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A REPORT ADVOCATING
FOR SOCIALLY RESPONSIBLE
SUSTAINABLE DEVELOPMENT

ABOVE-CODE STEEL FRAME WINDOWS SPECIFIED FOR USC FERTITTA HALL

ENEREF INSTITUTE EXAMINES THE WINDOW SPECIFICATION DECISIONS FOR A MAJOR UNIVERSITY

The death of climate certainty, or “climate stationarity,” is how USC Professor Daniel Mazmanian urgently warns that our built environment is not prepared for the rapidly changing climate.

In a major paper, Dr. Mazmanian calls for integrating our climate future into today’s building codes. In fact, USC’s own Fertitta Hall, built soon after his paper was published, was constructed with long-term lifecycle standards

IF WE PUT WINDOWS IN AND THEY DON'T LOOK RIGHT, IT'S GOING TO BE A DISASTER WE CAN'T RECOVER FROM.

HUNTER GAINES | USC Program Director

in mind — incorporating solid steel-frame windows to mitigate extreme weather events locally, while integrating thermal window technologies to reduce the likelihood of those weather events globally.

WINDOWS AND LIGHT

The Gothic-style facility has “plenty of windows on all four sides — we put as many windows on this building as we could,” said Hunter Gaines, USC Program Director for Capital Construction Development. Steel windows spanning three stories high modernize what might otherwise have been a sunless interior, explained Gaines. “I think it turned out very light in there.”

USC Facilities Management Director Jane Hamatani concurred. “When campus tours happen, Fertitta is one of the buildings where we take potential students and parents,” said Hamatani. “The look on their faces, they’re in awe, like, oh wow!” Fertitta Hall supplies classrooms for USC’s Marshall

Business School undergraduate program.

GOthic STYLE BUILDING

The university president mandated a Gothic aesthetic for the construction of Fertitta Hall. The challenge, according to architect Bob Murrin, was to design a unique Gothic building compatible with the campus while introducing plenty of natural daylight not typically found in the Middle Ages cathedrals, abbeys, and parish churches of Europe. To accomplish this, Murrin incorporated Gothic architectural elements — the pointed arches and the steep roof profile — but departed from the period on the interior “to be more edgy and trendy.”

“We’re always pushing for natural light and driving daylight into the interior of the space; it does wonders for everybody,”

said Murrin. “But it’s kind of a yin and yang. We always love more natural light, obviously, but there’s the amount of glass in terms of energy performance. So, there’s kind of a balance.” Bob Murrin is principal architect with AC Martin Partners.

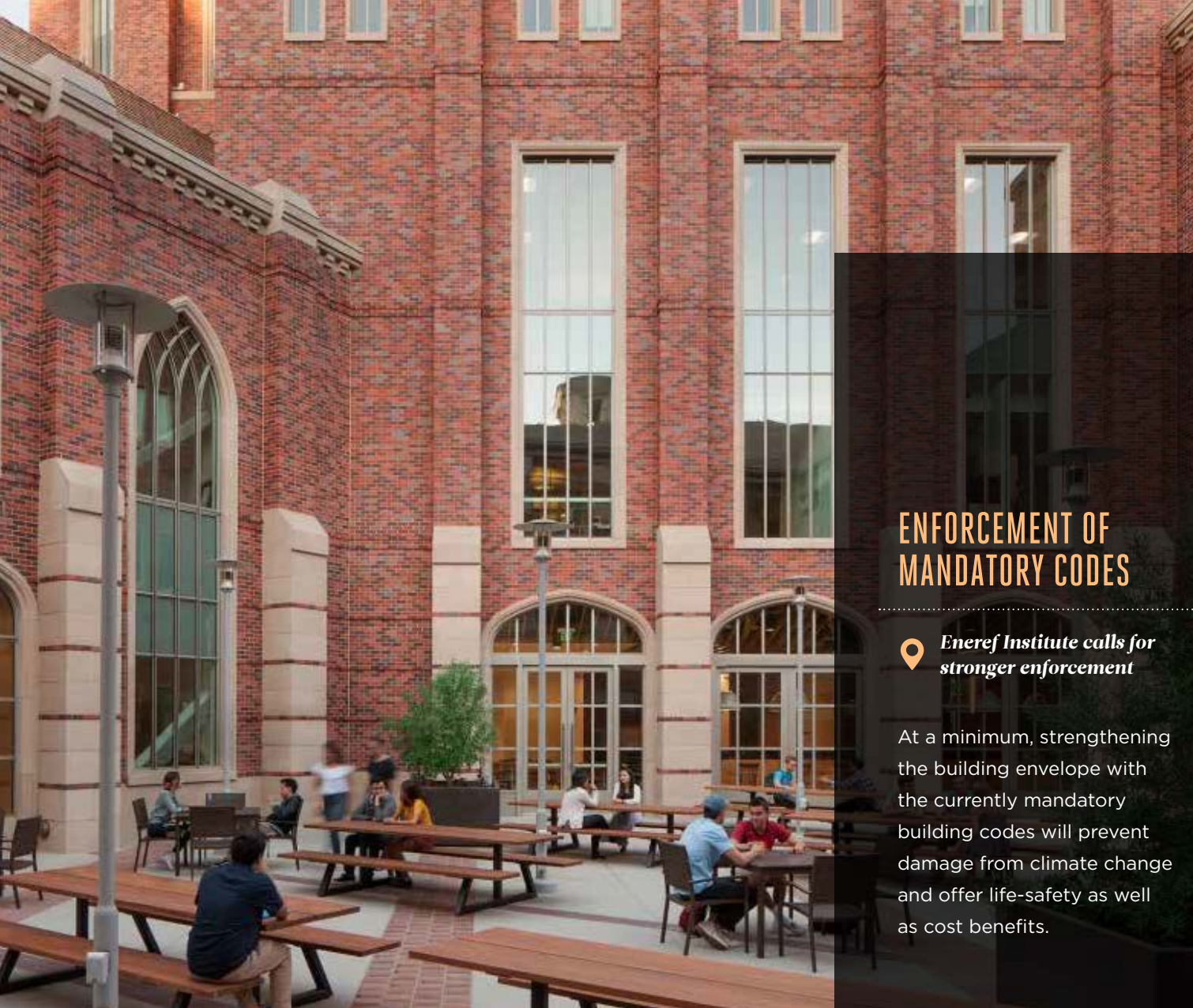
Murrin said the design team debated the benefits of aluminum windows versus more expensive steel windows, finally settling on steel from US manufacturer, Hope’s Windows, Inc.

