

BUILDING INNOVATION

Creative Project Design and Delivery Practices; Past, Present, Future



SPEAKERS



GORDON STRATFORD,
OAA, FRAIC, TSA

Chair

City of Toronto Design Review
Panel



DORON MEINHARD

Associate Partner

Hariri Pontarini Architects



JOHN KOOYMANS,
BSC, P.ENG.

Principal

Read Jones Christoffersen Ltd



ROBERT
QUATTROCIOCCHI, BSSO

Building & Material Sciences

Manager –

Construction Sciences Division

Ellis Don Corporation



KEVIN STELZER, BES,
BARCH, OAA, MRAIC,
LEEP AP BD+C, BSSO

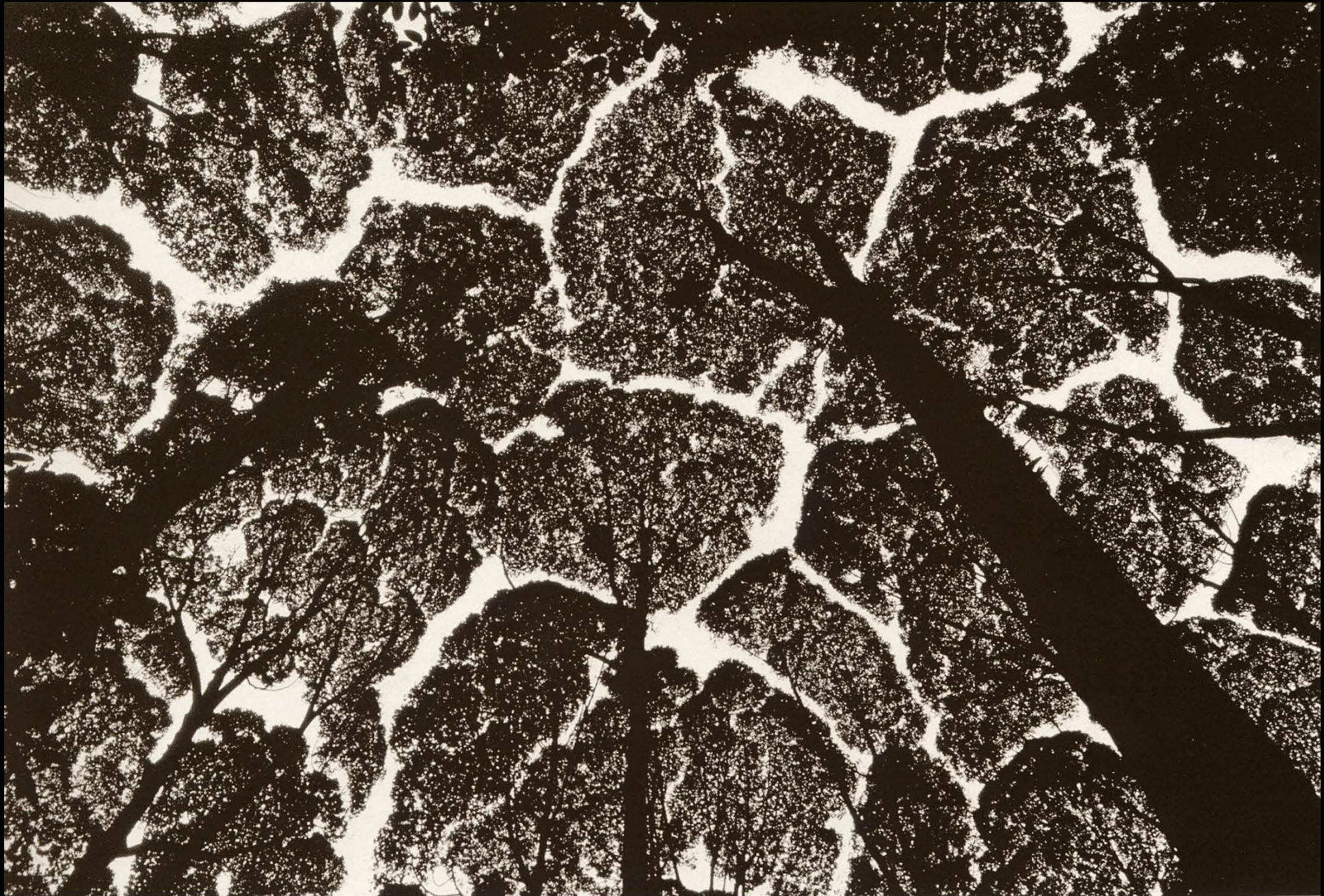
Principal

ENFORM Architects



GORDON STRATFORD, OAA, FRAIC, TSA
Chair
City of Toronto Design Review Panel

Presentation Unavailable













Tracy





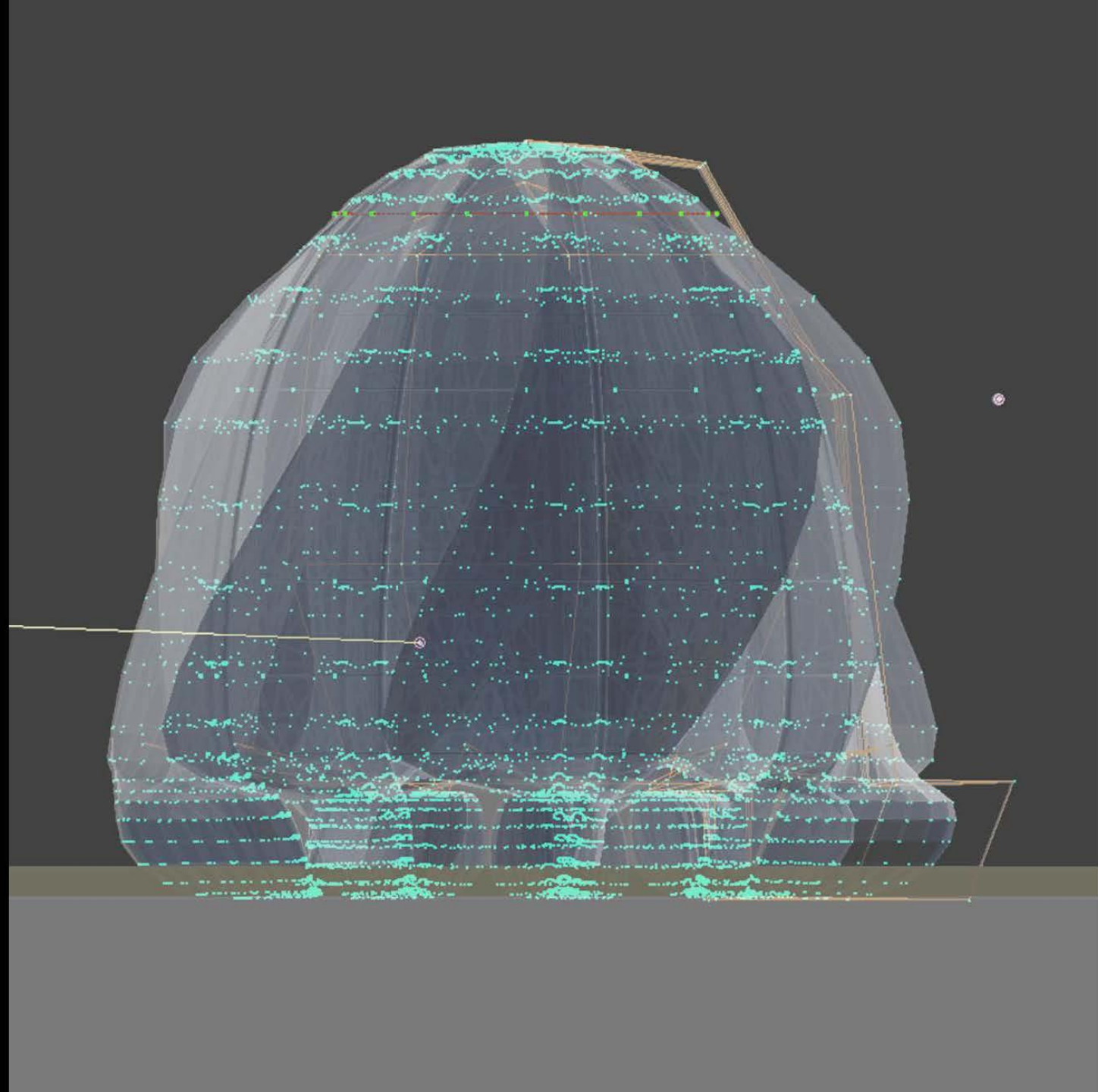




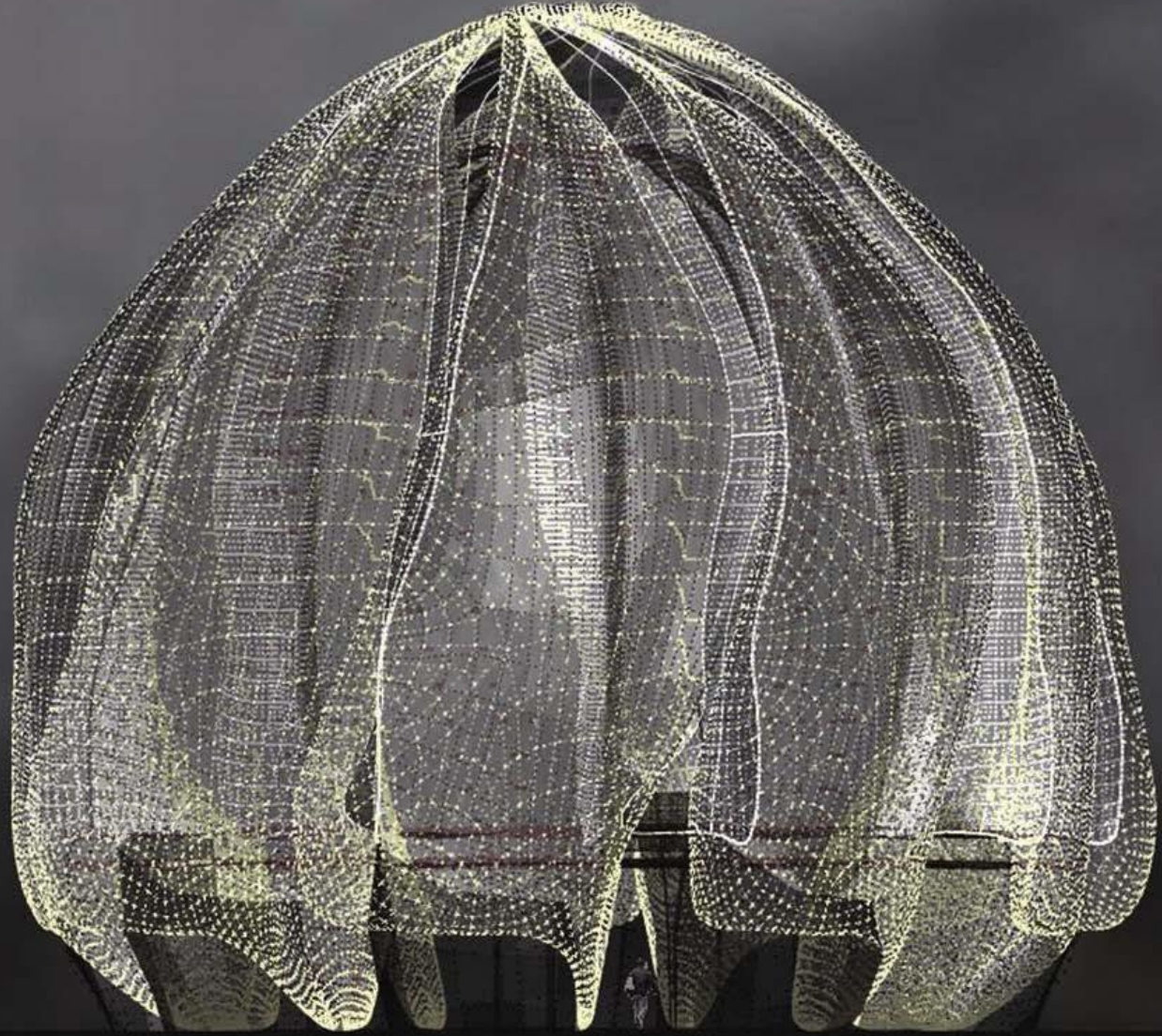






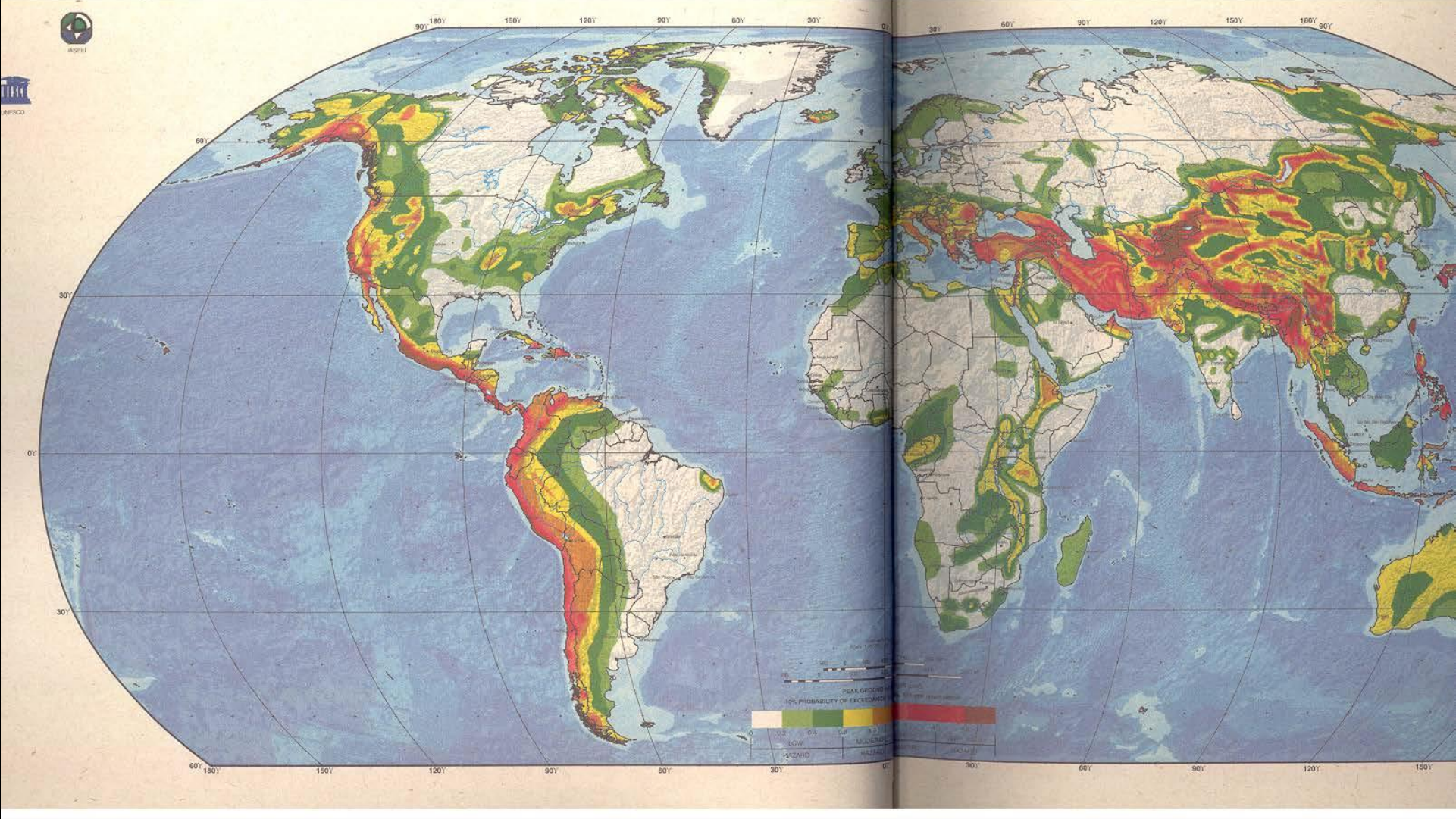












Chord Connection Type 1 – both-sided (Bottom Chord):

