



CONFERENCE SESSIONS
JUNE 14-16, 2023

NOKIA ARENA
TAMPERE, FINLAND

WAY TO GROW

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High Transparency RETRO-fitted

New Lobby Glass Enclosures beyond the Cutting Edge

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Roschmann GROUP



The Roschmann Group

As an international facade specialist focusing on tailor-made & innovative solutions for high-performance building envelopes, we are 350+ dedicated professionals at 5 locations, implementing individual wishes of architects, engineers and clients since 1952.

THESIS:

To emphasize on Value, Comfort and Inhabitant Quality combined with Basics of Design and Function, a transparent Storefront attracts and enhances in several ways ...

- Visual Appeal
- Window Display
- Natural Light
- Transparency
- Branding

Use Glass in Architecture

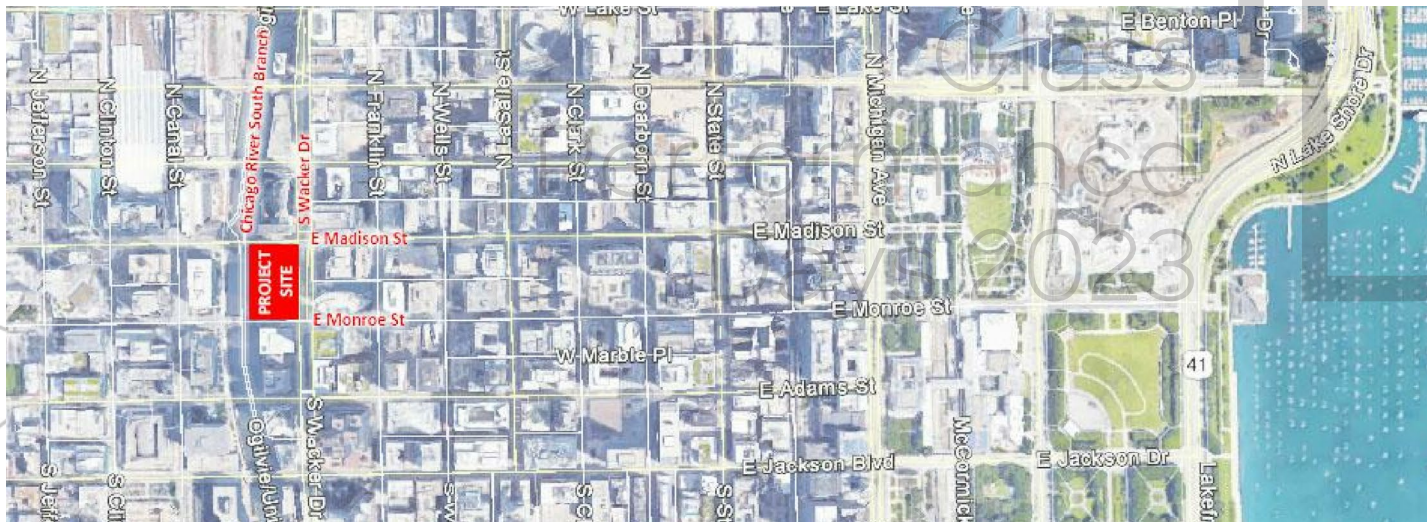




Apple Store @ BAMS
Brooklyn, NY

RETRO CASE: The Chicago Mercantile Exchange (CME)

Class-A office complex made up of two 40-story towers connected by a 10-story center structure occupying a full city block in Chicago. Designed by Fujikawa Johnson and completed in 1987, being the 87th tallest building in Chicago, but one of its most prestigious office buildings.



Owner's ... *SOLD!*

In 2016, Tishman Speyer appointed Krueck Sexton Partners to develop an architectural concept to redevelop the buildings lobby space transforming the buildings podium into a warm and welcoming environment attractive to the surrounding public – a space to be reimagined!

