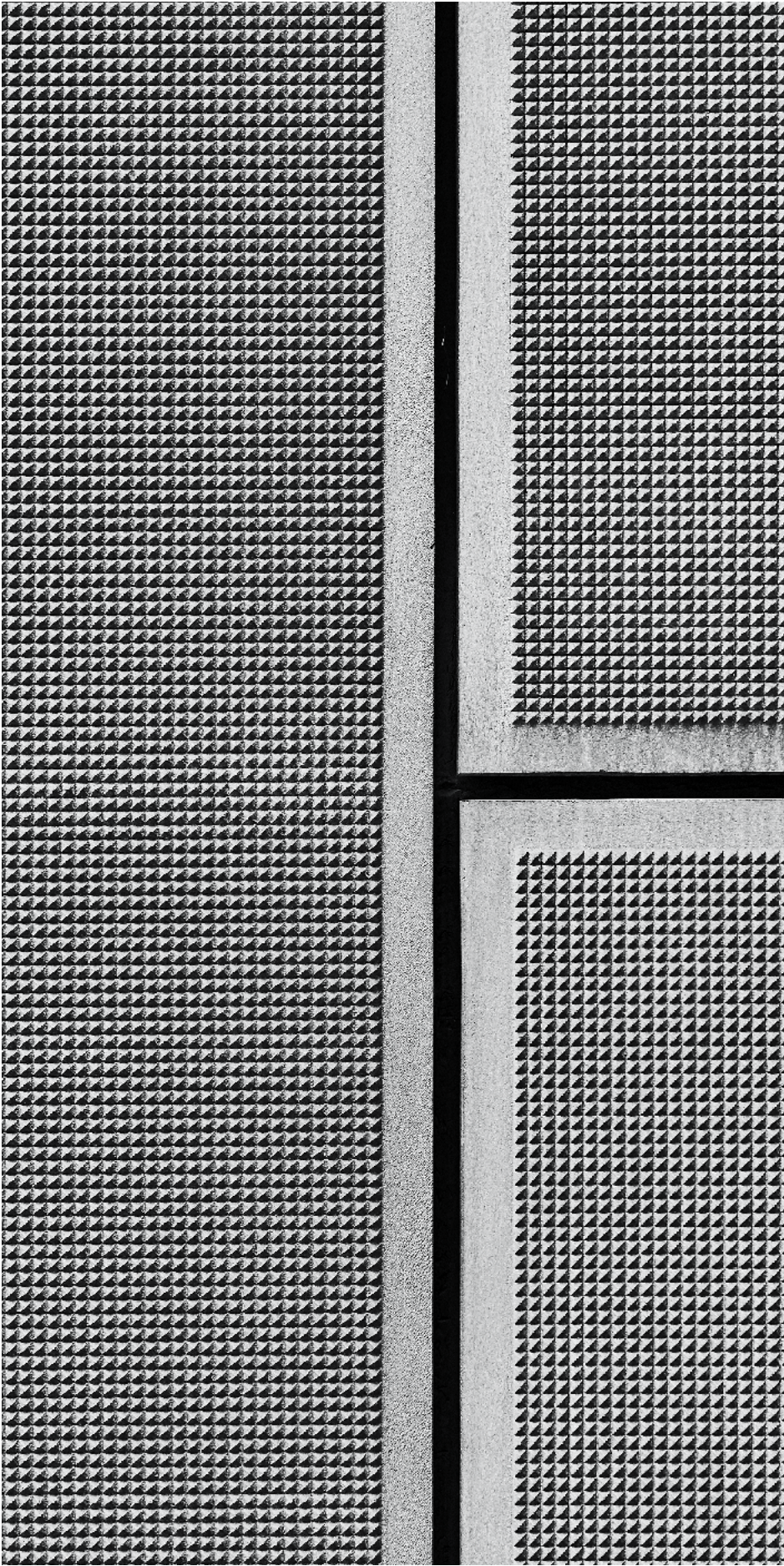


THE ARCHITECTURE OF
JOSEF PAUL KLEIHUES

MUSEUM OF
CONTEMPORARY ART
CHICAGO



SIMPLICITY, OPENNESS, QUIET,
AS WELL AS THE INTERPLAY
BETWEEN TRANSPARENCY AND
CONTAINMENT—THESE WILL
BE THE KEY ELEMENTS.

