

WHITE PAPER

Illuminating the Jobsite: Construction & Entertainment Lighting

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Improvements in design and ease of use of light towers has been impacted through advances in LED technology. This has resulted in better design and increased flexibility of light towers. In this paper, we will be discussing the evolution of innovation in light towers and the future of the product category.



INTRODUCTION

Traditionally diesel-powered machines have dominated the light tower market. Every light tower deployed in the field had an on-board diesel engine and alternator. These components were required to provide power to the lights and energize the outlets of the light tower. This was the standard package for many decades. Metal halide luminaires (MH), high pressure sodium (HPS), and other high intensity discharge lamps were the only type of lights available. They were high-tech products in their day, but they required a lot of power to operate. Therefore, a powerful 2- or 3-cylinder diesel engine was a design requirement for most light towers.

THE EVOLUTION OF INNOVATION

During the past decade, there has been a proliferation of new, plug-in light towers. They are often referred to as plug-ins because you can connect them with standard single-phase 120V electricity, which is prevalent in North America and many countries in the world. They do not have an onboard diesel engine and alternator and can be powered in three main ways: with another diesel light tower, generator, or with on-site shore power (the grid). Because they are easy to use, these lighting towers are now being 'plugged into' diesel light towers. These plug-in towers can be very useful and offer several advantages, which we will discuss.

The traditional MH lighting systems require high voltage and amperage to operate. They typically require 300-400% more power than LED. The LED technology allows plug-in lighting systems to be used in new and creative ways including linking them with a diesel-powered light tower.

One benefit of linking plug-in towers is that it allows machines to be used by the trades for indoor work such as concrete pours. Plug-in towers produce zero emissions and zero sound. This improves working conditions, which results in higher worker productivity. Plug-ins come in different sizes and light output intensity. Many are designed to fit through a standard door opening and can easily be set up and moved by a single person quickly, saving time and hassle.

Another benefit of plug-ins is that they can utilize the available, excess engine power of existing diesel light towers. This is beneficial for both rental companies and end users. If existing light towers have the electrical capacity available, it makes sense to use it. This can result in better fuel economy and load management of diesel light towers or generators.

Light towers in the higher kW nodes such as 8kW, 15kW, or 20kW can power even more electric plug-ins due to the higher engine and alternator output. Plug-Ins can be connected to these diesel machines in series or parallel depending on the electrical configuration and the outlet rating. Plug-ins can also be powered by mobile generators using "spider boxes" to distribute power from the generator.

FUTURE FOCUS

Diesel-powered light towers will continue to serve lighting needs, but with stricter emissions and regulatory requirements taking effect, some consumers are looking for alternatives.

Light tower design and usage is now being influenced by battery storage devices, solar technology, and hybrid solutions. These technologies create exciting opportunities for powering light towers in the future. Users will have the ability to mix and match technology to suit their lighting and power needs.

Battery storage capacity will allow the market to transition from a diesel dominated power source to full electric and hybrid energy sources. The benefits will include reduced fuel consumption, lower CO₂, reduced polluting emissions, noise reduction and elimination, and lower operation cost.

Two main types of battery storage chemistry utilized for light towers are lead acid and Li-Ion. Both have their advantages. Lead acid type batteries have been around for years and are lower cost compared to the newer Li-Ion type batteries. Li-Ion have higher energy density and therefore higher charge capacity for batteries. Battery storage devices can be integrated into light towers or they can be self-contained as either stationary or mobile units. Battery storage devices often provide both Single Phase and 3 Phase Power in a variety of different voltages.

Batteries and other alternative fuels have the potential to open a new era in light tower design. With the lower energy consumption made possible by LED lighting, today's battery storage devices have become practical energy sources for light towers.

CONCLUSION

There are many emerging technologies that are influencing light tower design. LED technology adoption has made much of this possible. These technologies will enable greater flexibility for both the end user and equipment owner managing the light tower fleet. Much of the technology adoption will be determined by regulations, applications, regional needs, and user preferences.

Generac has the ability to assist with special projects and applications. Our sales support staff would be happy to help.

BIOGRAPHY

Vince Hunt has served as Senior Product Manager for Generac since October 2020. Vince held various roles including product management and sales with Wacker Neuson from 2004 until he joined Generac. He started his career in 2000 with Metso Minerals as an applications and systems engineer. Vince holds a B.S. degree in Mining Engineering from Virginia Tech