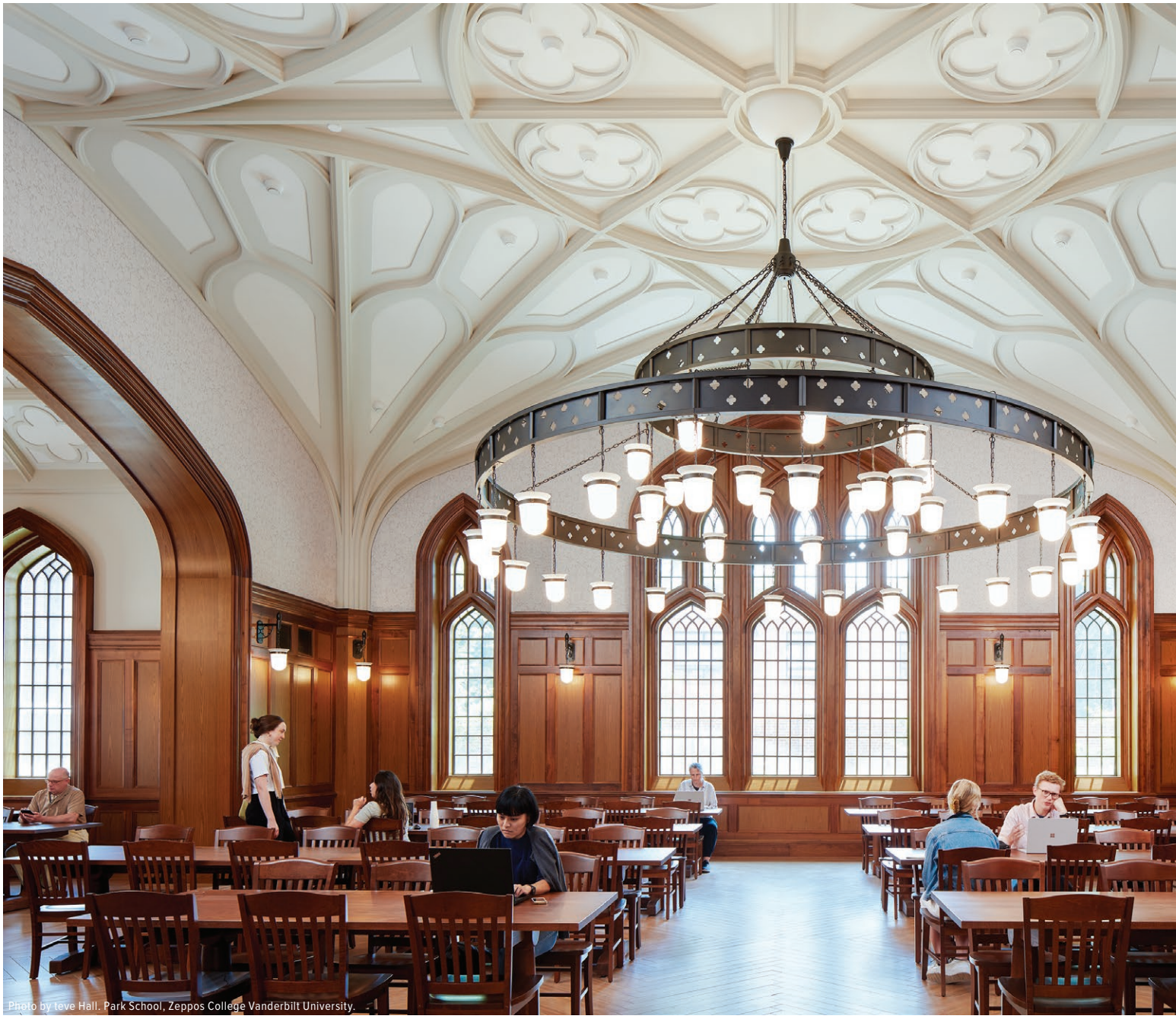


Photo by teve Hall. Park School, Zeppos College Vanderbilt University.