Before



Krueck Sexton Design

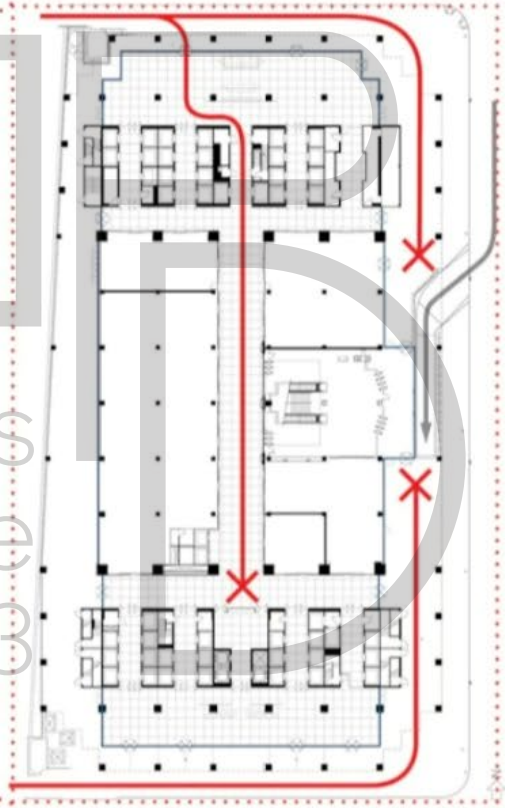
Architectural Intention

SITE PLAN

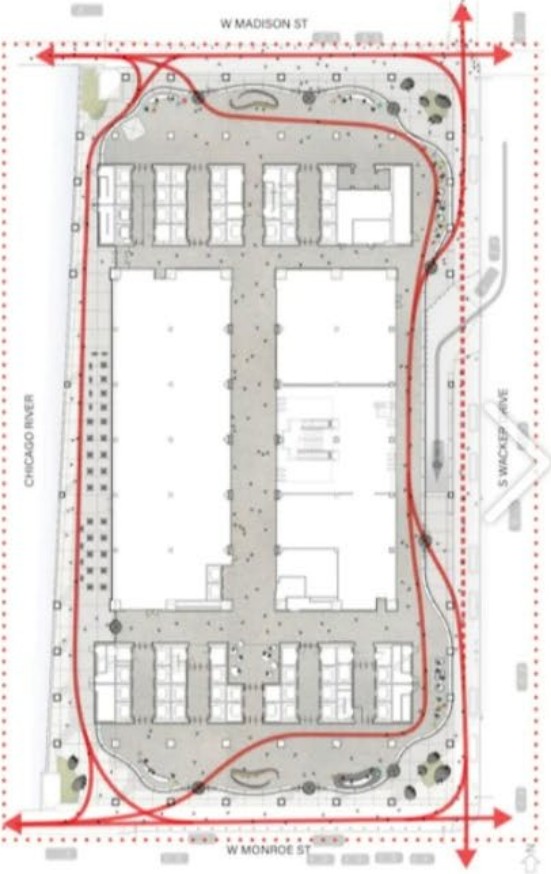


- ★ PROJECT LOCATION
- COMMUTER RAIL STATION ACCESS POINT
- ➔ TENS OF THOUSANDS OF PEOPLE

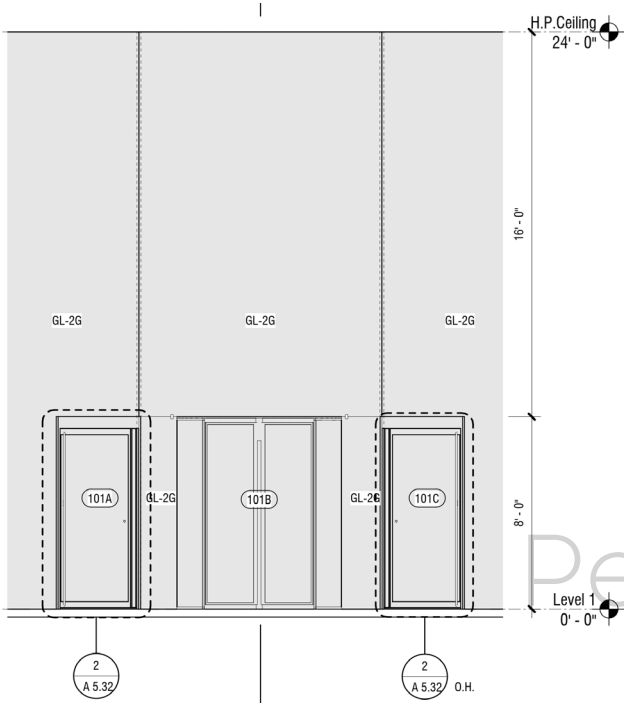
