

At the new Kenyon College Athletic Center, ceramic metal halide teams with daylight to create multiple levels of illumination

LEVELING THE PLAYING FIELD

One day it's an NCAA competition; the next it's intramural sports; and later that night it's a simple pick-up game between roommates. Such is life for a new athletic center at Kenyon College—a small liberal arts college located in Gambier, OH (roughly 90 minutes north-east of Columbus), with a student population of approximately 1600. The school fields teams in NCAA Division III intercollegiate athletics, winning over 20 consecutive national championships in men's and women's swimming.

The new Kenyon Athletic Center (KAC) will provide indoor venues and training facilities for the intercollegiate athletic teams, the intra-

mural teams and for general fitness and recreation. The KAC houses indoor track and field, an intramural multi-use court (for basketball and floor hockey), a 2000-seat varsity basketball and volleyball arena, tennis, swimming and locker rooms on the first floor; racquetball and squash on the lower level; and training facilities (weight room), dance, aerobics and theater on the second level. The footprint of the building is over 150,000 sq ft.

The college's goal was to create a state-of-the-art athletic center that was also energy-efficient. Architect Gund Partnership's mission was to tie together the multiple venues and their varied requirements architecturally, and design a facility that in-

corporated a maximum amount of daylight while minimizing glare.

The building is nominally a single story, 500 ft long by 300 ft wide, with a barrel-vaulted roof with a ceiling height arcing from about 25 ft at the east and west walls to about 50 ft above the center of the facility. The vaulted ceiling and exposed structural elements unify the venues architecturally. Where required, glass partitions separate one venue from another (such as the natatorium from the remaining venues), but still allow visibility from one end of the building to the other.

MULTI-USE FACILITY

Grenald Waldron Associates' lighting concept was born from

the following questions: How will students and community members use the facility? How do we support the architect's vision? How can we incorporate daylight into the concept to provide necessary task light, as well as an appropriate quality of light? What do we want to see? The answers to these questions resulted in a lighting design that relies on the creative use of glass walls, skylights and daylight-responsive electric lighting.

First, the lighting design team understood that students would use each of the venues in numerous ways: as individuals, for pick-up games, intramural games and in varsity competition. They would use the facility from 6:00 am until midnight

in each of these different fashions. The lighting needed to be designed with the flexibility to accommodate this matrix of options. GWA's design intent was to provide a base level of illumination that would be on continuously throughout all of the venues. This base level of illumination would be the minimum required for individuals or small groups (such as pick-up games) when using the facility. For higher level competition (intramurals or varsity level), there would be a supplemental system that would raise the light levels to meet those requirements (**Table 1**).

Holophane 400-W ceramic metal halide high-bay fixtures spaced uniformly throughout the facility (on a 18 ft x 26 ft grid pattern)

provide the base level of illumination. This "uniform" grid of fixtures throughout the facility also helps support the architectural vision of tying together all venues. The high-bay fixtures are located between each of the main trusses and provide a continuous rhythm of fixtures and structure throughout. The fixture selected also provides nominally 15 percent upright, softly lighting the ceiling planes between the trusses and visually reinforcing the height and volume of the venues. "Uniform" is in quotations because the actual pattern varies slightly between venues to account for the slight variations in the low end of light requirements. Fixtures over the track and field area, for ex-

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Photos: David Lamb Photography

VENUE	IES CLASS	BASE LEVEL	HIGH LEVEL
Multi-use court	Class III	50 footcandles	50 footcandles
Track	Class III	20 footcandles	50 footcandles
Field	Class III	30 footcandles	50 footcandles
Basketball Arena	Class II	50 footcandles	80 footcandles
Tennis	Class III	75 footcandles	75 footcandles
Swimming	Class III	50 footcandles	100 footcandles

Table 1: (Note Kenyon College competes at NCAA division III and with the seating the venues either fall into IESNA classification III or II.)

ample, are 18 ft 4 in. x 26 ft on center, as compared to the multi-use court where the fixtures are located on a 16 ft x 26 ft spacing.