RF-STEEL Members CA3

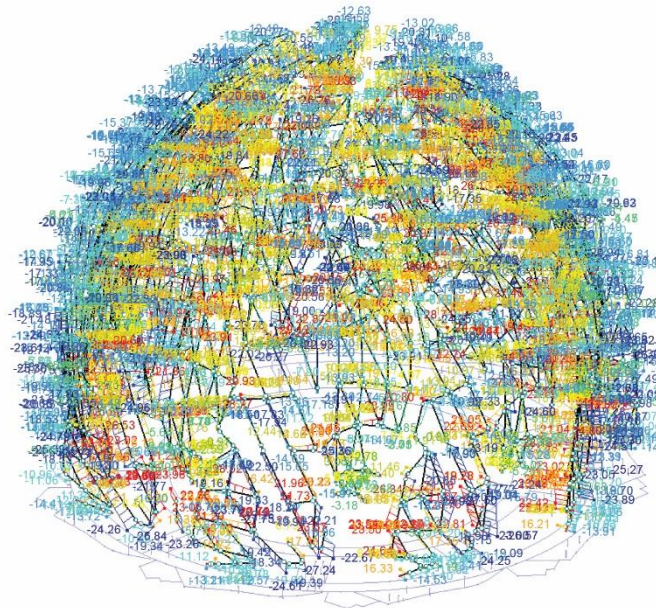


Max Sigma Total: 29.65, Min Sigma Total: -27.75 [kN/cm²]

RF-STEEL Members CA3



Max Tau Total: 2.94, Min Tau Total: -1.06 [kN/cm²]

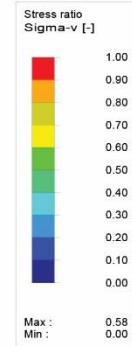


Design of the pipe

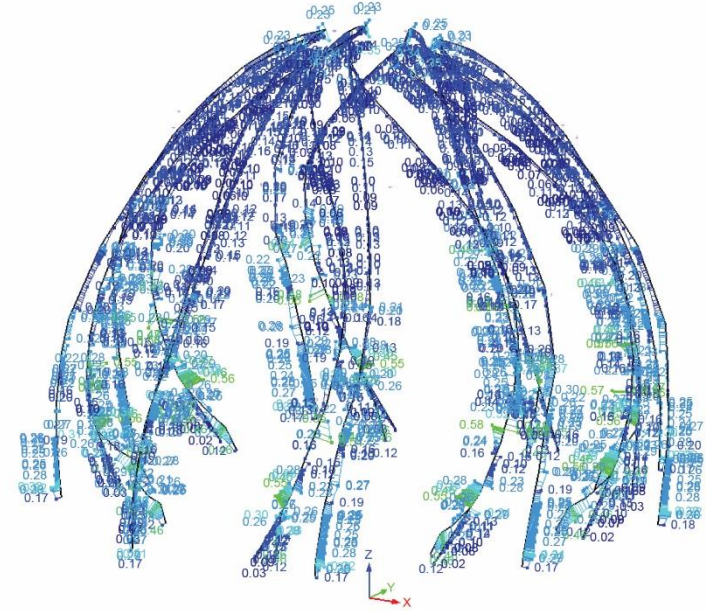
Max stress ratio of the main tube at the connection – Static: $eqv=0,58$

STEEL CA3
Sigma- eqv

Isometric



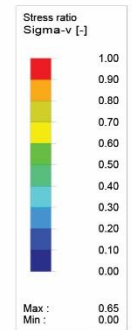
Max Sigma eqv : 0.58, Min Sigma eqv : 0.00



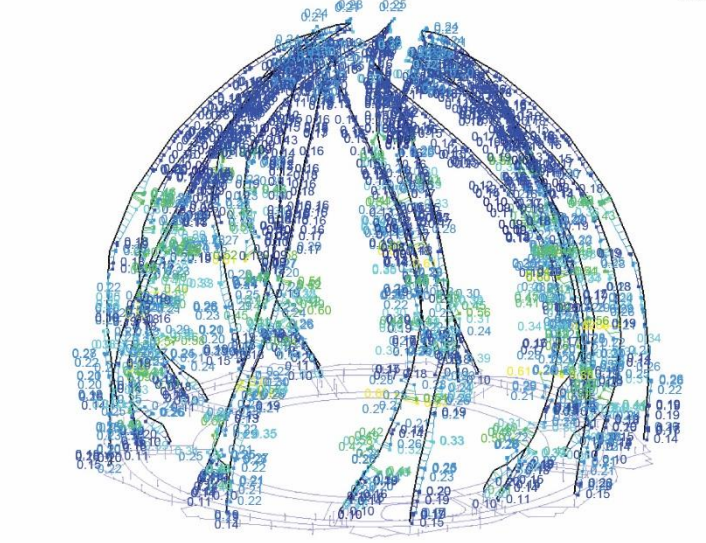
Max stress ratio of the main tube at the connection – Static: $eqv = 0,65$