CIRCULATION BEFORE



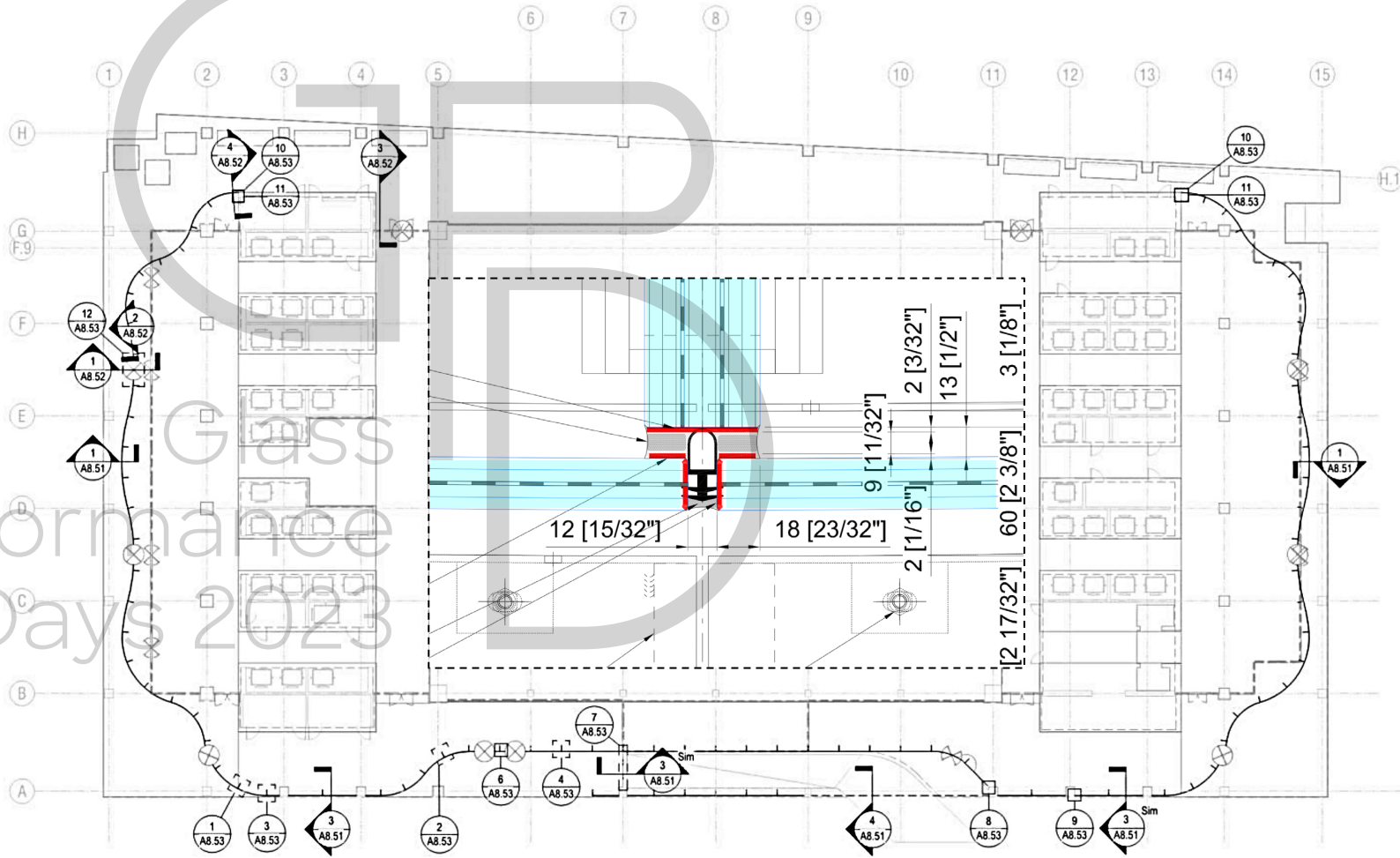
CIRCULATION THROUGH THE PROJECT



Architectural Design Criteria



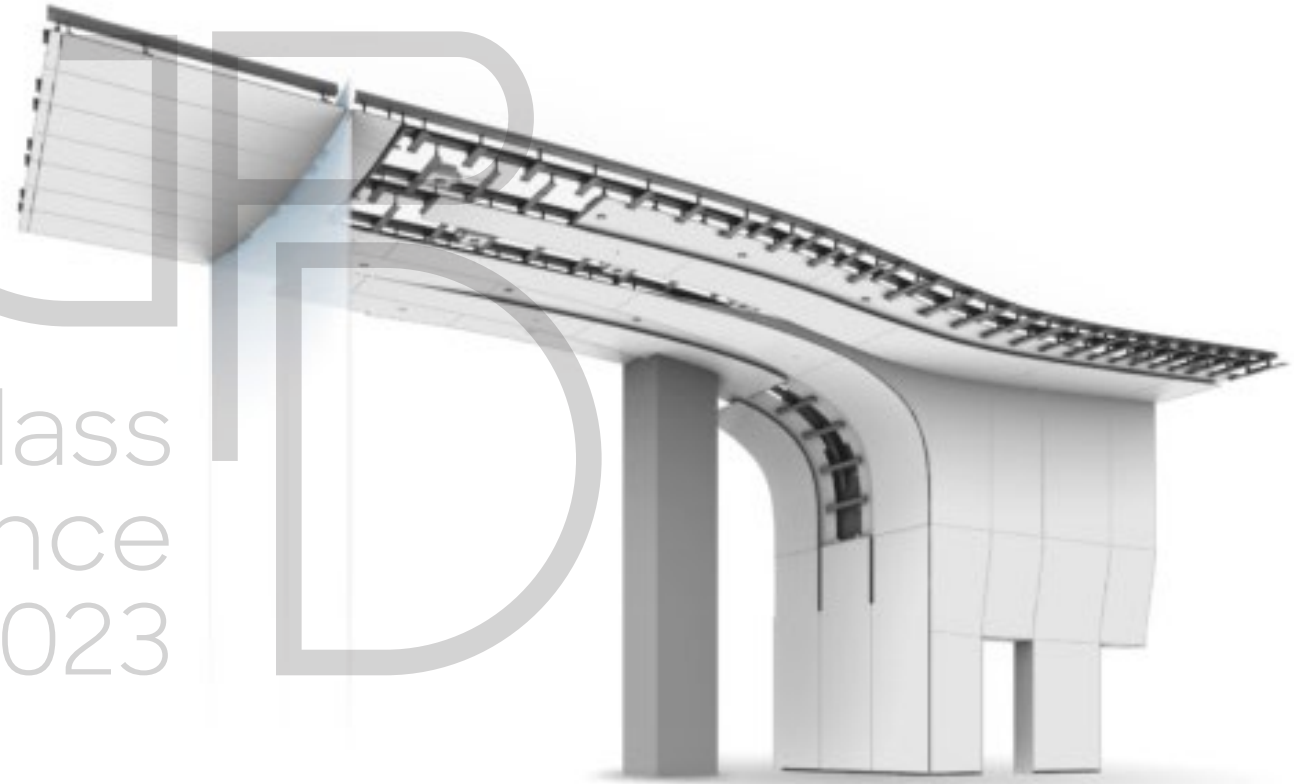
1 ELEVATION @ REVOLVER TYP.
1/4" = 1'-0" 2 - A 2.00



Design Assist

A Design Assist was awarded to turn the architectural vision into constructable reality considering aesthetics, budget, schedule, technical feasibility, quality and material selection ...

- Material Selection
- Design & Modeling
- Fabrication Techniques/Equipment
- Quality Control Strategy
- Process Optimization