The supplemental light for each venue is unique to its needs and desired light levels. In the basketball arena, for example, special arena-type fixtures with narrow controlled beams are located along the long side of the courts; in the tennis venue, supplemental indirect fixtures create a glare-free playing environment; and in the natatorium, indirect fixtures along the long sides of the pool were specified for maintenance purposes.

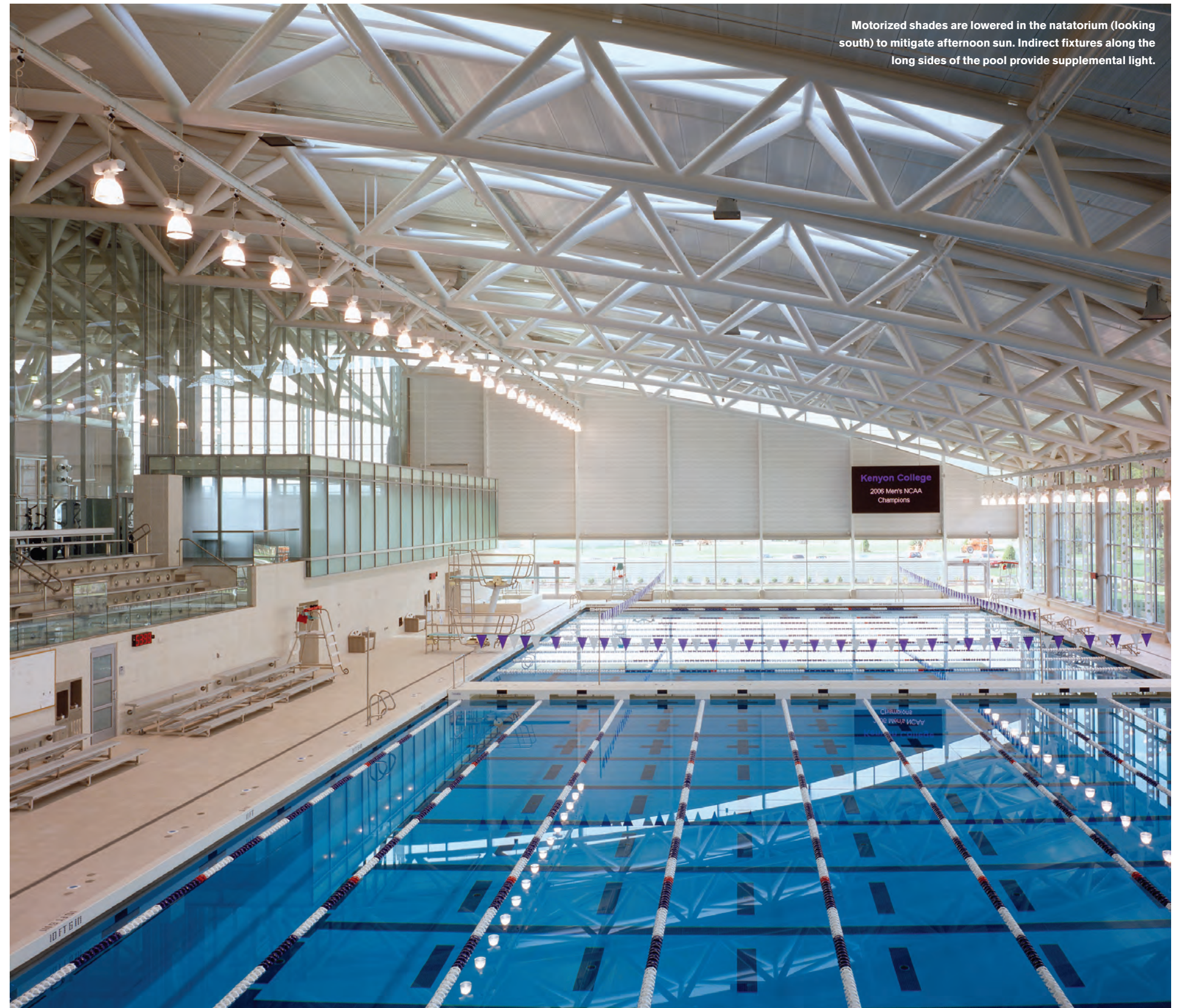
DAYLIGHT JOINS IN

Daylight is used as part of the base level lighting where possible (but not in areas where direct sunlight is undesirable, such as the tennis venue) and as supplemental lighting. The Holophane fixtures worked well with daylight. One reason they were specified was for the dimming capability of the 400-W