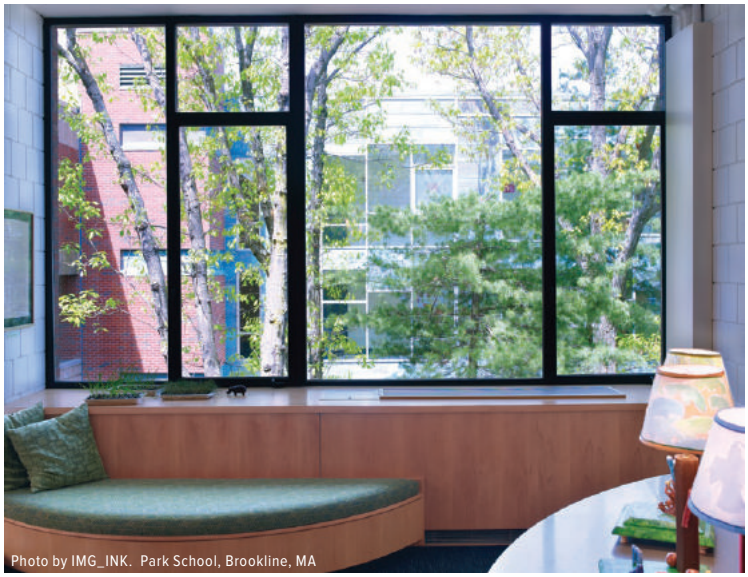
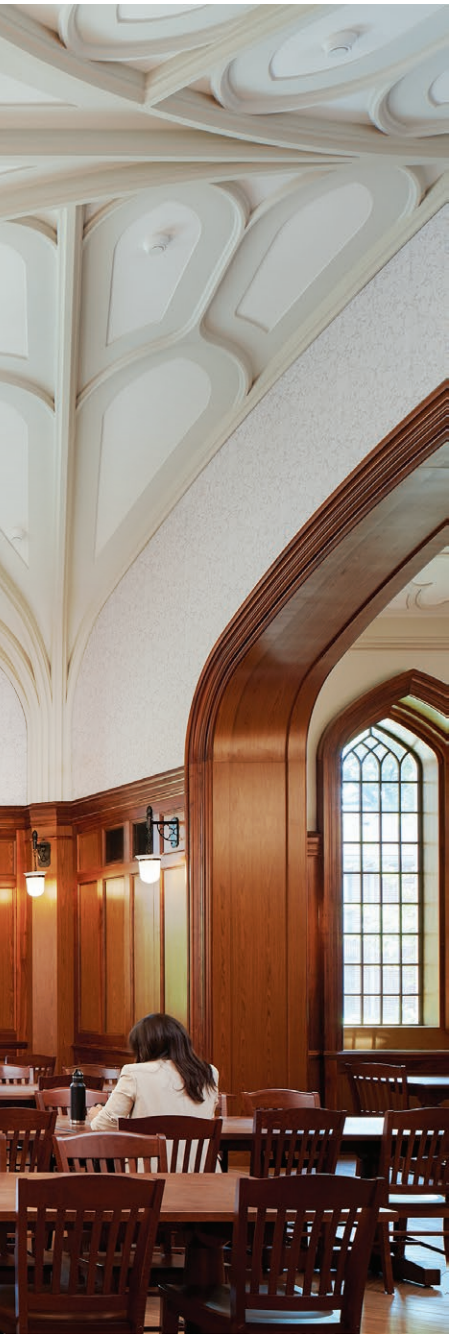


Photo by IMG_INK. Park School, Brookline, MA

Photo by IMG_INK. Taft School, Watertown, CT



Green Building

WITH STEEL WINDOWS AND DOORS

BY MATTHEW FULLER

Steel sets the standard for performance excellence. Steel windows and doors offer sustainable solutions to create healthy indoor educational environments while preserving our planet and natural resources. Steel windows and doors grace innumerable schools and universities across the United States. Their strength, longevity, and versatility make these products ideal for public and high-traffic areas.