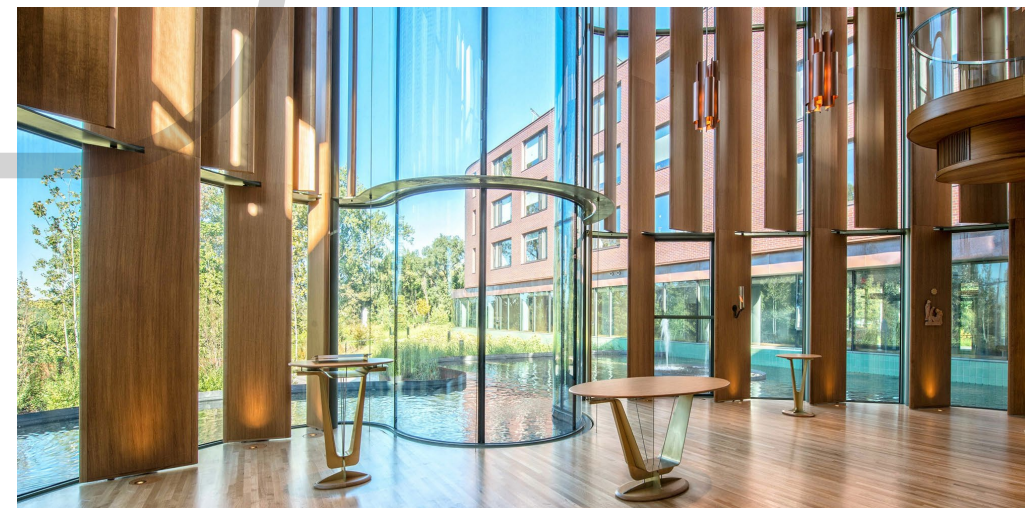


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Bending of Glass

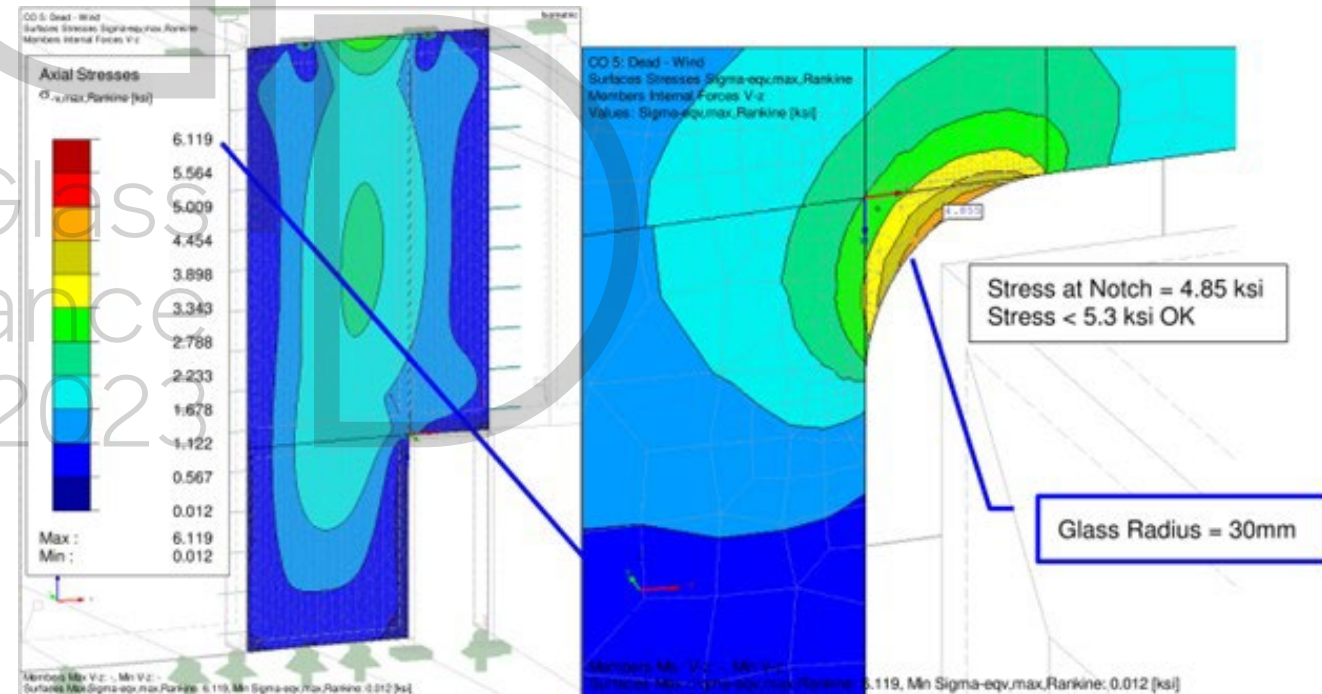
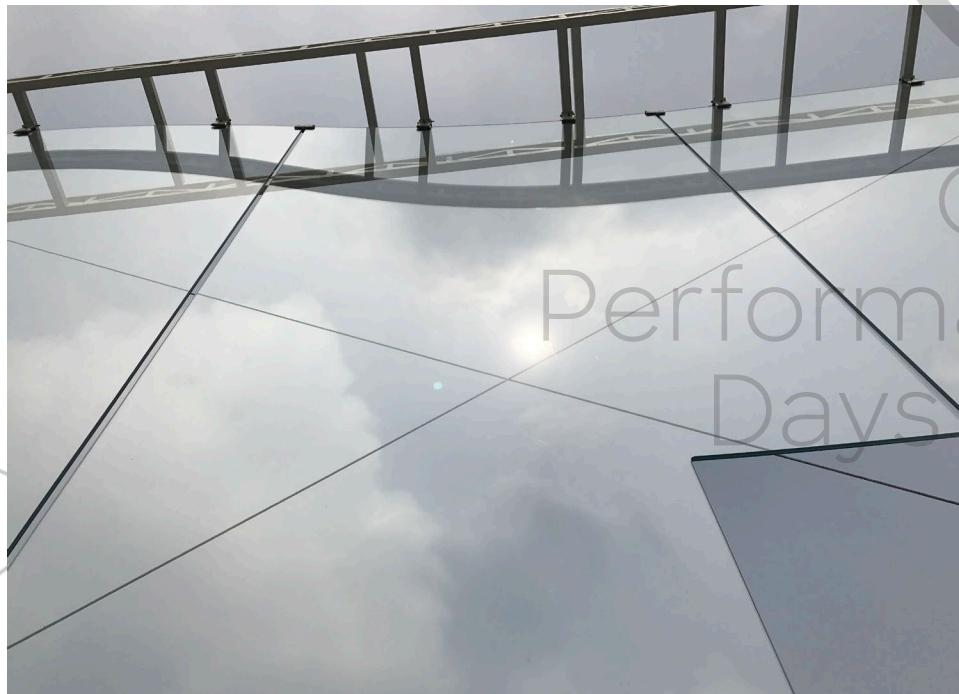
Bending glass has a long tradition in architecture. Glass can be bent, curved & warped by use of different technologies such as ...

