Industrial LEDs for Oil and Gas Drilling Applications (2/21/2017)

Oil and gas facilities present several unique challenges for industrial lighting manufacturers. This article provides an overview of the types of LED lights used on drilling sites, specific safety regulations that prevent fixture degradation, and long-term factors that affect maintenance and operational costs.

Article - February 21, 2016 By LarsonElectronics.com

(https://www.larsonelectronics.com/product/1878/explosion-proof-light-250-watt-pedestal-mount-100-cord-w-exp-plug-c1d1-c1d2)

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Types of LED Fixtures in the Oil and Gas Sector

Drilling sites in the oil and gas sector use a wide range of industrial lighting products to support busy and hazardous work operations. In the category of hazardous location fixtures, a drilling facility may use marine grade LED rig lights and high bay luminaries during extraction and processing. For inspection, workers may utilize handheld LED flashlights, drop lights and circular manhole fixtures for confined spaces, such as storage tanks. LED light towers may also be deployed on the site during nighttime operations, as well as security and perimeter lighting at the entry points and parking lots of the location. LED beacon and signal lights are regularly installed on top of buildings, instruments, rigs and derricks. Although reliable, solar-powered LED fixtures are not commonly used around oil and gas drilling sites.

Safety Regulations and Compliance

Industrial luminaries in the oil and gas sector (https://www.larsonelectronics.com/category/154/explosion-proof-lights) must support various approval ratings from recognized safety institutions in order to ensure compliance and prevent accidents in the workplace. Guidelines vary from the design of the fixture, to the method and parameters for installation. Below covers the primary ratings and certifications LEDs carry for the oil and gas industry:

• National Electric Code (NEC): Class 1 Division 1 and 2 ratings set forth by the NEC is required to prevent the combustion of flammable gases and liquid-produced vapors in the facility. Lights with C1D1/2 ratings are equipped with special mechanisms that contain ignitions and sparks inside the unit during operation, where it cannot spread or cause explosions.

• Appareils destinés à être utilisés en ATmosphères EXplosibles (ATEX): ATEX ratings dictate the application of fixtures in extreme work environments. Because oil and gas facilities are typically found in marine environments, lights with ATEX Zone 1 and 2 ratings are applicable in the hazardous work area. Fixtures approved for Zone 1 are protected with two independent safety components, and are utilized in locations where explosive substances are always present. Zone 2 lights mitigate ignitions through explosion proof enclosures, and are applicable in environments where explosions may occur.

• International or Ingress Protection (IP): Long-term exposure to water and corrosive compounds must also be considered for oil and gas facilities in marine settings. Protection against such elements are addressed through IP ratings. The two most common IP ratings for LED fixtures in the industry includes IP66 and IP67. IP66 provides protection against dust and water damage from a nozzle from any direction. While IP67 offers protection from dust and temporary immersion up to one meter.

Addressing Maintenance and Long-term Costs

Traditionally, T8 fluorescent lights were the industry standard for oil and gas drilling sites. However, this does not mean that the fixtures were reliable. Luminaries in oil and gas facilities are constantly exposed to vibration, shock and extreme temperatures, which contributes to premature failure in sensitive fluorescent units. Because of this, most lights do not reach their rated lifespan. LEDs are viable replacements for fluorescent fixtures, due to their solid state design, ability to produce light without dangerous chemicals or filaments, and compact nature. Workers on the site are not required to replace LED lights as often as traditional fixtures. In some cases, light replacement costs for outdated luminaries can reach $1,000+ when factoring in labor, scaffolding and permitting costs.

From an energy consumption perspective, LEDs offer a myriad of benefits for businesses in the oil and gas space. For example, a 175-watt LED fixture could easily replace a 400-watt HID lamp. A case study that focuses on replacing fluorescents with LEDs on Northeast Operations at Horizontal Well Drillers work sites highlights the advantages of modern lighting applications. The company, after transitioning to LEDs on derricks, saved over 60 percent in energy costs and significantly lowered CO2 emissions, which allowed the group to gain power capacity for other machines and activities on the drilling site. In most cases, the conversion to LEDs in the sector is a slow, tedious process; because some locations may have as many as 20,000 working fixtures that need to be addressed, compared to a residential home that may use an average of 40 luminaries.