—JOSEF PAUL KLEIHUES, 1988

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ORIGINS

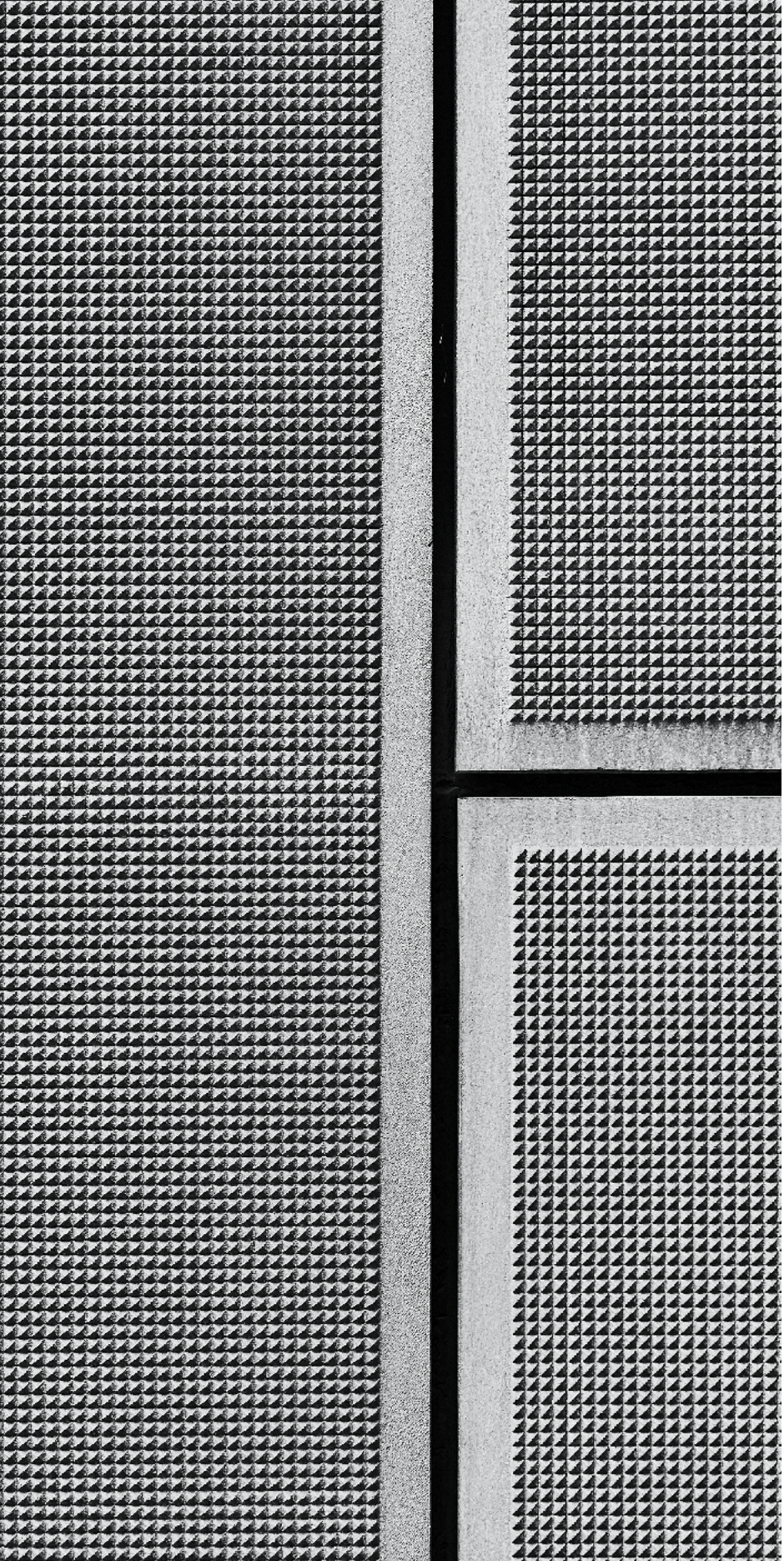
The Museum of Contemporary Art Chicago’s building represents a unique combination of historical references and architectural innovations. While the symmetric plaza and monumental staircase evoke the entrances of antique structures such as the Pergamon Altar and the Propylaea of the Acropolis, the museum’s modern form is reminiscent of the cast-iron, Prairie School style of Louis Sullivan, as well as the mid-century minimalism of Ludwig Mies van der Rohe, whose work also profoundly shaped the architecture of Chicago.