“Hope’s are tested to meet code, and that’s why they ended up in the spec,” said Paul Sherrin, owner of Sherrin Glass and Metal, the subcontractor hired by the university to install the windows. “I’ve been installing windows for 30 years or more. I don’t see anything else out there that’s quite as nice and well crafted as Hope’s. There’s no equal really.”


To comply with building codes, steel windows are tested to meet an air rating for energy codes, a water rating for leaks, and a structural load rating to prevent high-wind damage. Yet, in a recent study, Enerref Institute found that as many as 50% of steel window manufacturers in the US fail to test their products to assure even a minimum

ENEREF INSTITUTE ACKNOWLEDGES THE CONTRIBUTION OF USC

Professor Dan Mazmanian, lead author of “A Governing Framework for Climate Change Adaptation in the Built Environment,” is chair of the USC Presidential Sustainability Working Group and professor of Price School of Public Policy.



ENFORCEMENT OF MANDATORY CODES

 *Eneref Institute calls for stronger enforcement*

At a minimum, strengthening the building envelope with the currently mandatory building codes will prevent damage from climate change and offer life-safety as well as cost benefits.

code compliance. (See Eneref Report: *Enforcing Mandatory Robust Building Codes for Steel Windows.*)

“When did code compliance become an option?” insisted Brian Whalen, Vice President of Hope’s Windows, Inc. “And at what point will insurance companies reject claims when products utilized did not meet code from the very beginning?”

ALUMINUM VS STEEL

While aluminum-frame windows are more common because of their lower cost, steel frames have features not possible in aluminum. “We wanted steel rather than aluminum. I just think the profile looked more authentic,” affirmed architect Bob Murrin.

The far stronger structural integrity of steel windows allows for narrow, or thin, sight lines.

When angled, steel holds its shape, which was necessary for the tight corners that Murrin’s team designed into the Fertitta Hall windows. Aluminum has memory and tends to return to its original shape.

While the higher cost of the Hope’s windows was discussed, USC Program Director Hunter Gaines explained, “We spent a lot of time looking, debating, and talking about it. We pulled the trigger on that cost because

we felt that if we put windows in and they don't look right, it's gonna be a disaster we can't recover from. So we just said, 'Look, we got to do it right to pull it off right.' And it was absolutely the right decision."

THE WINDOW MANUFACTURING PROCESS

The steel window frames were custom shaped into Gothic arches using solid hot-rolled steel and fully welded construction. Eight of the arched-top window frames are over 40 feet tall, spanning up three floors. After the steel frames were hoisted into position, Sherrin's team set the glass in place while working from scaffolds. Even before the glass was set, the steel frames weighed hundreds of pounds. Individual pieces of glass were set into single bays, or separate

panes, with structural silicone glaze. The panes are united with supporting mullions and muntins, creating one seamless steel window assembly.