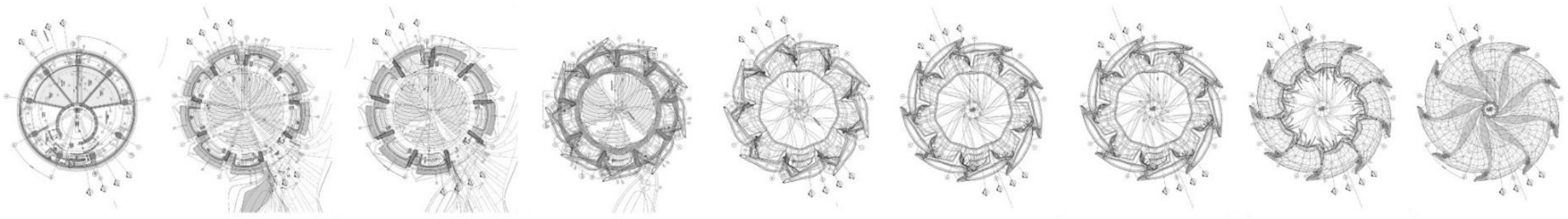
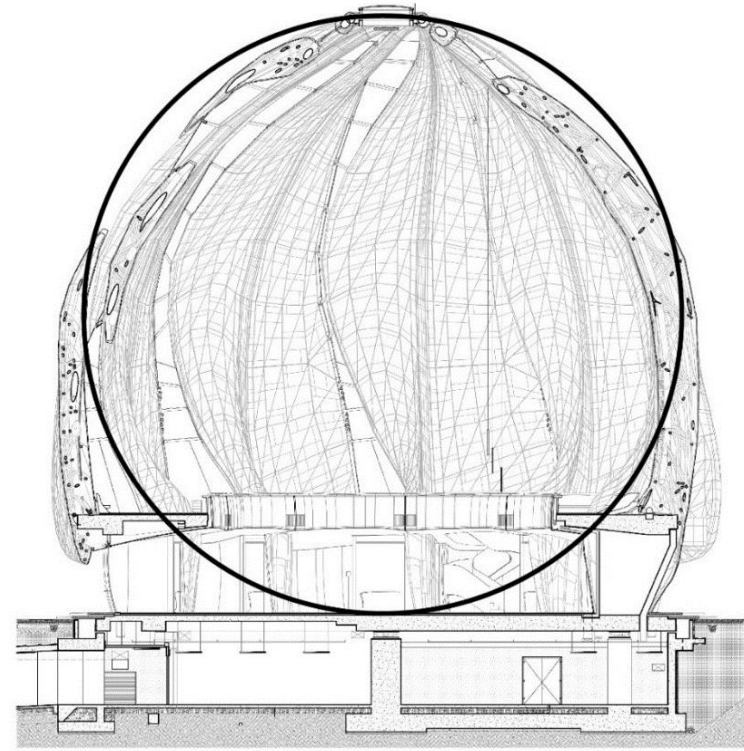
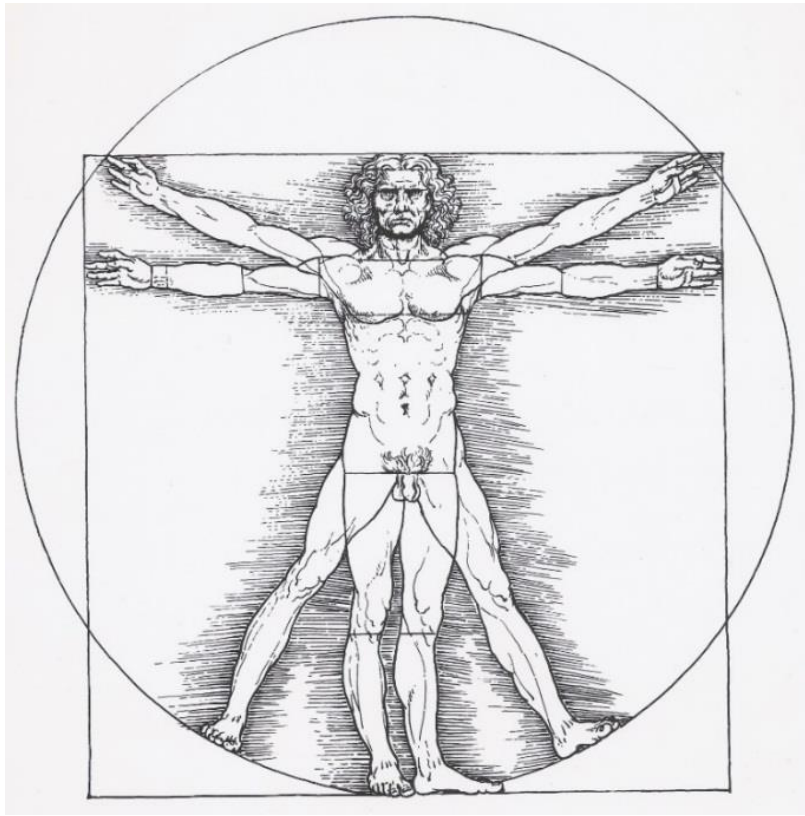
RF-STEEL Members CA2