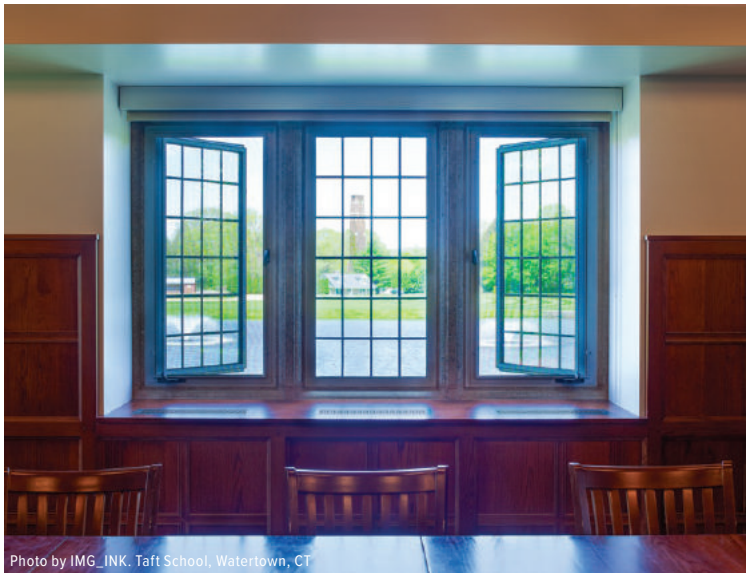


Photo by IMG_INK. Taft School, Watertown, CT

Energy Efficiency and Thermal Performance

Steel has better natural insulating capability compared to other metals, conducting heat and cold at one-fifth the rate of aluminum. Aluminum products require a thermal break just to match the natural thermal performance of steel. The minimal frame dimensions of steel windows and doors further lesson thermal transfer by reducing surface exposure. Architects may still specify a thermal break despite the natural thermal properties of steel. It is important to understand that adding a typical thermal break into any metal frame results in dramatically weakening the material. This is because a traditional thermal break splits the frame into interior and exterior pieces and then reconnects them with a weaker insulating material. An advanced alternative solution called Thermal Evolution™ technology is available from Hope's Windows, Inc. that ensures that the solid steel profiles remain solid for the full depth of the frame, thus maintaining the structural integrity of the steel. These properties and features, together with modern advancements in glazing, result in exceptional thermal performance and condensation resistance for steel windows and doors.

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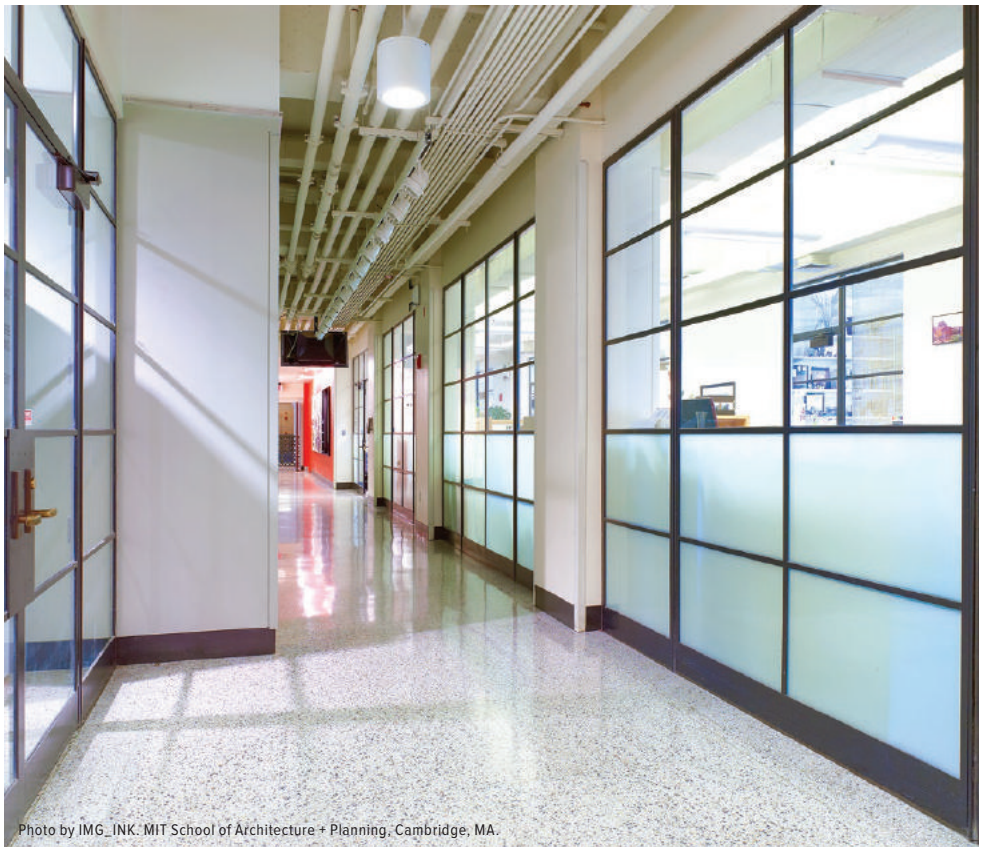

