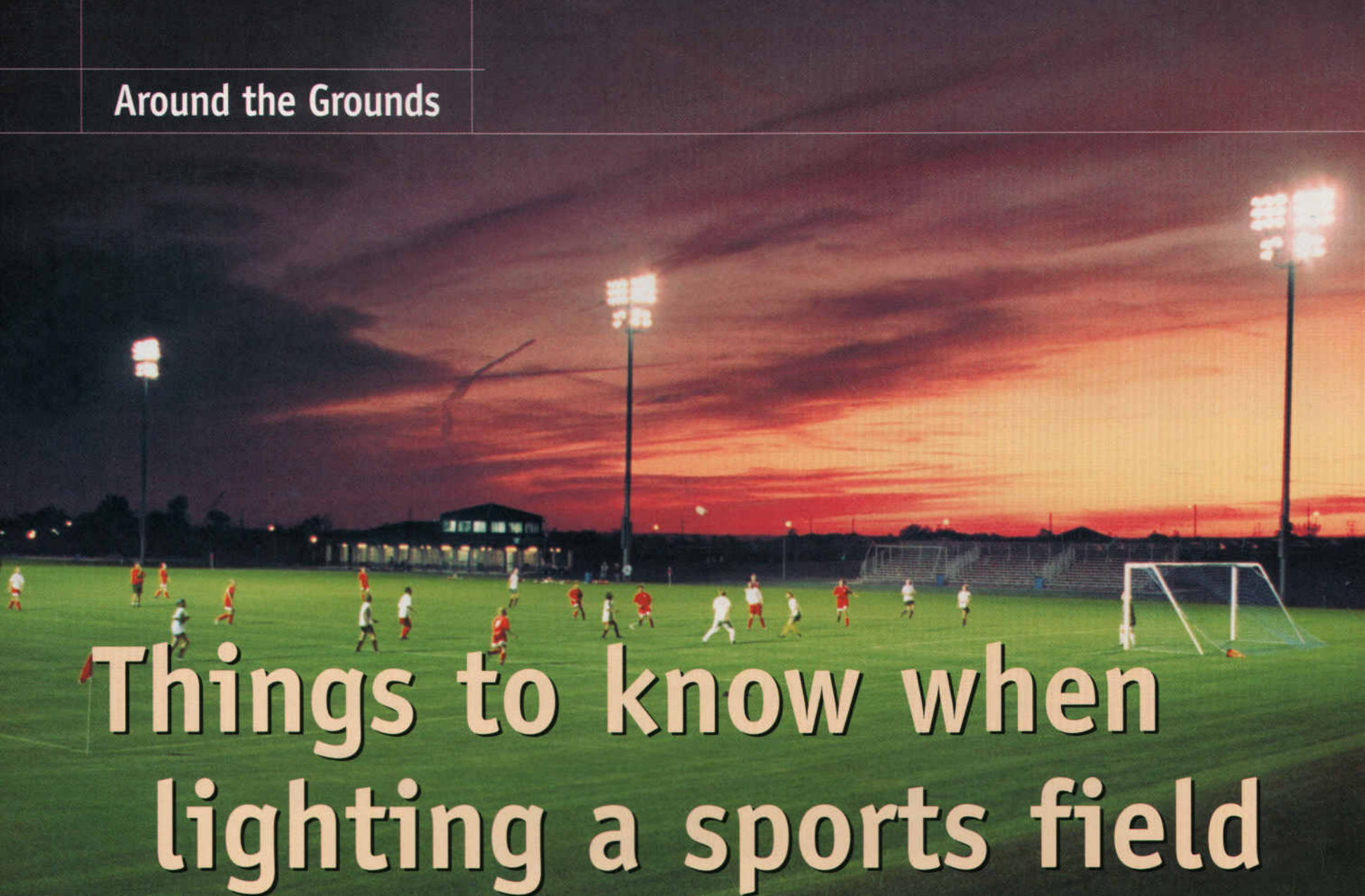

Things to know when lighting a sports field

Photos courtesy of Musco Lighting

BY JEFF ROGERS

Lighting an outdoor sports facility is an exciting endeavor, but you need to ask many questions to ensure the success of your project. Will fixtures be energy efficient? Can burdensome maintenance costs be avoided? Will the lights meet safety standards?