- Cold Bending by Force
- Warm bending by Lamination
- Hot Bending by gravity Slumping
- Temper Bending by online Tempering



Engineering follows ... Fabrication ... follows Engineering

To achieve a perfect surface finish, glass wants to be annealed, not tempered or heat-strengthened. Curved shapes help to overcome the lesser strength of annealed glass, but complex features such as doors & openings become a significant driver of wall engineering.



Selection of Glass

Based upon structural engineering the glass and under consideration of the owners wish for an absolute transparency and ...

- 48.04mm LG Glass Fin
 - 3 x 15mm FT-HST, low-iron
 - 2 x 1.52mm clear SentryGlas
- 21.52mm LG Vision Glass
 - 2 x 10mm HS, low-iron
 - 1 x 1.52mm clear SentryGlas
 - Flat & curved ($\leq 60\text{ft} / 18\text{m}$)
($\geq 15\text{ft} / 4.5\text{m}$)

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Temper Bending

Temper-(online) bending uses online furnaces to heat the glass up to its softening point (580-620 °C), curving the glass with a mechanical operable mold to obtain the required shape and then quickly cool down the glass allowing its surface to trap a high compressive strength at the curved surface.

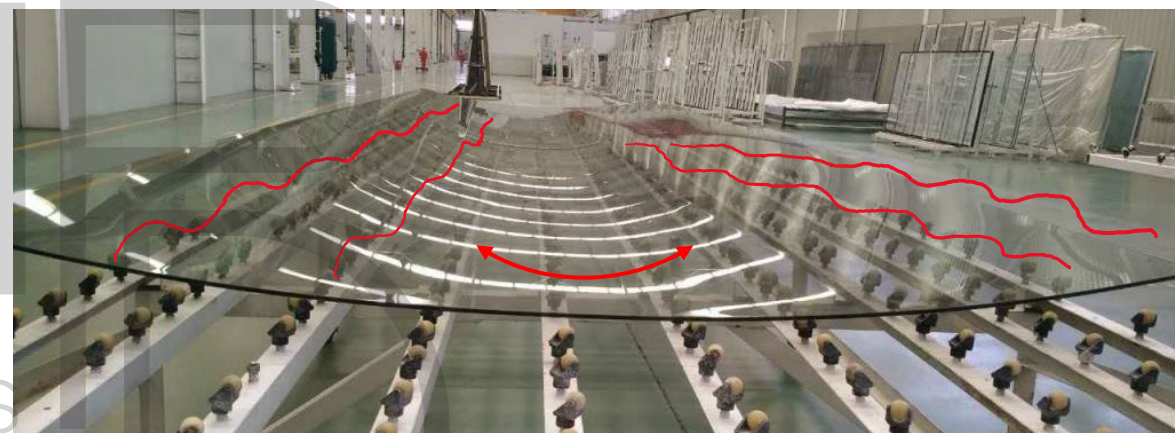
- Advantages: high strength of tempered glass, economical fabrication, broad variety of low-e possible
- Disadvantages: limited shapes and minimal radii, tempered glass surface imperfections



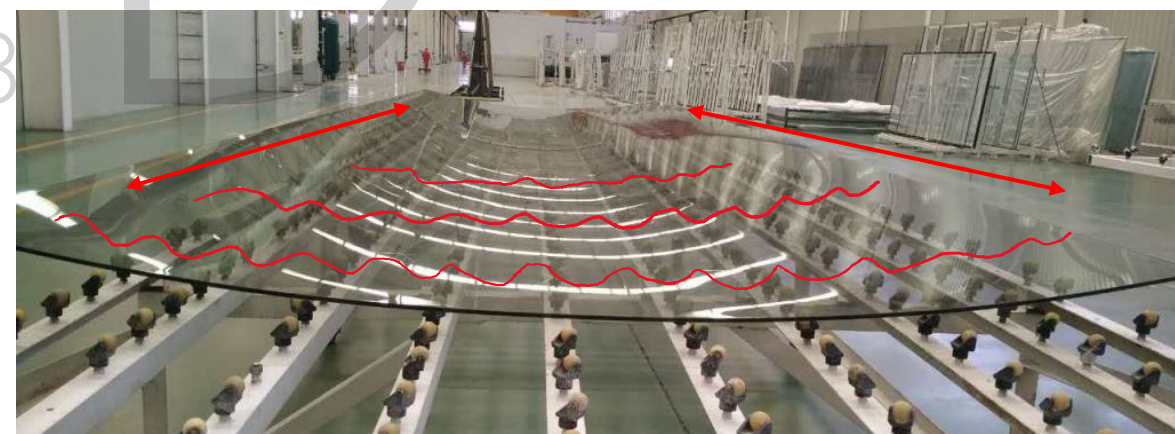
Quality Control Process

Curved furnace and quench rollers leave waves & local bows on the glass surface, running by parallel to units' short edge (latitudinal) as well as along the units' long edge (longitudinal). Waves typically appear on the convex side of the panel.