Photo by IMG_INK. MIT School of Architecture + Planning, Cambridge, MA.

Natural Light Improves Student Academic Performance

In 2020, the Collaborative for High Performance Schools® (CHPS) adopted its updated U.S. CHPS 2.0 Criteria. These criteria of building design and construction strategies have been proven to yield high-performance schools which improve student learning and wellness outcomes. Both new construction and major modernization projects can receive CHPS-Verified recognition. The criteria are based on industry best practices, with proven techniques that reduce operating costs, achieve higher student performance, increase daily attendance, improve water and resource efficiency, and minimize the environmental impact of school facilities.

According to the CHPS criteria, "daylighting is fundamentally important to high performance design and should be the primary source of light in classrooms. Daylighting has a number of advantages, including improved occupant productivity, improved connection to the outdoors, improved health, energy savings, and quality of light."

One of the ten concepts of the WELL Building Standard®—a science-based roadmap for creating and certifying spaces that advance human health and well-being—is light. The standards promote enhanced daylight access to minimize disruption to the body's circadian rhythm which, in turn, improves energy, mood, alertness, and cognition. Integrating natural light into indoor environments also provides individuals with a connection to outdoor spaces through window views.

The biological rhythm of circadian clock genes is stimulated and regulated by the wavelengths of light received by our eyes. Light at short wavelengths increases alertness by suppressing melatonin production. Unfortunately, most electric lighting offers much less light at this wavelength than daylight. Using the full spectrum of natural daylight to illuminate schools thus helps students' bodies regulate melatonin and reinforce circadian wellness. Numerous studies have shown that classrooms optimized with natural daylight improve students' academic performance.

Additionally, using natural interior daylight as a primary light source can significantly reduce energy consumption and help reduce global carbon emissions. Connecting building occupants with the outdoors, reinforcing circadian rhythms, and reducing the use of electric lighting by introducing daylight into interior spaces are integral components to earning credits toward LEED® certification from the U.S. Green Building Council.

Steel windows are an ideal choice for school planners looking to design lighting that supports students' alertness, mood, and cognitive function. The inherent strength of steel allows for substantially larger windows which allow more natural daylight to fill a room. Solid, hot-rolled steel also offers extremely narrow frame width to maximize glass area within the opening, as well as a much shallower frame depth, letting occupants see more when viewing at an angle than when viewing through windows with a deeper frame depth.

Interior steel doors and window walls can also be used to create common use and workspaces, such as computer labs and fitness rooms, allowing natural light to flow deeper into interior spaces. Interior glass divisions foster a larger and more open feeling by separating spaces without blocking natural light. They also serve to create unique focal points and can help to highlight collections, such as art galleries and library collections.

Ventilation

According to the U.S. Environmental Protection Agency, adequate outdoor air ventilation is shown to improve students' ability to perform, raise test scores, and reduce airborne transmission of infection. EPA studies of exposure to air pollutants indicate that indoor levels of pollutants may be two to five times higher than outdoor levels. Good indoor air quality management includes the introduction and distribution of outdoor air.

For schools, major health risk factors include microbial concentrations in the air as well as dampness and mold in the building at large. Outdoor air ventilation is important for the maintenance of acceptable temperature and relative humidity. Adequate outdoor air alleviates dampness and mold conditions which can, in turn, relieve asthma symptoms and absenteeism.