The MCA broke ground for its new building at 220 East Chicago Avenue —once the site of a National Guard Armory—in 1993. The building’s unusual design provoked mixed reactions from critics and neighbors when construction was completed in 1996 but has since been recognized for its singular and lasting addition to the city’s rich architectural history.

MUSEUM OF
CONTEMPORARY ART
CHICAGO

FACTS & SPECIFICATIONS

- 1.1
- The MCA contains approximately 40,000 square feet of gallery space, an education center of more than 8,000 square feet, and a 300-seat theater.



ARCHITECT

Architect Josef Paul Kleihues (German, 1933–2004) studied architecture in Berlin and began his career there in 1962. After Germany’s reunification in 1989, Kleihues became an influential voice in urban planning discussions about the future of the rapidly modernizing capital, using his concept of critical reconstruction to advocate for the preservation of traditional urban spaces using contemporary construction methods and materials. His theory of architecture—known as poetic rationalism—emphasized the integration of new architectural elements into existing spaces in ways that embrace geometric precision, functionality, and harmony. In the early 1990s, Kleihues, who was by then known for his work on civic and museum buildings, won an international competition to design the MCA’s new building.

THE ARCHITECTURE OF
JOSEF PAUL KLEIHUES

FACTS & SPECIFICATIONS

- 2.1

Some of Kleihues’s previous museum projects include the Museum of Prehistory in Frankfurt (1980–86), the Civic Gallery and Lütze Museum in Sindelfingen (1987–90), and the Hamburger Bahnhof (1990–96).
- 2.2

Two hundred companies entered designs for the MCA’s new building competition. The finalists competing with Kleihues were Emilio Ambasz, Tadao Ando, Fumihiko Maki, Los Angeles-based firm Morphosis, and Christian de Porzamparc.

LOCATION

For the design of his first US commission, Kleihues found inspiration in the work of Chicago architects, including Dankmar Adler, David Adler, and Louis Sullivan, as well as William Le Baron Jenney, Daniel Burnham, and John Root, whose use of cast iron shaped Kleihues’s choice of materials. Kleihues also took into account the museum’s location—framed by one of the city’s busiest centers of commerce, the Magnificent Mile, and the reflective expanse of Lake Michigan—and conceived the building as a continuous whole, with uninterrupted views of the sculpture garden and Lake Michigan to the east and the Chicago cityscape to the west. Not least of the Chicago influences is the square grid of Chicago’s city plan, on which Kleihues based the museum’s form. The building’s grid motif, with a two-by-two-foot basic module, is easily visible from the exterior, but it is also present in the facade, windows, floor tiles, and doorframes, as well as the translucent glass cladding of the ceiling lights used throughout the galleries. The grid proportion was so integral to Kleihues’s design that when budget concerns threatened the initial size and scale of the museum, the architect chose to reduce the building’s overall dimensions in order to maintain the building’s proportions.