"There's quite a bit of build quality that goes into Hope's Windows," said the nephew of Paul Sherrin who was in charge of the installation and is also named Paul Sherrin.

THERMAL RESISTANCE

To comply with California's Title 24 sustainability requirements for building codes, the glass specifications accounted for other energy factors, including insulation and HVAC. Hope's designed the window frames with enhancements to further resist thermal transfer through the windows. Based on engineering and code requirements, Murrin specified

low-E, fire-rated, Solarban 70 brand glass, which comprised two quarter-inch panes of glass with a half-inch of air space between them for thermal insulation. A laminate for noise reduction was added to the exterior side.

SUSTAINABILITY GOALS

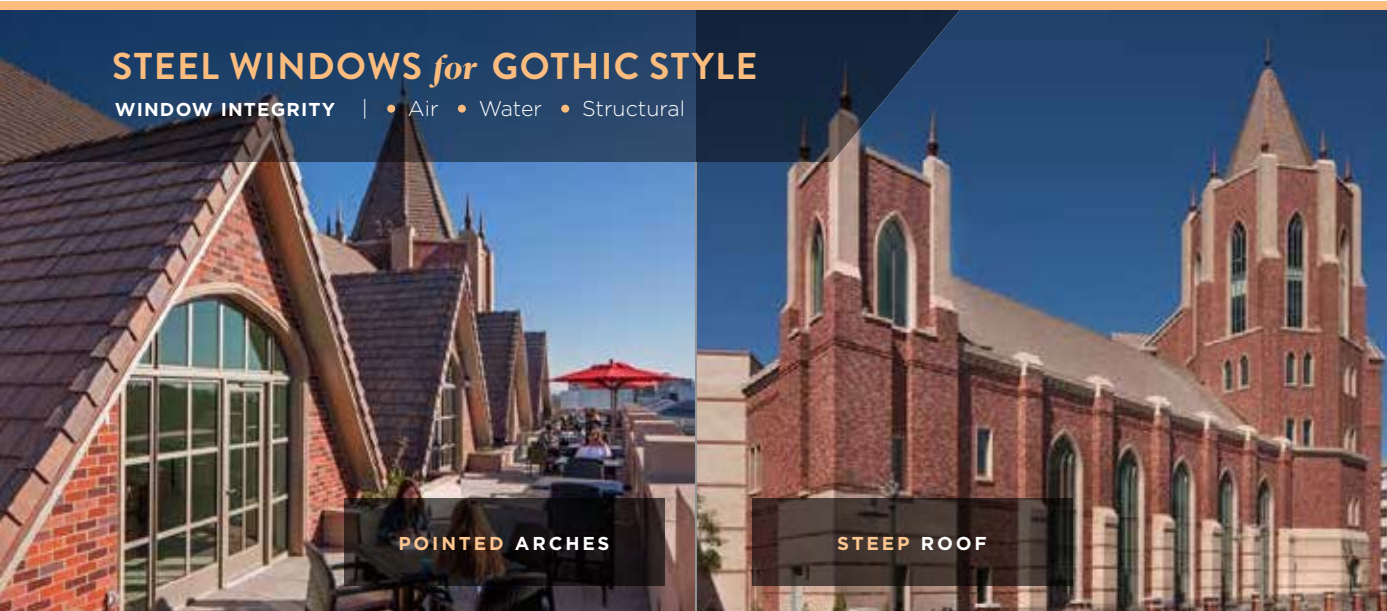
USC's own energy standard usually carries their buildings to LEED silver; however, Fertitta Hall met the requirements for LEED gold.

"LEED gold drove a lot of our decisions," said architect Bob Murrin.

While the university does not always apply for LEED certification even when the requirements are met, USC's Hunter Gaines said that with Fertitta, they chose to pay for the LEED gold certification.