Roller Waves by parallel to short panel edge



Roller Waves by parallel to long panel edge



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Quality Control Process

The lack of applicable code standards typically identifying acceptable quality base lines resulted in fabricating a full-size “Benchmark Glass” unit to be utilized as worst case for ...

- Local and overall bows
- Latitudinal and longitudinal roller waves
- Curvature & radius tolerance
- Laminated edge offsets
- Uneven Anisotropy clouds



Visual Mock-Up

Full-size Glass & Installation VMU's in
China and in Germany to verify Design



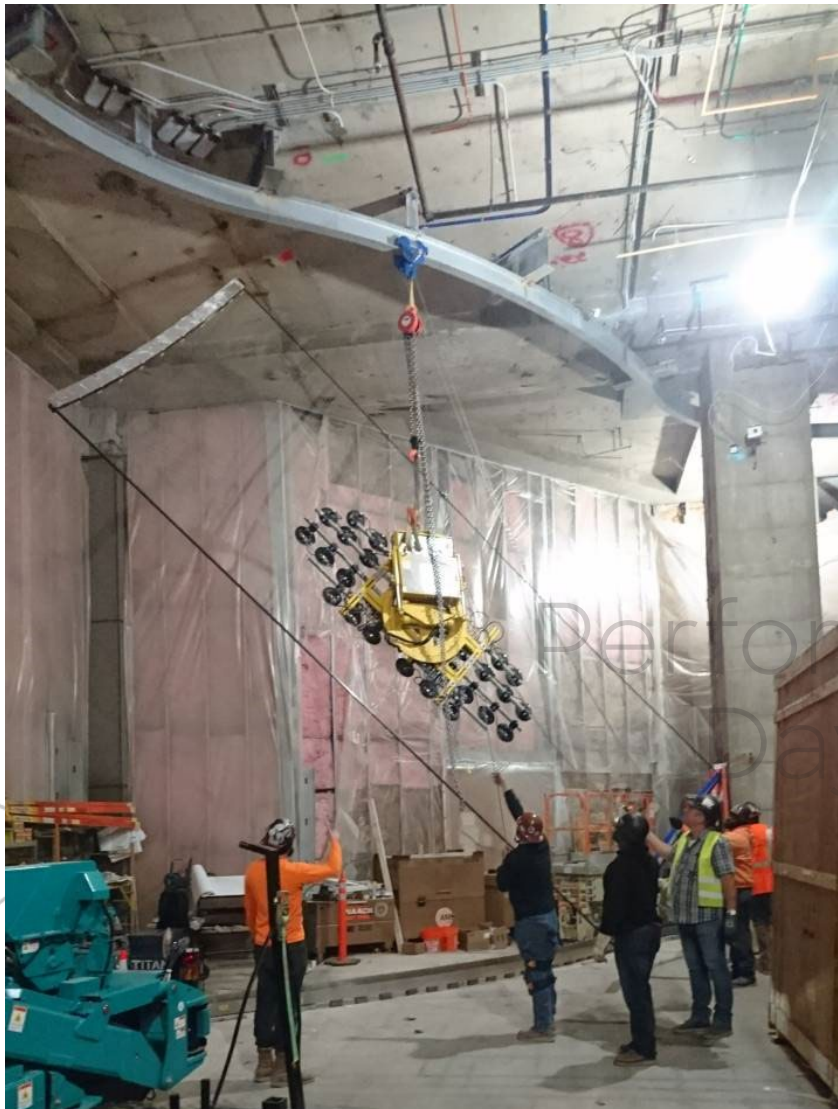
Construction Process

Upon fabrication 24 ft (7.30m) tall x 10 ft (3.00m) wide, curved laminated glass units, shipping becomes an extra complex process considering fragility & value of the load:

- Packaging and Crating
- Freight Carrier selection
- Documentation & Labeling
- Handling and off-Loading
- Tracking & Monitoring

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Installation & Logistics



1- Install by *Mobile Crane*

- Off-hours Operation
- Lane closure
- Costly equipment

Installing 24ft glass units in built environments adds more complication. Options are to be compared and designed:

2- Install with *BIMS*

- Time independent
- Engineering required



Building Integrated Monorail Systems (BIMS) may be reused for replacement & cleaning.