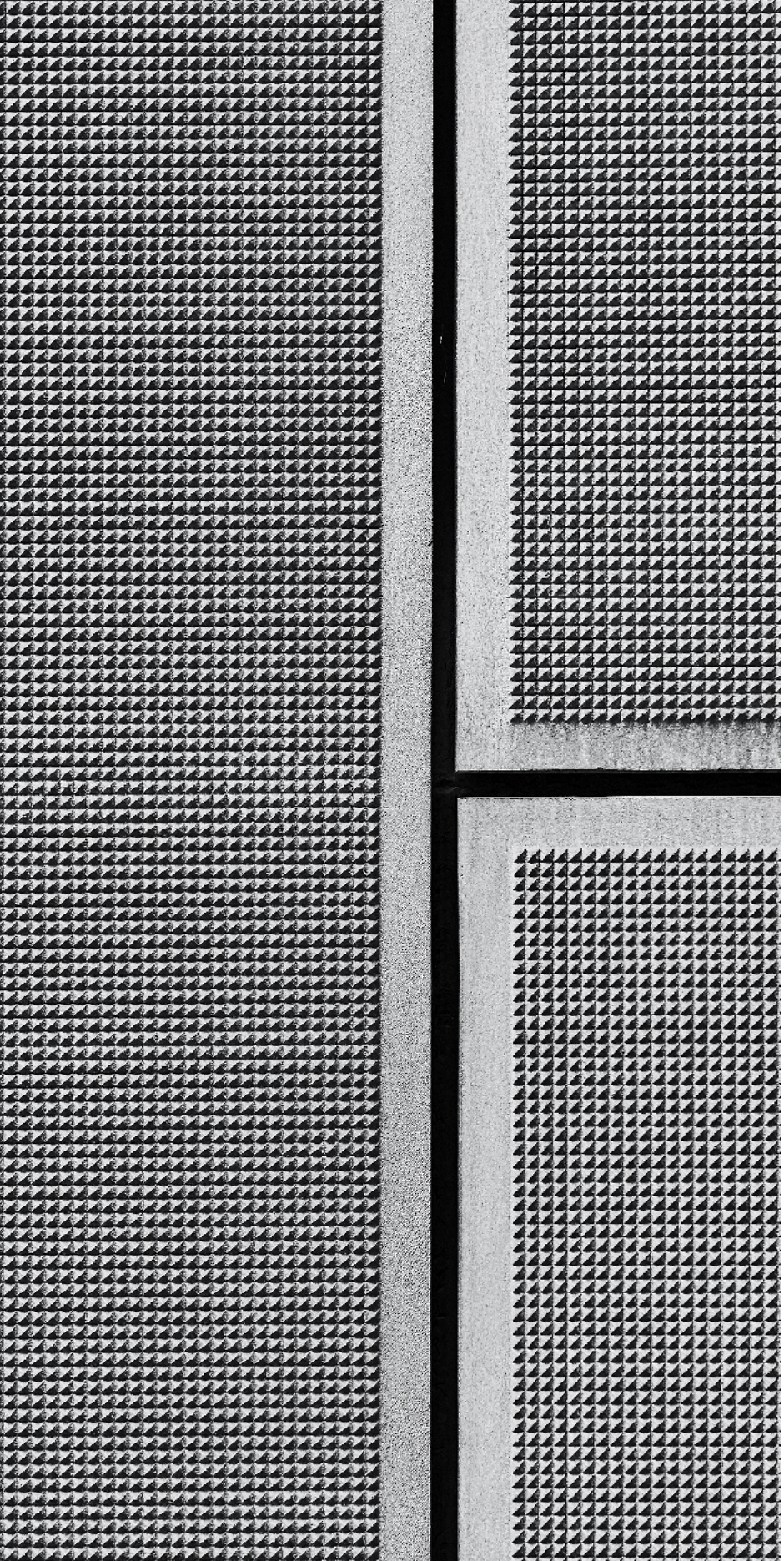
MUSEUM OF
CONTEMPORARY ART
CHICAGO

FACTS & SPECIFICATIONS

- 3.1

The MCA’s two-acre rectangular building site measures 219' × 416'.
- 3.2

The MCA building’s footprint, measuring 184' × 184', is identical to that of the terraced sculpture garden.



FACADE

Kleihues’s choice of cast-aluminum panels and an Indiana limestone base proved to be one of the most significant aspects of the MCA’s exterior. These materials link the building to the architectural history of the city and create a visual continuity between the MCA and the nineteenth-century limestone Water Tower and Pumping Station located directly to its west. At the same time, the MCA’s facade dramatically distinguishes the museum from the surrounding glass-and-steel high-rise buildings—and, because of the unprecedented ways in which it was constructed, from any other building in the world.

During planning, conflicts arose over the building’s exterior. Kleihues wanted a facade that would produce certain effects in terms of color, patina, and modularity, and he argued with contractors and then-MCA Director Kevin Consey about the precise specifications and their cost. Eventually, these disputes necessitated important innovations, which led to the building’s one-of-a-kind facade. Kleihues wanted to contrast a dark material with the light color of the limestone, and he initially proposed using large one-inch-thick lead squares for the cladding, or skin, of the building. Due to concerns about potential toxicity and the difficulty of making a structure that would support the heavy lead panels, aluminum was selected instead. This adaptation proved not only to be a practical solution—aluminum is lighter—but also a historically minded design solution: it links the MCA to the traditions of Sullivan and the Chicago School of architecture without imitating them. The square panels also emphasize the Chicago-inspired grid while allowing the MCA’s exterior to weather beautifully over time.