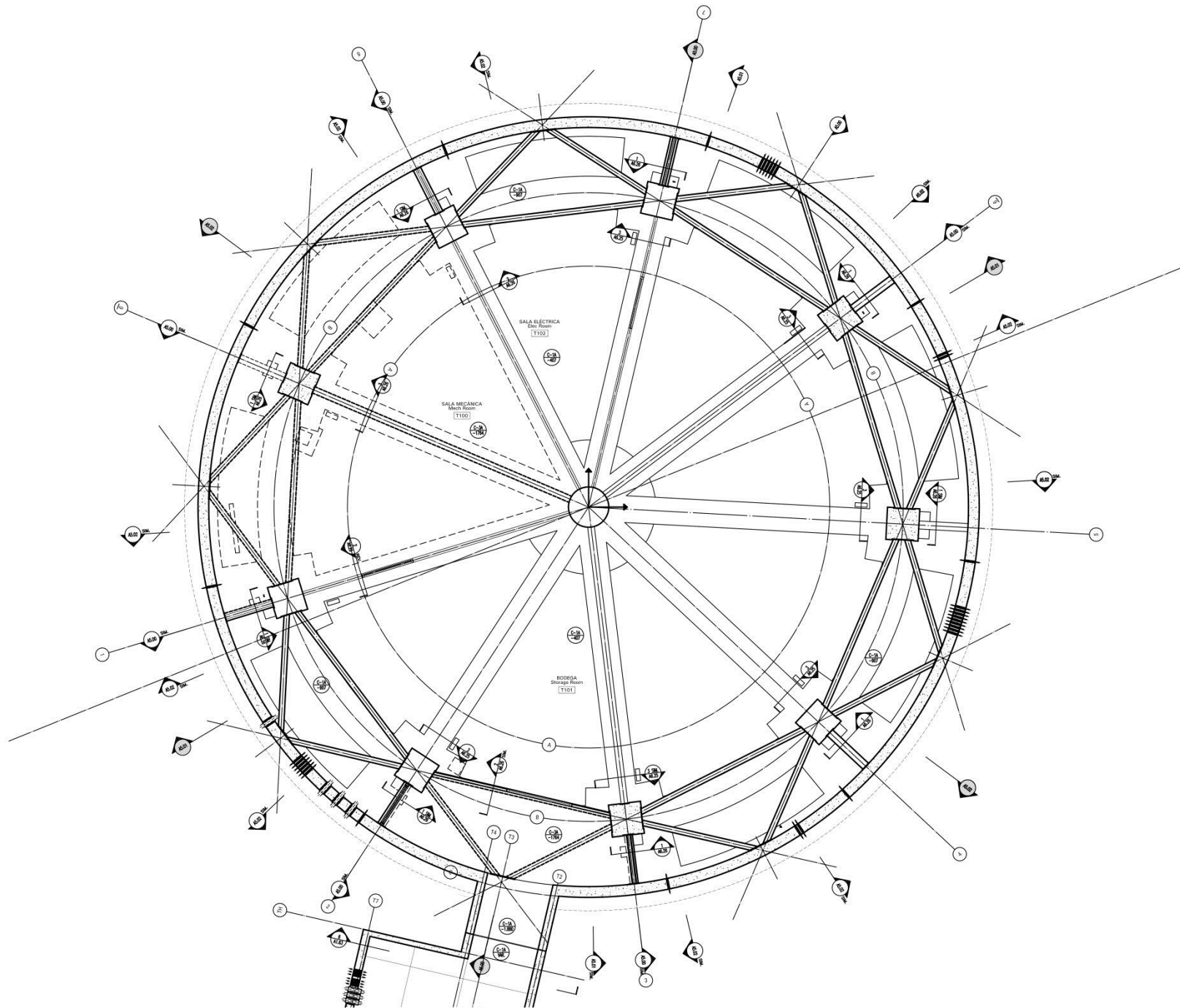
Isometric

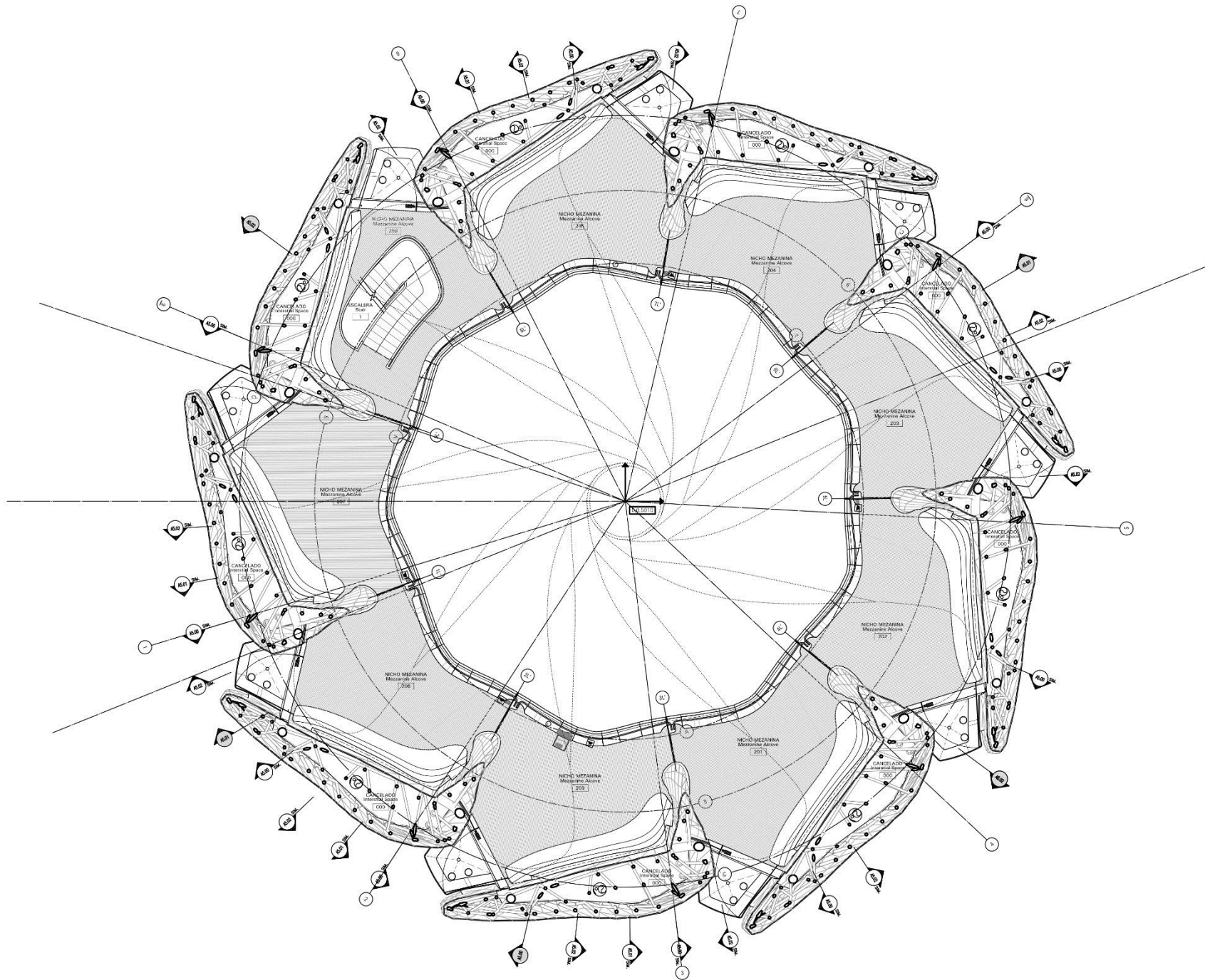


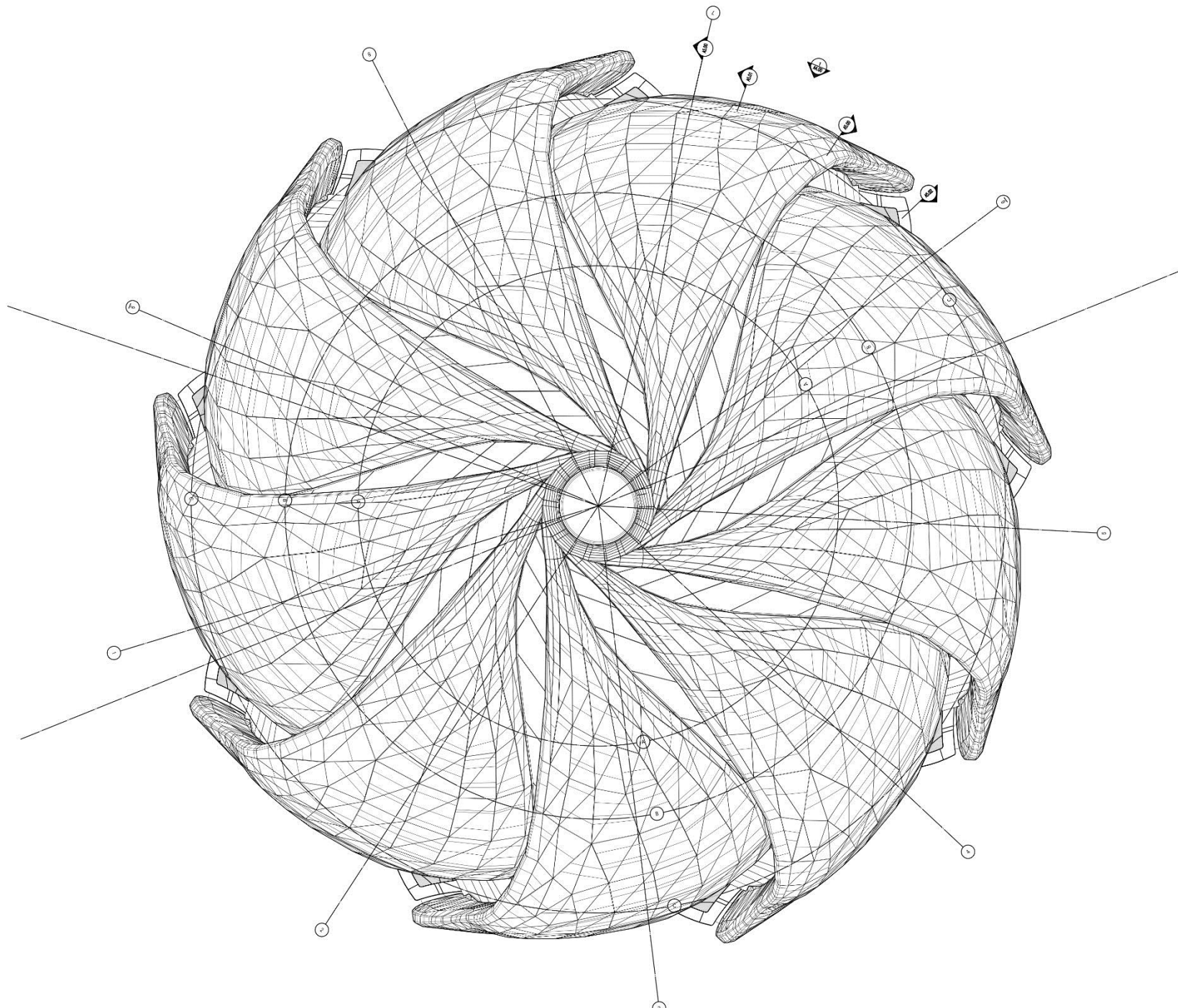
Max Sigma- eqv : 0.65, Min Sigma- eqv : 0.00