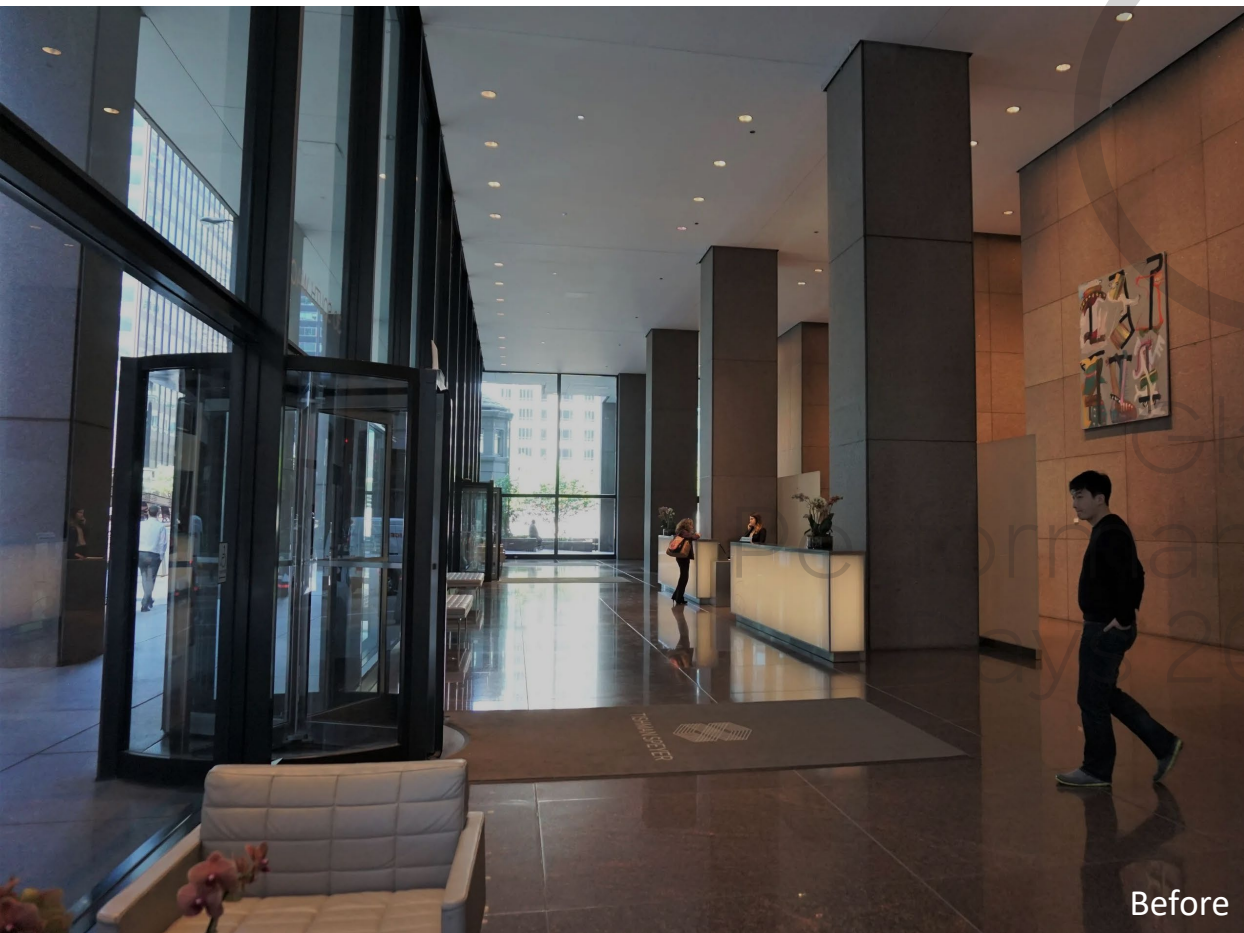
Owner's ... *SOLD!*

In 2019, Roschmann completed the RETRO-fitting of the lobby wall at the CME Center in Chicago. The result reflects the process of design, engineering, fabrication, execution and close collaboration between all parties on purpose driven material selection and process optimization incl. glass fabricator as being key to success.

Owner's ... *DELIVERED!*



Owner's ... *DELIVERED!*



10-30 S Wacker Dr
CME Center
Chicago, IL

UL, 9 - 21

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Thank You

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First presented in GPD 2023

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