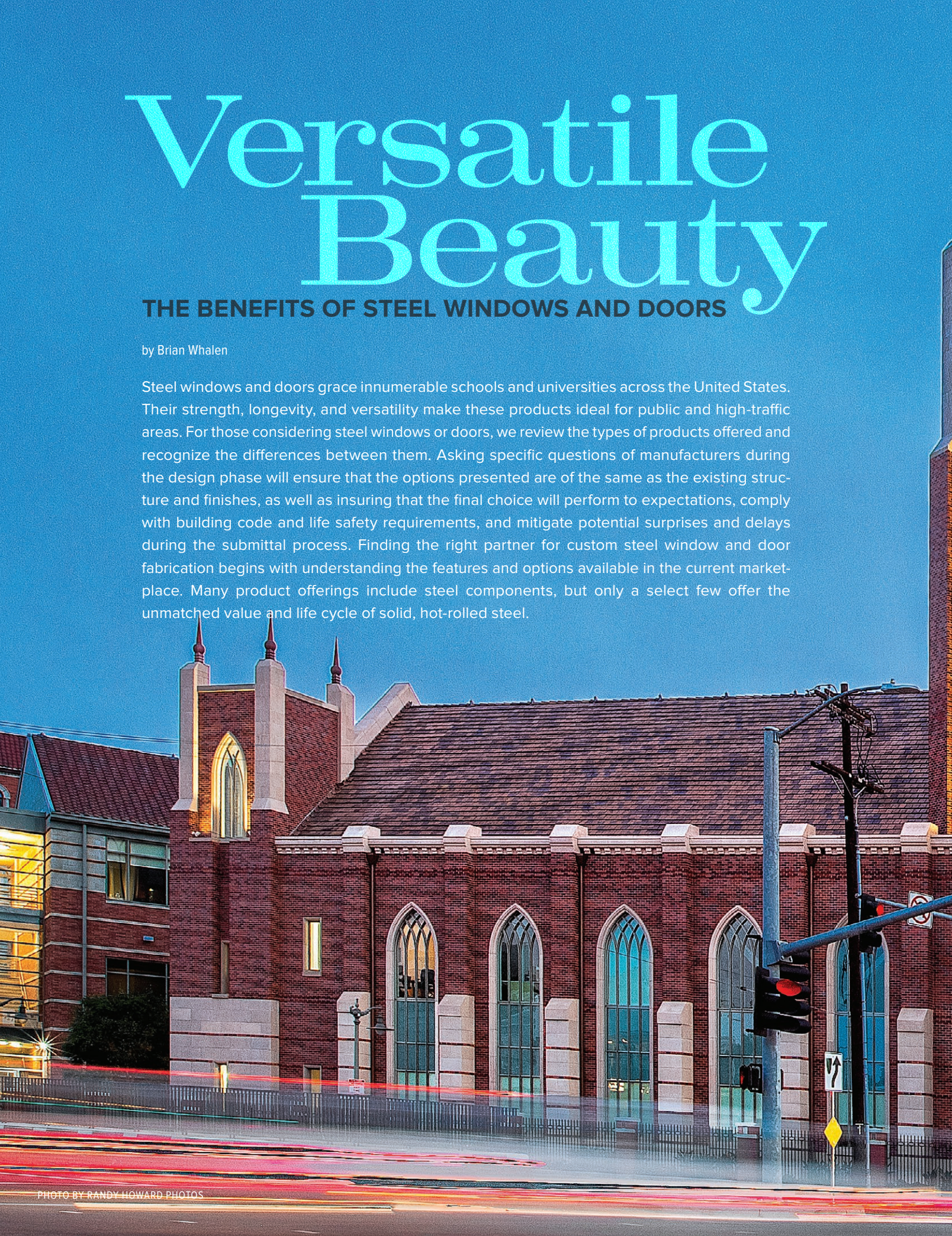
Versatile Beauty

THE BENEFITS OF STEEL WINDOWS AND DOORS

by Brian Whalen

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. For those considering steel windows or doors, we review the types of products offered and recognize the differences between them. Asking specific questions of manufacturers during the design phase will ensure that the options presented are of the same as the existing structure and finishes, as well as insuring that the final choice will perform to expectations, comply with building code and life safety requirements, and mitigate potential surprises and delays during the submittal process. Finding the right partner for custom steel window and door fabrication begins with understanding the features and options available in the current marketplace. Many product offerings include steel components, but only a select few offer the unmatched value and life cycle of solid, hot-rolled steel.



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Figueroa St
JILL AND FRANK
FERTITTA HALL
USC University of
Southern California

Strength

Solid, hot-rolled steel is stronger than any other window and door material—strength that allows for immense glass lites in virtually unlimited scale and shape and with substantially thinner frames. Moreover, hardware fastened to steel windows and doors will not loosen or pull out over time, and ventilators will not rack or distort with age, even with heavy use.

Look for a manufacturer that offers custom, purpose-made steel profiles designed for strength and structural loading, and compare the type of steel being offered—solid, hot-rolled steel sections, light-gauge cold-rolled steel (i.e. hollow), or a hybrid.

Versatility

Steel windows are widely specified for use in traditional and historic structures as well as modern and contemporary settings. Steel windows and doors can meet virtually any design criteria—from individual residence hall windows designed to achieve daylighting and ventilation, to spectacular openings on the grandest scale.

Steel windows and doors are also increasingly being used for interior applications to facilitate the flow of natural light, create open and collaborative spaces, and to showcase gallery art and library collections.