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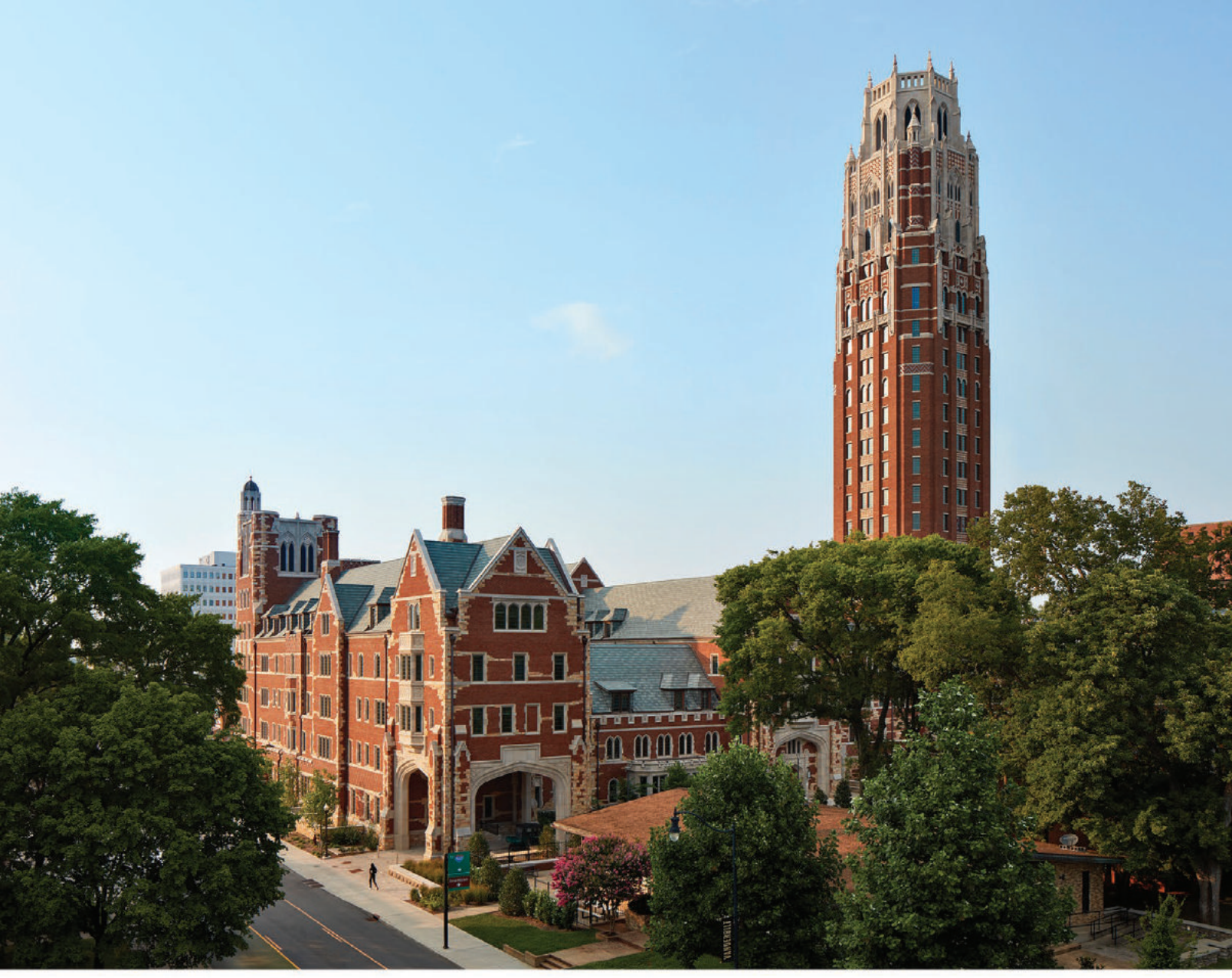

HOPE'S®

For more than a century, Hope's has handcrafted the world's finest steel and bronze windows and doors, and we continue to refine the art that makes them the most sought-after and longest lasting windows and doors available. Hope's exclusive hot-rolled steel and solid bronze profiles replicate the traditional aesthetic of historic buildings while providing modern performance and efficiency. Hope's windows and doors are built to last a lifetime and beyond – sustaining their beauty and performance for generations. **HopesWindows.com**