Difficulties with the facade led to an unusual construction process and a final product that has never been repeated. Rather than use aluminum sheet metal, a manufacturer in El Paso, Texas, poured liquid aluminum into a sand mold in order to hand cast each panel. (The manufacturing company attempted to make a corner mold in one piece but settled on

THE ARCHITECTURE OF
JOSEF PAUL KLEIHUES

FACTS & SPECIFICATIONS

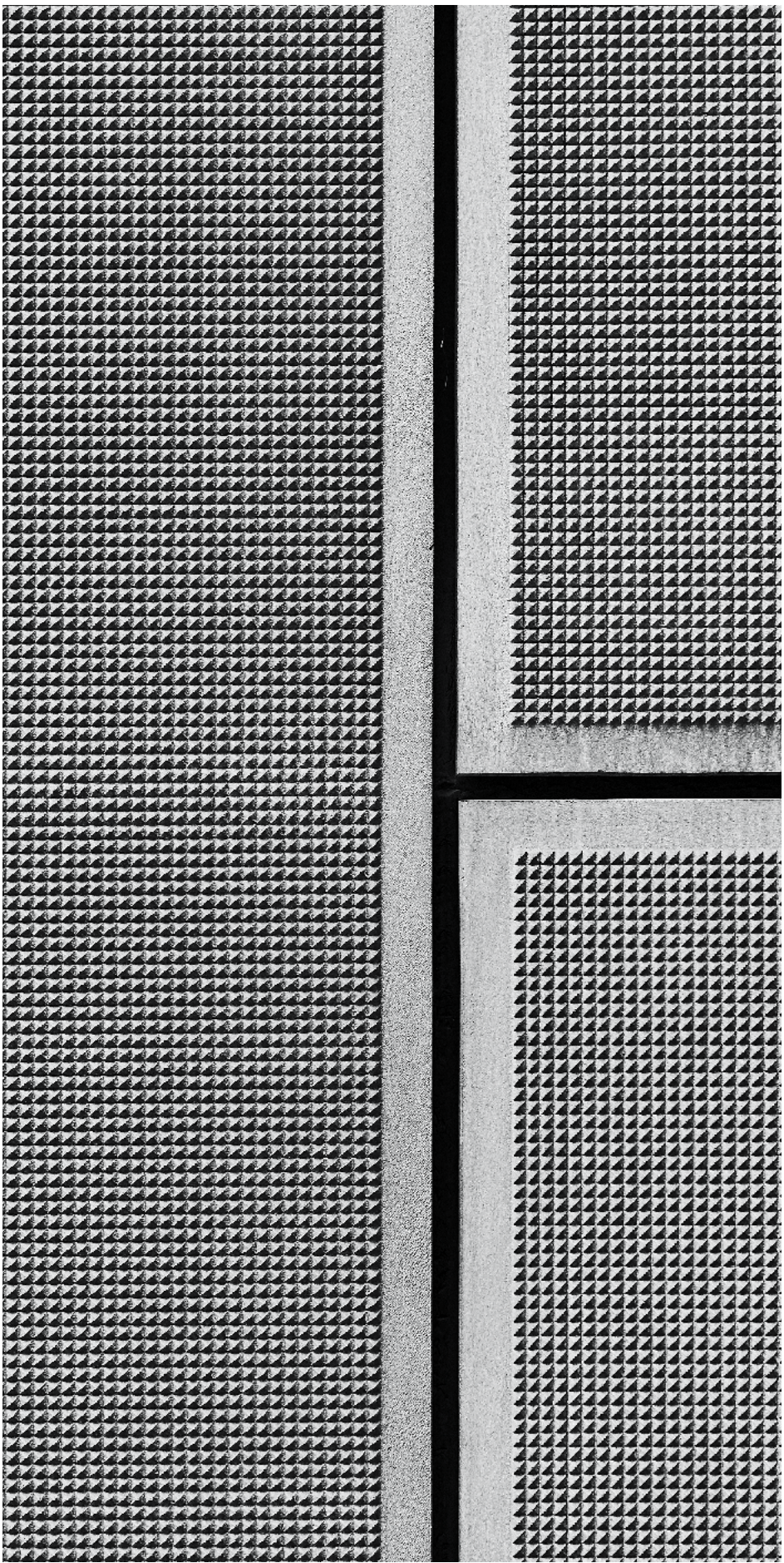
- 4.1
- The cast-aluminum panels were produced in three different sizes: 5'6" x 5'6"; 2' x 11'; and 2' x 2'. The breakdown: 752 panels sized 5'6" x 5'6"; 364 panels sized 2' x 11'; and 306 panels sized 2' x 2'. Panels were welded together to create corner pieces: 36 made from 2' x 11' panels and 36 made from 2' x 2' panels.
- 4.2
- One 5'6" x 5'6" aluminum panel is imprinted with 254,016 pyramids.
- 4.3
- The fine texture of the sand mold as well as its graphite component, which helped cool the sand’s surface, resulted in smoother and shinier aluminum panels.