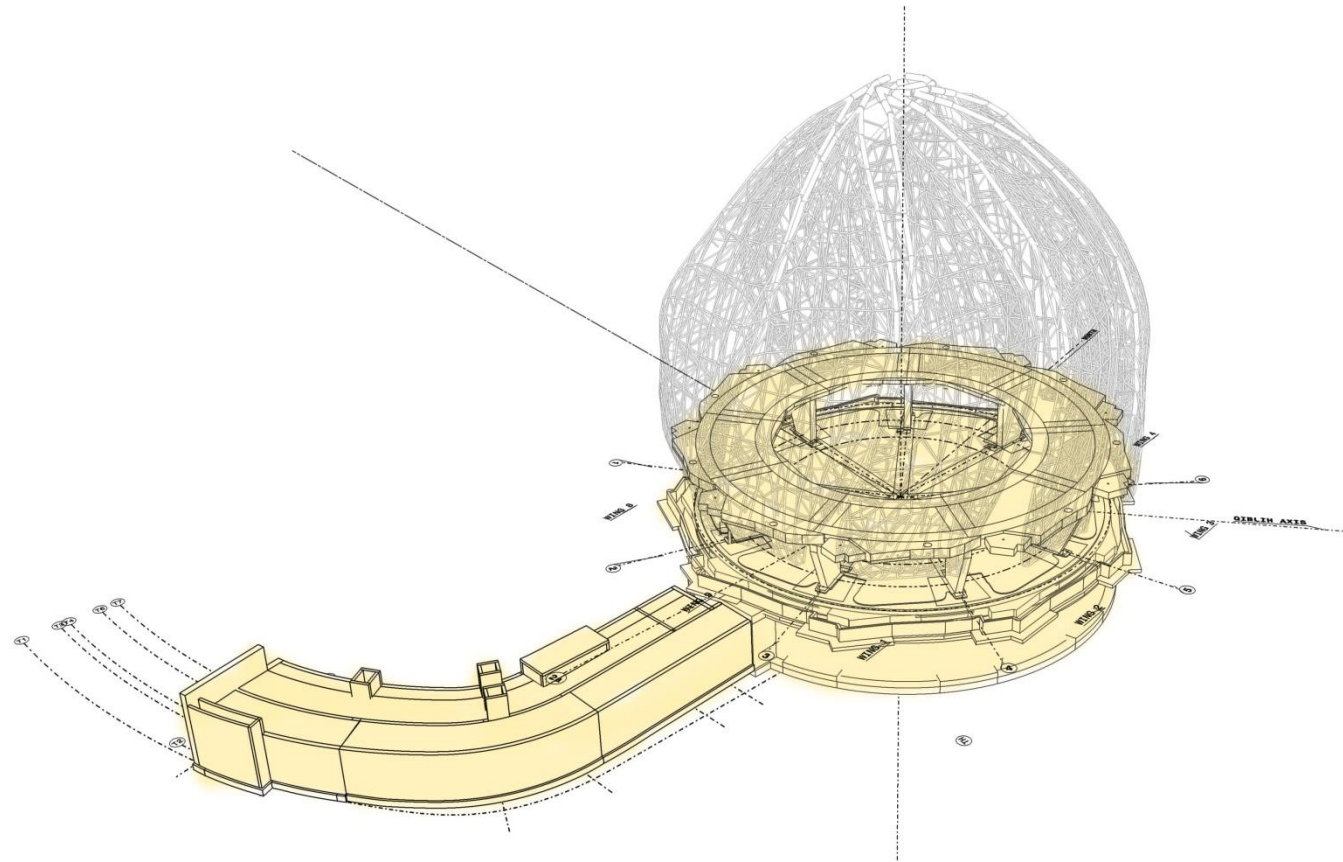
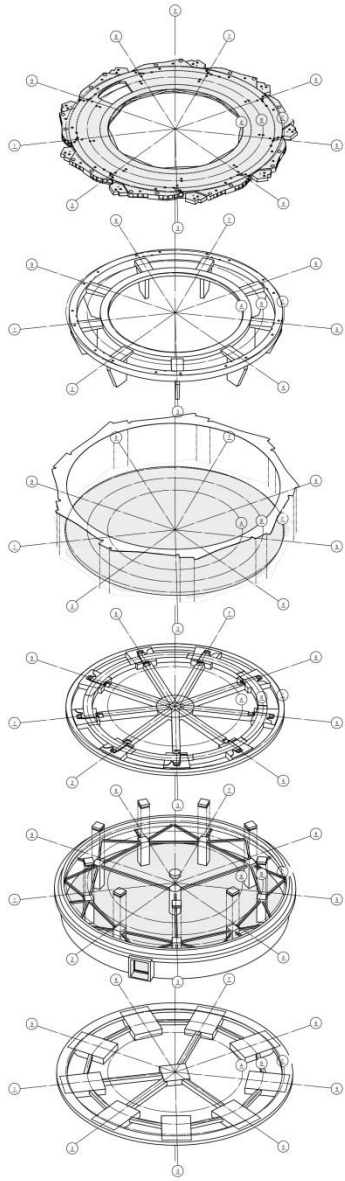












