminal closer to being a "green port" and provides significant maintenance savings and operational improvements. **EMM**

Ryan Hertel has a degree in mechanical engineering and is pursuing a MBA from the University of Chicago. He is the Director of Business Development at Phoenix Products Company and can be reached at +1-414-973-3349 or rhertel@phoenixproducts.com.



HARRIS ELECTRIC, INC.
Marine Electronics and Electrical



Western Towboat's Western Titan with Furuno Radar System provided and installed by Harris Electric.

Whether it's marine electric or electronics sales and service from our operations in Dutch Harbor and Seattle, or a custom engineered system for land or sea from our UL listed panel shop, **Harris Electric** is ready to serve you. **We do it all!**



Furuno 21X7BB Series Radar
AIS Compatible!

FURUNO
AUTHORIZED SALES & SERVICE
DEALER SINCE 1984



Family owned and operated since 1928!

*Fishing Vessels
Towboats
Passenger Vessels
Megayachts
& Shipyards*

HARRIS ELECTRIC, INC.

MARINE ELECTRONICS
MARINE ELECTRIC

Sales & Service
Contractors & Engineers

LOCATIONS:

Seattle 206-282-8080
Dutch Harbor 907-581-1679
Bristol Bay (Seasonal)