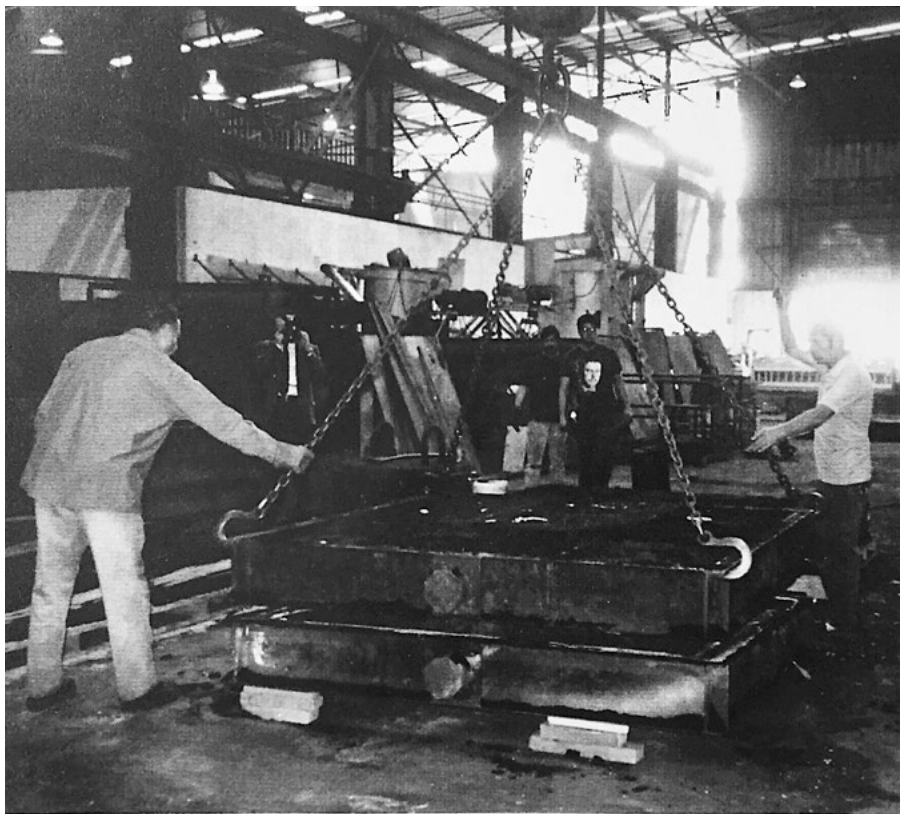


A 5'6" x 5'6" sand-cast mold waits to be filled.



Molten aluminum is poured into a sand-cast mold.





A sand-cast mold is separated to remove the cast-aluminum panel.



A cast-aluminum panel is inspected within its mold.

welding two panels together instead.) This industrial process—similar to what is used for casting jewelry—followed these steps: heat raw aluminum to approximately 1340 degrees Fahrenheit in a tilt oven; pour aluminum into a mold at a gradual angle (to force out gas and air); cool metal within the mold for 12–14 hours; remove and finish manually.