ceramic metal halide lamp. Holophane’s proprietary electronic ballast allows the lamp to be dimmed to 25 percent of full light output in response to available daylight. This reduces energy consumption, extends lamp life and increases the efficacy of the lighting system and overall visual comfort.

Meanwhile, daylighting designer Mark Loeffler and the Retec Group collaborated with GWA and Gund Partnership team to develop architecturally integrated skylights, windows and interior shading to provide optimal daylight while controlling direct solar glare.

Kenyon College has a predominately cloudy to partly cloudy sky condition during the school year. During the summer, it is partly cloudy to sunny. The recommended daylighting system has been designed to shield direct sun and to allow reflected sky brightness to provide generous interior illumination during daytime hours. The system will typically provide approximately



Motorized shades are lowered in the natatorium (looking south) to mitigate afternoon sun. Indirect fixtures along the long sides of the pool provide supplemental light.

PROJECT



25 to 100 footcandles during daytime operating hours March through October, minimizing the need for electric lighting. On cloudy days during November through February, some additional electric lighting will be needed to bring average illumination levels up to this same range.

The daylighting system components include:

- Northward-sloped skylights above most areas to provide full shading from direct sun, except for brief periods during extreme summer mid-day altitude angles and summer evening azimuth angles when the sun sets to the north of true west. These utilize a clear thermal glazing for a view of the sky.
- Full skylights above the lobby/intramural court area to provide higher light levels and dynamic sun patterns to enhance the visual impact and connection to the outside. These skylights utilize a clear thermal glazing with a dot ceramic frit to partially screen, but not obscure the sun patterns.
- Motorized mesh shades for the

swimming pool, track and exterior offices to screen out direct sun but allow view to the outside.

- South window and clerestory glazing with a proprietary internal vertical louver system to shade direct afternoon sun but still allow view to the outside.

CONTROL INTENT

A control system was specified that allows the owner to take full advantage of the dimmable metal halide and daylight combination. The system includes photo sensors for daylight harvesting, motion detectors for occupancy detection, time clock and software for automated and scheduling functions, and local override so that coaches and facilities managers can add the supplemental light when desired.

Ideally, once the time program is set, the building runs on its own and the only programming required of the facility manager would be to add the competition (supplemental) lighting into the time clock functions once the practice and/or game schedules were set. The local override switches at

each venue allow the supplemental lighting to be turned on for unprogrammed events.

The daylighting scheme also reinforces the feeling of being outdoors with its abundant views to the outside. Because Gund Partnership's design included so much glazing and openness, the daylight penetrates deep into the facility providing much of the required light for recreational uses. Daylight sensors mounted on the ceiling measure the light levels, and the control system either raises or lowers the electric light to meet the minimum levels programmed. The fixtures are circuited and controlled in zones such that those groups closer to the window may be dimmed more than the fixtures in the center of the venue, thereby providing uniform lighting across the playing surface.

Motion sensors reduce energy consumption during periods of inactivity. The metal halide dimming system allows the fixtures to be dimmed to their lowest level, but remain on such that the fixtures can ramp up to full brightness almost immediately when activated by the motion detectors.

Athletes at Kenyon College might want to take a bit more time warming up, now that they have a first-class recreation center in which to exercise. 🏆



About the Designer: Mark W. Harris, IALD, LC, is principal/director of design and production at Grenald Waldron Associates, Philadelphia. His lighting designs cover the gamut of architectural projects and include corporate headquarters, master plan/roadway lighting, resorts, educational and healthcare.