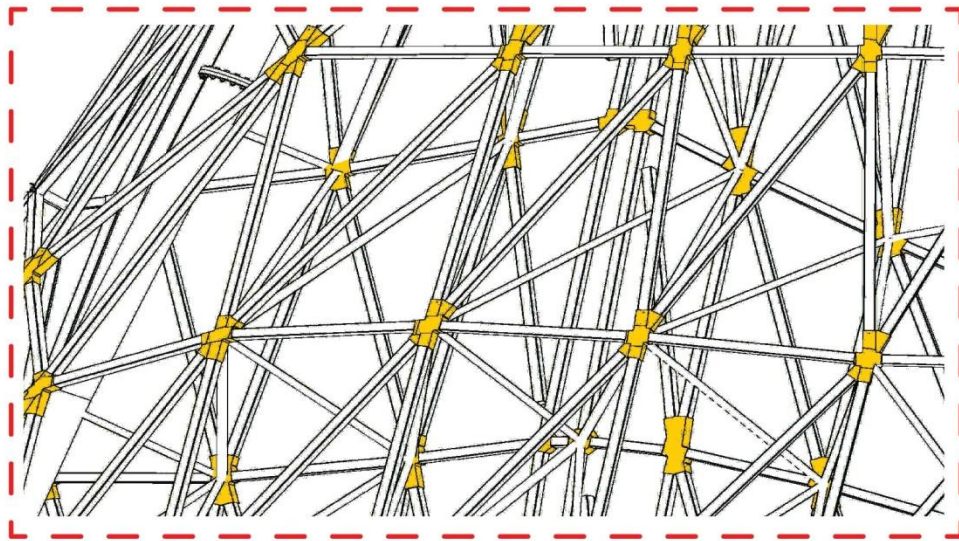
Concrete Structure





Earthquake Protection Systems
Friction Pendulum Bearing

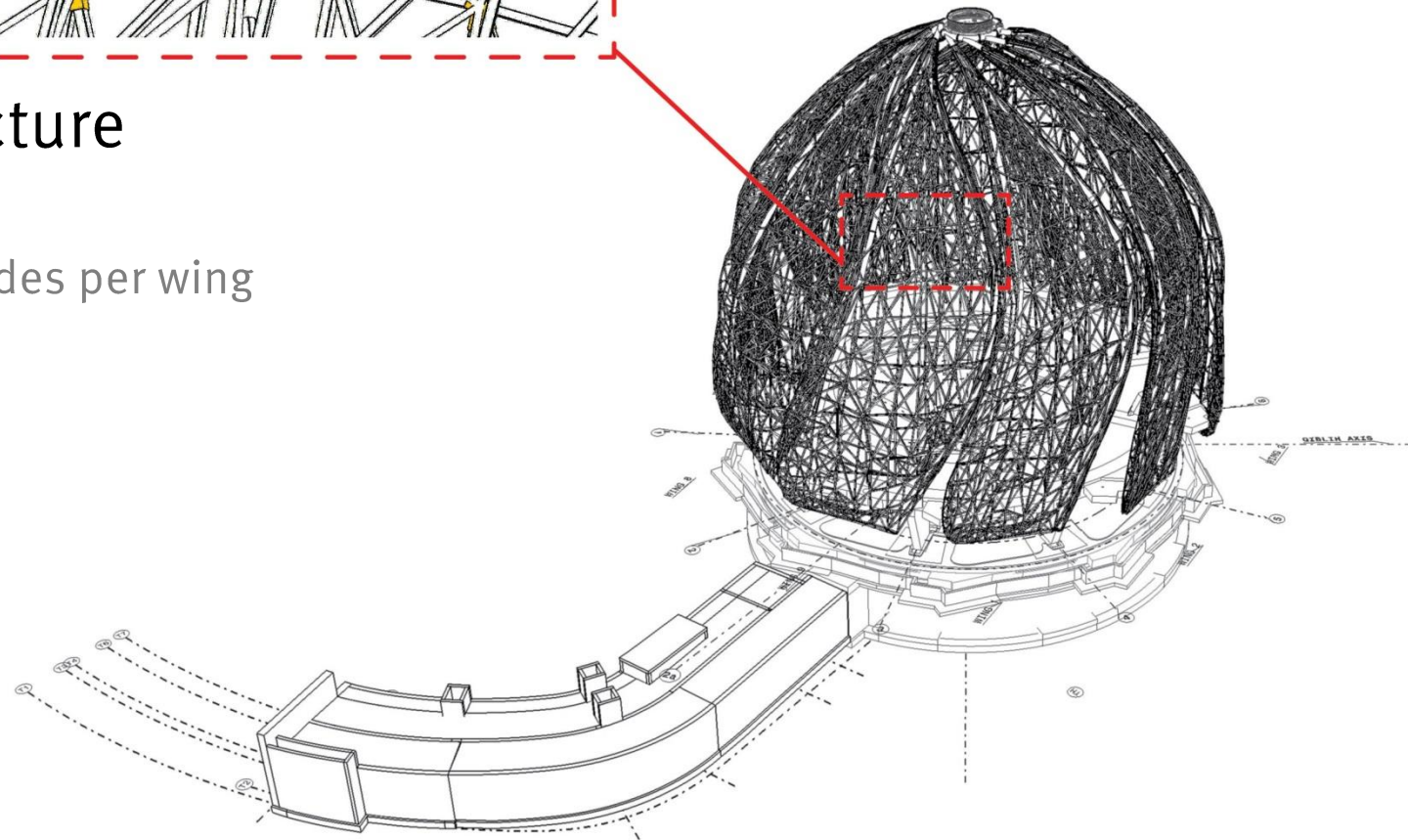
223

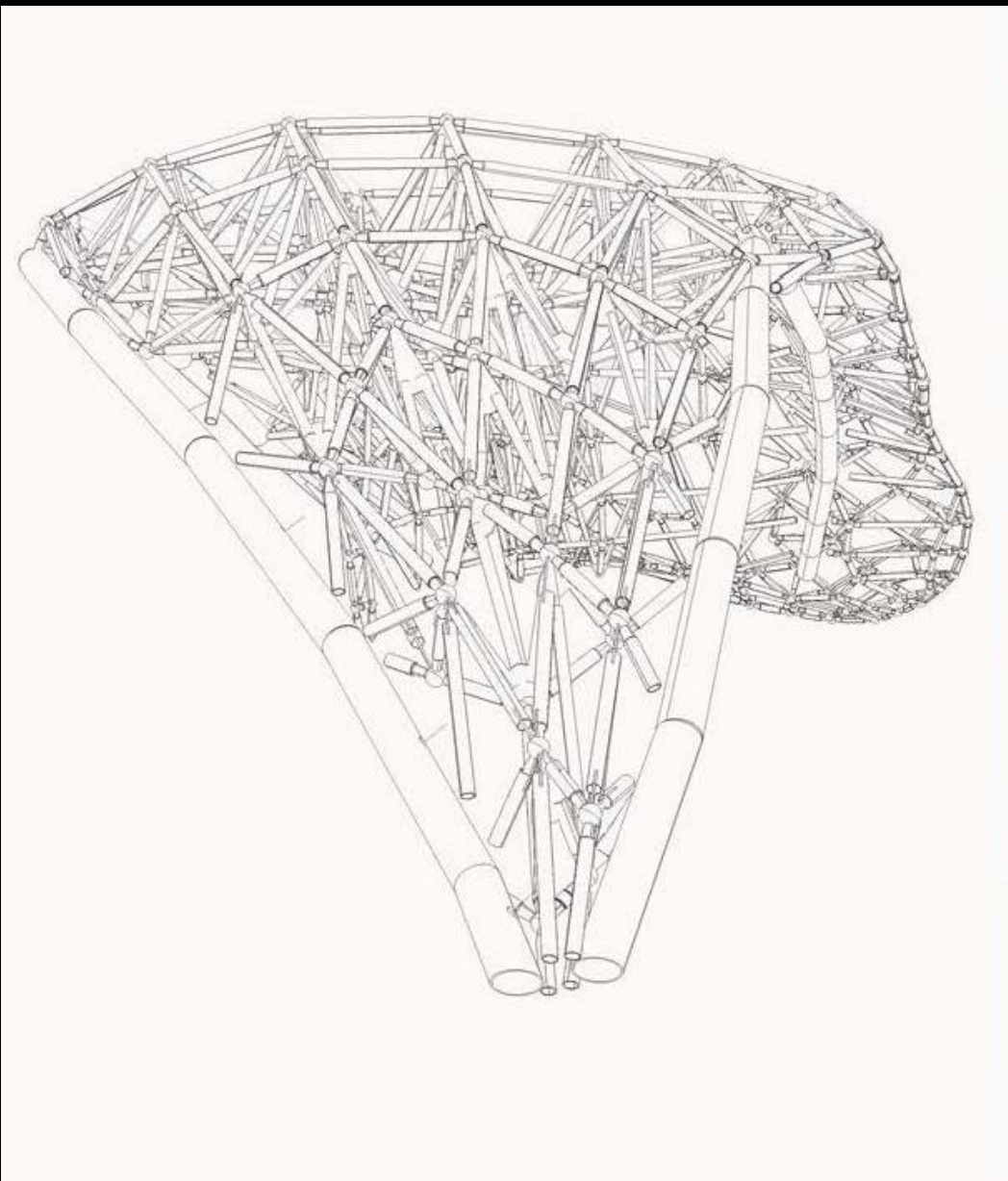


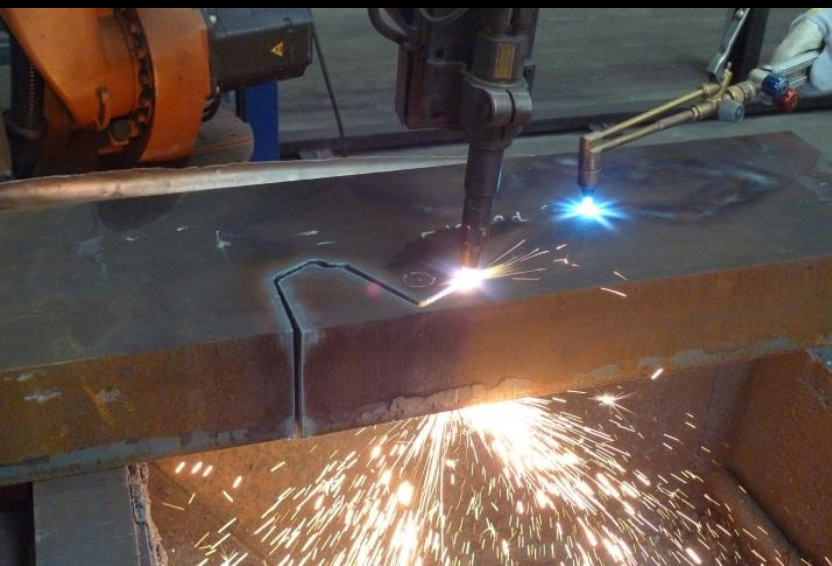