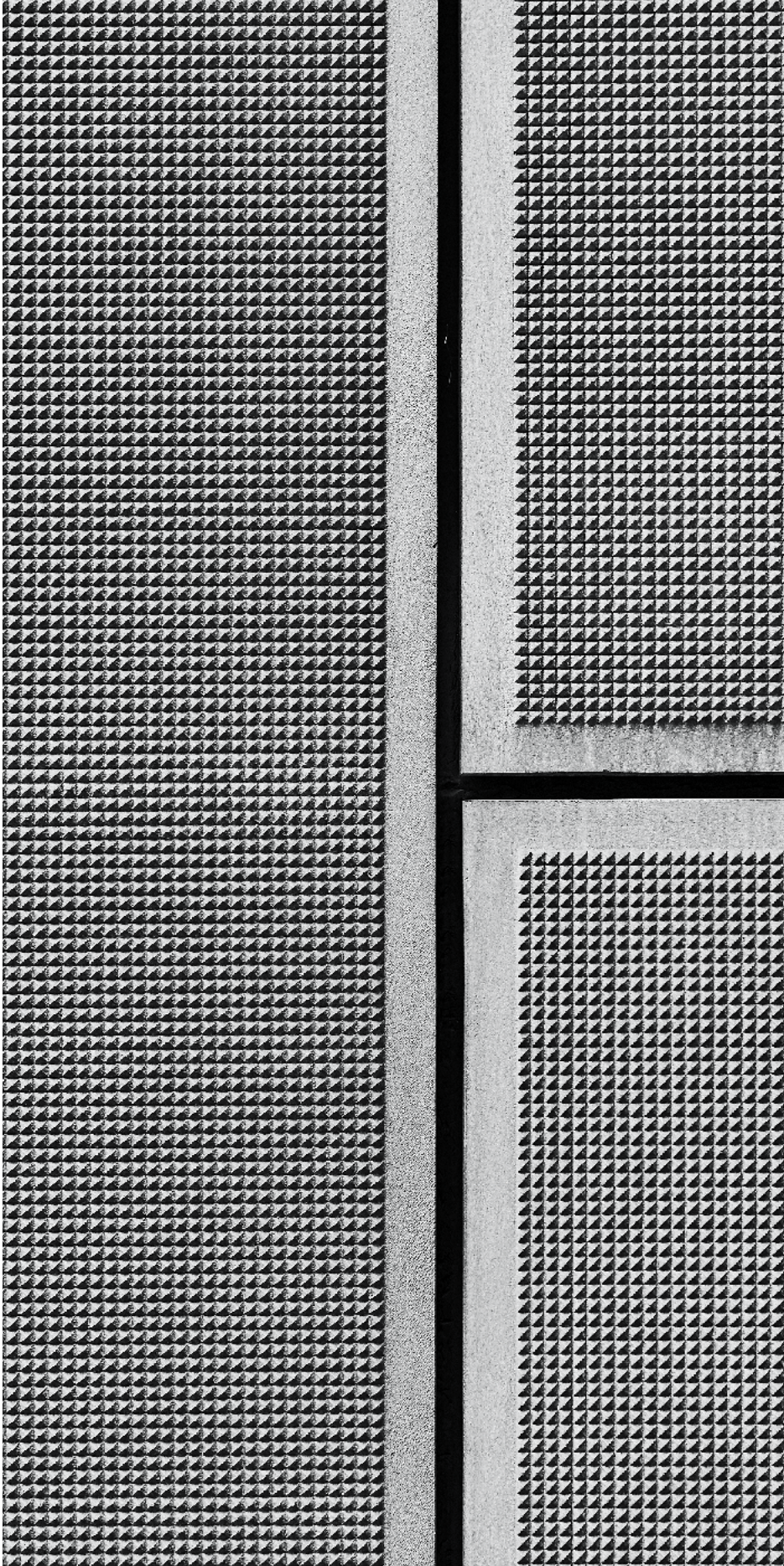
Construction was arduous and posed significant challenges. The manufacturer could not control the metal’s flow, resulting in numerous mock-up casts that were rejected for issues such as wavy edges, visible flow lines, and too much variation in color. To achieve consistency from one panel to the next, plastic molds were pressed over each panel, creating rows of identical, three-dimensional pyramids. Only after many rounds of testing—sand/chemical ratios, the metal’s temperature when poured, cooling times—did the manufacturer perfect this process. In the last stages, any exposed marks were ground off on-site and microblasted, and a light acid etch was added to clean each panel. The final sandblasting left tiny particles on the surface of the aluminum sheets, making them more susceptible to Chicago’s damp weather, which in turn accelerated the development of a darker patina on the building.