When planning a sports-lighting project, three elements of design should be understood: lighting, structural, and electrical.

Sports lighting should provide a specified quantity and quality of light on the playing surface. The required quantity (level) of light is determined by the players' skill level, the speed and size of the ball, the number of spectators, and any television requirements.

Manufacturers should provide calculations that state both initial and maintained light levels, usually stated in foot-candles. Initial light levels concern the amount of light produced when the system is new. Maintained light levels concern the amount of light to be maintained on the field throughout the life of the system. When comparing manufacturers' proposals, be sure all are designed to the same criteria.

Specifications should also address uniformity, or evenness, of light on the field. Poor uniformity is a safety hazard for players, and unpleasant for spectators. Just like viewing movement under a strobe light, as the ball travels between light and dark areas, it appears to change speeds, making it difficult to gauge with the eye. To ensure smoothness, ideal lighting design provides no variation in light greater than one percent per foot. Uniformity ratios should be included in each manufacturer's proposal.

Manufacturers use computer-generated models called point-by-points. These models are used to evaluate the quantity and quality of proposed lighting levels. It is extremely important that each manufacturer determine how many fixtures are needed to achieve desired light levels, but it would be a mistake for a buyer to base a decision on a designated number of fixtures. That's comparable to buying a car based on the size of its gas tank rather than its fuel efficiency. All 1,500-watt metal halide lamps produce the same amount of light.

Structure

The two structural components of a lighting system are luminaire assemblies and poles. Each component affects the initial cost, life-cycle cost, safety and quality of a project. The luminaire assembly consists of a lamp, reflector, ballast mounting, cross-arm and mounting hardware. If the luminaire assembly is not sufficient to support fixtures that can weigh 60 pounds, the original aiming pattern of the fixtures may be altered, which will result in a loss of proper quantity and uniformity of light. When aiming patterns are disturbed, the only way to restore light levels is to re-aim fixtures, a costly and tedious process.

A manufacturer that pre-aims fixtures in the factory can eliminate the initial aiming and re-aiming problems that often accompany installation. Technology allows mounting hardware to lock into place at a pre-determined aiming position.

When it comes to poles, a consultant or lighting manufacturer can help determine the correct strength and burial requirements, based on wind

and soil conditions, and the design of the luminaire assembly. In some areas, pole foundation design and installation are subject to governmental review.

Three types of poles are commonly used in sports lighting installations, wood, concrete, and steel. Wood poles, usually the least expensive to purchase and install, have high maintenance requirements. Exposure to rain and wind causes wood to warp and twist; this can create serious fixture alignment problems. A 10-degree misalignment can cause a loss of as much as two-thirds of the light on the field. Concrete poles are often less expensive than conventional steel poles and can be direct buried. However, concrete poles are heavy and expensive to set.

Conventional base-plate steel poles require construction of expensive concrete foundations with anchor bolts. An alternative steel pole design offers a galvanized steel pole shaft that slip-fits over a concrete base which has been set directly into the ground and backfilled with concrete.

A sports lighting electrical system should be safe and simple. Although the electrical requirements for athletic fields are specialized, they are far less complex than most commercial and industrial applications. Electrical systems that comply with the National Electric Code, as well as state and local codes, coupled with luminaire assemblies that have Underwriters Laboratory approval, ensure that an installation will operate safely with minimal electrical maintenance.

Grounding at the service center and at each pole is needed to ensure the safety of anyone who comes in contact with the pole or electrical equipment. Grounding for lightning protection should be designed and installed according to National Fire Protection Association (NFPA) Code 780. Safety disconnects on each pole provide additional protection for service crews. Individual fusing of each fixture avoids gang failure of the lights and eliminates costly emergency repairs.

By keeping several additional factors in mind, the likelihood that a lighting project will please administration as well as players and spectators is enhanced. First, compare the warranties offered by different manufacturers. How long is each, and what items are covered? Multi-year part and labor warranties reveal confidence in the product. Next, be sure to develop clear-cut specifications concerning how the project should be built, and its expected results. Definite standards prevent unacceptable substitutions, and bids that are overpriced to cover the uncertainties of an under-defined project. **ST**

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