Look for a manufacturer that fully understands the capabilities of their product offerings through routine product testing. Additionally, the vendor should be open to assisting with code compliance and able to produce calculations during the conceptual design and estimating stages. The ability to achieve design intent with code compliance is critical.

Historic Replacement and Replication

Original steel windows are often replaced with replica units in historic restoration and adaptive reuse projects. These historic replacement windows benefit from more than a century of advancements in technology and fabrication techniques such as protective steel pretreatments and finishing, improved weatherstripping, modern glazing beads, and the ability to incorporate high-performance glass.

Historically accurate steel frame and muntin (supporting strip) profiles are also important for new construction where campus expansion projects require matching an established historic aesthetic.

Look for a manufacturer that offers specially designed hot-rolled steel profiles and glazing beads that replicate the visual elements of early steel windows, such as putty glazing. Experience in partnering with historic preservation committees and an in-depth knowledge of the U.S. National Park Service standards and guidelines for historic preservation is also beneficial.

Narrow Sightlines

No quality is more readily associated with steel windows and doors than narrow sightlines. When choosing windows and doors, designers must consider the entire field of vision by evaluating both the width and depth of the frame. "Sightline" is the term often used to describe only the face width of the perimeter frame. Naturally, thinner widths provide less obstructed views when viewing a window straight on.

However, windows are most often viewed at an angle, which is why a true sightline comparison must also include the depth of the frame. Windows with a shallower depth let people see more when looking through the window from an angle. Alternative systems from wood, aluminum, or cold-rolled steel have attempted to mimic

these delicate face dimensions, but must add depth to match the natural strength of solid, hot-rolled steel.

Look for a manufacturer that will provide product details customized to your specific design criteria. Details should include both the width and depth dimensions for the units as well as any mullion, stack and other structural elements required to compare effectively.

Energy Efficiency

Steel has better natural insulating capability than 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 decrease thermal transfer by reducing surface exposure.

Architects may still specify a thermal break despite the natural thermal properties of steel. Adding a thermal break into any metal frame results in dramatically weakening the material because a traditional thermal break splits the frame into interior and exterior pieces and then reconnects them with a weaker insulating material. Hope's Windows, Inc. offers Thermal Evolution™ technology, an advanced alternative solution 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.

Look for a manufacturer that offers NFRC tested, listed, and certified products to compare U-factor (measure of heat loss) and condensation resistance (CR) ratings. Be sure to confirm that all thermal products offered are also third-party tested and proven to meet air, water, structural, and forced entry criteria.

Product Finishes

Finishing processes for steel windows and doors vary dramatically and must be carefully scrutinized to ensure products will perform, both aesthetically and functionally, for years to come while remaining virtually maintenance free.

Modern steel finishing systems offer pretreatment processes (i.e. hot-dip galvanizing), primers, and powder coat or liquid paint finish coat applications. These high performance coatings have been developed to ensure that windows and doors remain pristine and free from corrosion decade after decade, even in the harshest environments.

Look for a manufacturer that provides a comprehensive product finishing process that is third-party tested in a variety of environments, and make sure the manufacturer backs their finishes with a warranty.

Life Safety

Steel windows and doors can be designed to protect building occupants in the event of dangerous events caused by man or Mother Nature. Steel window and door systems provide life safety protection for special applications such as hurricane and impact testing and certification; fire testing, certification and labeling; bullet resistance; and blast protection. Steel windows and doors also satisfy ADA and egress requirements.

Look for a manufacturer that offers products that meet your project requirements and that will provide up-to-date testing and certification data.

Building Code Compliance

Windows and doors are a significant part of the exterior building envelope. All products should be third-party tested and certified for minimum performance criteria required within the *International Building Code (IBC)* and other applicable regional and local building codes.

Window and door designs must also be properly evaluated to ensure that the preferred visual characteristics depicted on architectural drawings are truly achievable. This evaluation must be verified by the architect/engineer and by the manufacturer.

Most steel systems are custom fabricated and it is imperative the offerings presented during the bidding stage surpass design intent alone. Confirming code compliance with design intent is a routinely under-valued aspect that could bring a project to a standstill if overlooked.

Look for a manufacturer that will review the architect's proposed designs and verify compliance with structural and wind load requirements as well as applicable building codes. Confirm the manufacturer's product test reports have been prepared by independent testing laboratories in accordance with industry standards organizations such as:

ASTM International—building material and product standards for air infiltration, water penetration, structural integrity, forced entry resistance, paint finish performance, and hurricane-impact resistance among others

Testing Application Standard (TAS)—Florida Building Code test protocols, requirements and standards for hurricane-impact resistance

National Fenestration Rating Council (NFRC)—standards for determining thermal performance through thermal heat transfer (U-factor), solar heat gain, and visible transmittance of light

American Architectural Manufacturer's Association (AAMA)—performance standards for fenestration (window and door) systems including air/water leakage, structural strength, thermal performance, and condensation resistance

Underwriters Laboratories (UL)—testing and certification standards for public safety including fire and bullet resistance

Steel Window Institute

Additional information to further educate architectural product specifiers is available from the Steel Window Institute (SWI). The Steel Window Institute (SWI) provides the public with general and technical information covering the industry's products. Its member companies comply with voluntary specifications for steel windows and doors, establishing a standard of excellence by including rigorous testing to meet air, water and structural requirements and providing a reference to the quality and standards which should be applied to materials and products.

ABOUT THE AUTHOR: Brian Whalen is the Vice President of Sales at Hope's Windows, Inc., the largest domestic manufacturer of luxury steel and bronze windows and doors. Brian has worked in the custom steel window and door industry for 28 years.