The building’s base is composed of four-inch thick, two-by-two-foot slabs of pale Indiana limestone. Laid without bracket anchors, the stones are self-supporting and look like solid masonry. But the centrally placed, countersunk steel pins used to fix the stones introduce a playful element: the pinheads offer visible proof that the stone is actually cladding. From top to bottom, the MCA wears its craftsmanship on its skin.

MUSEUM OF CONTEMPORARY ART CHICAGO

FACTS & SPECIFICATIONS

- 4.4 Holes were cast (not machined) in the aluminum panels to fit circular medallions 1½" in diameter. The medallions house steel pins, which fix the limestone slabs and the aluminum panels to the MCA’s exterior.
- 4.5 The MCA is clad with 317,060 lbs. of cast aluminum. If recycled at today’s market value, the scrap metal would be worth approximately \$152,200.



LIGHT

Kleihues deemed transparency and light critical to integrating the museum into its environment. He saw the MCA’s building site as an urban canyon—a space surrounded by skyscrapers and bathed in the light that radiates off of their reflective surfaces—and used glass fixed in frames (glazing) for the walls of the building’s core to flood the museum with sunlight. In the galleries, window coverings and other adjustable natural and artificial light sources were incorporated to regulate lighting, including four skylights above the long fourth-floor galleries with additional light dispersed by barrel-vaulted false ceilings made of translucent glass.

Light also plays a critical role in the viewer’s experience of the museum. In the second-floor atrium, the combination of sunlight, high ceilings, and an open floor plan gives a sense of spaciousness belied by the museum’s solid exterior. The interior northern staircase offers a continuation of the museum’s airy entrance while functioning as an access point to every public floor. Its marquise, boat-shaped form stands in contrast to the right angles and squares that dominate the MCA’s aesthetic, and its lighting counters the sheer heft of the building. Kleihues lined the stairs with sconces and further brightened the space with a skylight at its summit. The skylight’s silhouette is echoed throughout the eye of the stairwell, drawing the viewer’s gaze upward.

THE ARCHITECTURE OF
JOSEF PAUL KLEIHUES

FACTS & SPECIFICATIONS

- 5.1 Anodized aluminum frames the insulated glass panes used in the MCA’s glazed core.
- 5.2 Skylights designed by Kleihues raise the MCA building’s total height from 70' to 81'.
- 5.3 Translucent glass panes that measure 5'6" x 5'6" cover the ceiling lights in the galleries.
- 5.4 The north staircase is mirrored by a two-story version in the MCA’s store.
- 5.5 The boat shape of the interior staircases is repeated in details throughout the museum, including the elevator button panels.

LEGACY

Kleihues’s MCA has been widely studied as an exemplar of the architect’s philosophy of poetic rationalism and his efforts at critical reconstruction. Less has been written about the sophisticated construction techniques that produced the never-replicated, virtually indestructible cast-aluminum exterior that gives the building its unique appearance. Together, the architect’s principles and the builders’ innovations produced the combination of lyricism and pragmatism that defines the MCA as an icon of a modern architectural design—one that is tied to local history and the needs of a contemporary city.

MUSEUM OF
CONTEMPORARY ART
CHICAGO

FACTS & SPECIFICATIONS

- 6.1 The MCA is the only museum in the United States designed by Josef Paul Kleihues.



IMAGE CAPTIONS

- 01Close-up view of cast-aluminum facade
- 02Southeast view of the museum from Chicago Avenue
- 03Weathered limestone-clad base
- 04Detail of an aluminum panel
- 05View of the northern plinth and exterior staircase leading to the second-floor atrium
- 06View of the museum from Seneca Playlot Park
- 07Fourth-floor exhibition gallery
- 08Second-floor atrium skylights viewed through interior, open-air windows on the fourth floor
- 09View of north interior staircase and matching skylight from below
- 10Skylight above the second-floor atrium
- 11Eye-level view of the southern plinth in the front plaza

ADDITIONAL READINGS

Andrea Mesecke and Thorsten Scheer, *Museum of Contemporary Art Chicago: Josef Paul Kleihues* (Berlin: Gebr. Mann Verlag, 1996).

Kim Shkapich, ed., *Josef P. Kleihues: The Museum Projects* (New York: Rizzoli International Publications, 1989).

CREDITS

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