HOPE'S WINDOWS, INC. — EST. 1912 — JAMESTOWN, NEW YORK

PRODUCTS SHOWN:
University Series™ steel fire-reated and non-rated windows and doors

ARCHITECT: David M. Schwarz Architects, Inc.
PHOTOGRAPHER: Steve Hall, © Hall + Merrick

Using natural interior daylight as a primary light source can significantly reduce energy consumption and help reduce global carbon emissions. Connecting building occupants with the outdoors, reinforcing circadian rhythms, and reducing the use of electric lighting by introducing daylight into interior spaces are integral components to earning credits toward LEED® certification from the U.S. Green Building Council.

The WELL Building Standard® also advocates for using operable windows to increase the supply of high-quality outdoor air and promote a connection to the outdoor environment by encouraging building occupants to open windows when outdoor air quality is acceptable.

A significant lesson learned during the Covid-19 pandemic is that Air Changes per Hour (ACH) are extremely important to the health and wellbeing of building occupants. In a 30x30 foot classroom occupied by twenty-five students, the air should be replaced at least every fifteen minutes, which equals an ACH of 4. Simply opening windows is an easy way to improve ventilation. Researchers at Harvard University have found that opening the windows just six inches can result in an ACH of 5 or more in a room.

The versatility of steel offers a variety of window operating types such as casement, sliding, and awning windows, as well as human safety features well-suited to classroom applications. Despite the stiff ruggedness often associated with steel, steel windows offer a surprisingly easy interaction, with smooth, graceful movement at the touch of a finger. Moreover, steel windows and doors will not rack or distort with age, and hardware will not loosen over time.

Environmental Responsibility/ Green Construction

Steel windows and doors are energy efficient and impervious to air and water infiltration, crafted from recycled steel, and finished with environmentally-friendly coatings. These strong and extremely durable windows and doors achieve unparalleled life cycle value and assist building owners and architects seeking LEED® certification from the U.S. Green Building Council.

Additionally, steel is the most recycled material in the United States. Each year, the

steel industry saves enough energy through recycling to power eighteen million homes—one-fifth of the nation's households. Campus decision makers can conserve natural resources by choosing high-quality steel windows and doors made with solid, hot-rolled frame profiles that are 100% recycled steel.

The strength and durability of solid, hot-rolled steel windows and doors consistently outperform wood, aluminum, and vinyl products. With their proven ability to last for a century or longer, steel windows and doors provide an unparalleled life cycle value and contribution to campus sustainability.

Steel windows and doors also have eco-friendly coatings. The most advanced pretreatment and finishing processes available for steel are lead-free, contain zero hazardous air pollutants (HAPs), and have ultra-low volatile organic compounds (VOC), resulting in an earth-friendly product with unlimited color options and long-term protection against corrosion and abrasion. Steel finishing processes exceed the most rigorous testing standards and are carefully scrutinized to ensure products will perform, both aesthetically and functionally, for decades to come and with extremely low maintenance requirements.

Independent Testing and Certification

Hope's custom crafted windows and doors set the standard for performance excellence that no other steel manufacturer has equaled. Hope's provides peace of mind, with products that are tested and proven to deliver protection solution for inclement weather, harsh and extreme environments, and even dangerous situations caused by people or natural forces.

Hope's prides itself on its long-standing commitment to testing and certification, subjecting its products to more third-party testing and certifications than any other steel window and door manufacturer. The process of exceeding both rigorous, independent testing and customer expectations begins with the engineering and design of Hope's products—expertise derived from more than one hundred years of experience.

Hope's provides custom solutions to satisfy local, state, and national building code requirements—including Air, Water, Structural, Thermal, Hurricane/Impact Resistance, Fire Resistance, Forced Entry Security, and ADA and egress compliance—for any building project.

ABOUT THE AUTHOR: Matthew Fuller is the National Sales Manager and LEED Green Associate at Hope's Windows, Inc., the largest domestic manufacturer of luxury steel and bronze windows and doors. Matt has worked in the custom steel window and door industry for fifteen years.