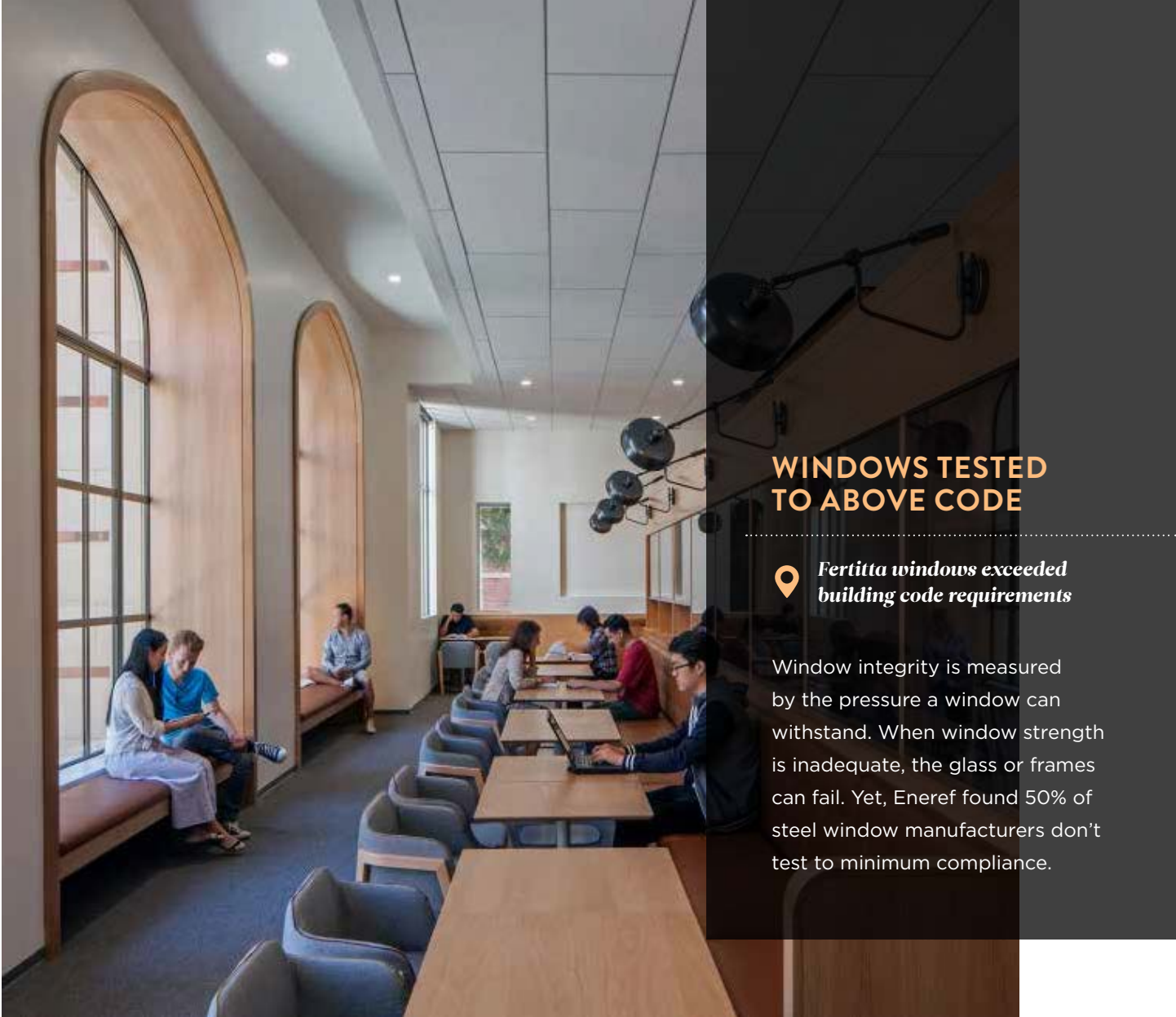
STEEL WINDOWS *for* GOTHIC STYLE

WINDOW INTEGRITY | • Air • Water • Structural



POINTED ARCHES

STEEP ROOF



WINDOWS TESTED TO ABOVE CODE

Fertitta windows exceeded building code requirements

Window integrity is measured by the pressure a window can withstand. When window strength is inadequate, the glass or frames can fail. Yet, Eneref found 50% of steel window manufacturers don't test to minimum compliance.

"It's a good communication tool because all our students and stakeholders want to know what we've done in our sustainability policy."

PROTECTING OUR FUTURE

In his paper, USC Professor Daniel Mazmanian argues for government adaptation to climate change through stronger building codes and compliance. "The reason we don't have an adaptation strategy as bold as

our mitigation is because of the sunk-in costs of our existing infrastructure. It's a dictatorship of the present — the present is a constraint on change."

The University of Southern California's Fertitta Hall is an example of best practices that other universities should follow. At a minimum, strengthening the building envelope with the currently mandatory building codes — only the minimum acceptable standard — will

prevent damage from climate change and offer life-safety as well as cost benefits.

"The beauty of working with universities like USC is they want long-term, maintenance-free buildings. And they are willing to pay a premium for lasting materials," said architect Bob Murrin.



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to improve our planet and society.*

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