Steel Structure

Nodes

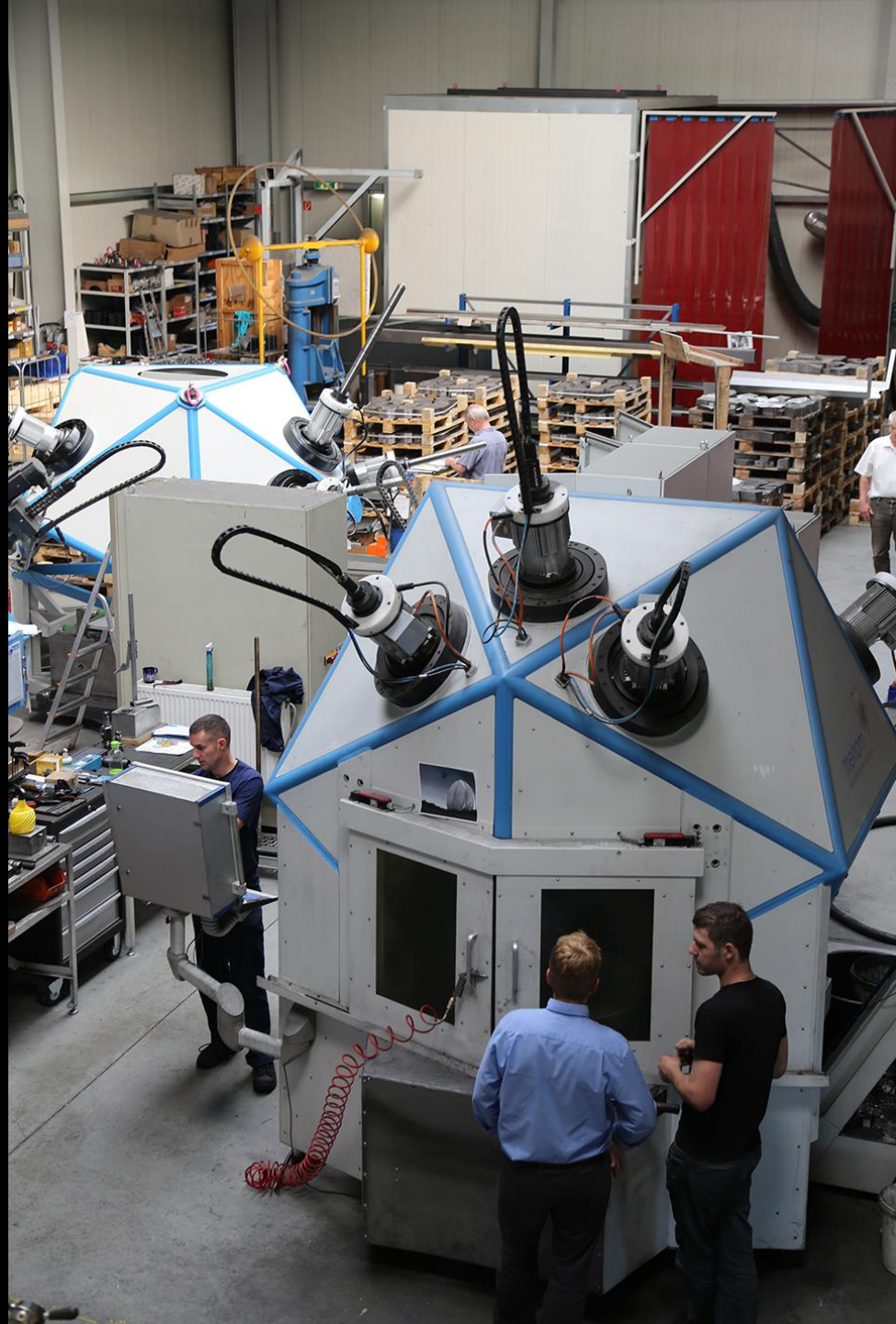
281 unique nodes per wing

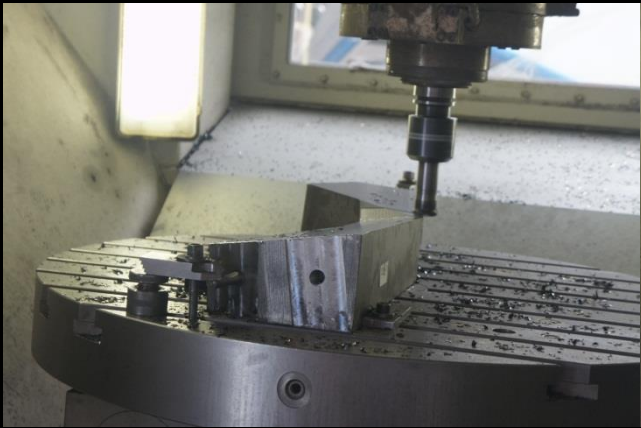


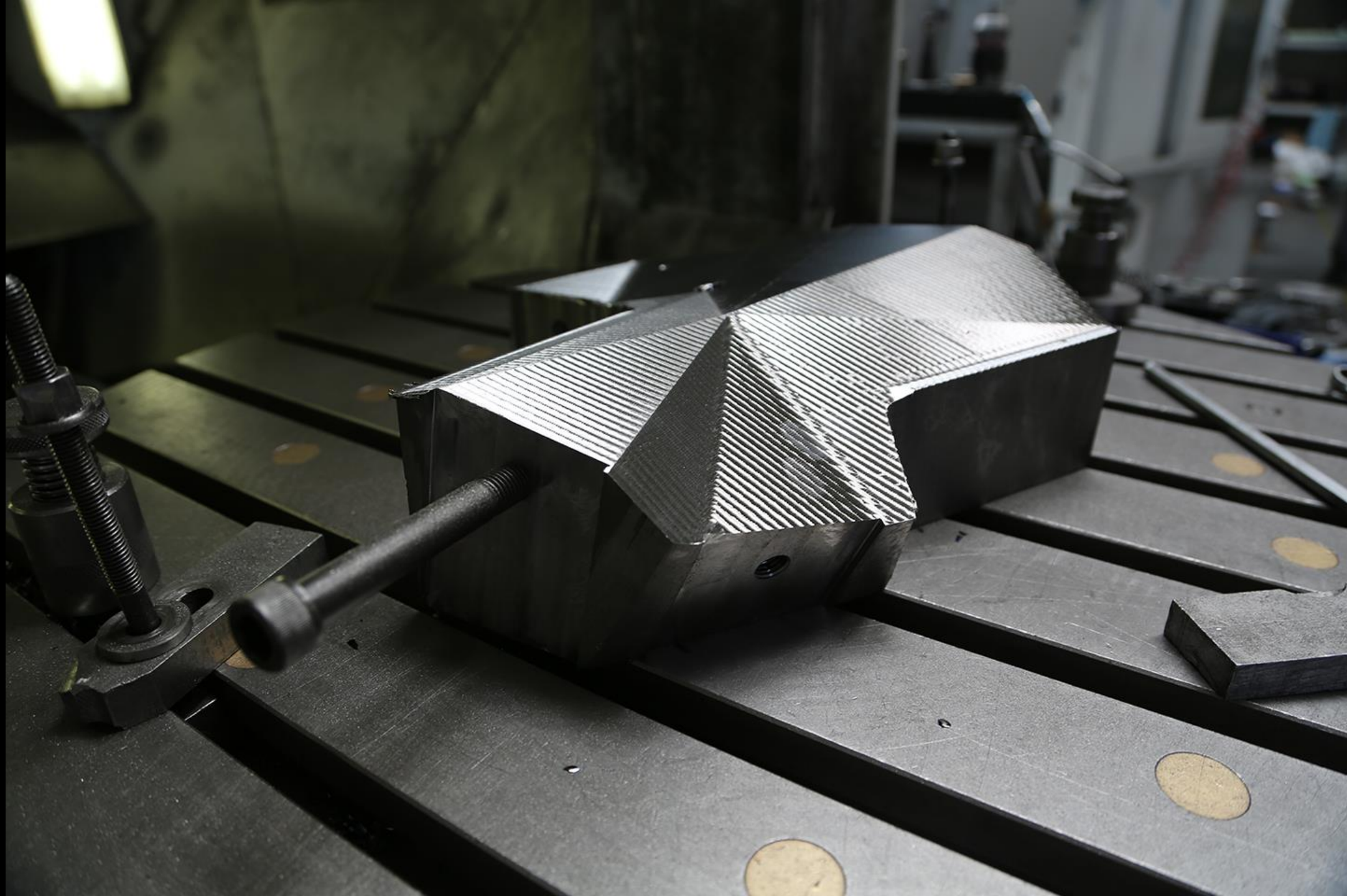














W 2656 1038

h = 1574

660 1175

W 2659 1177

GR 275

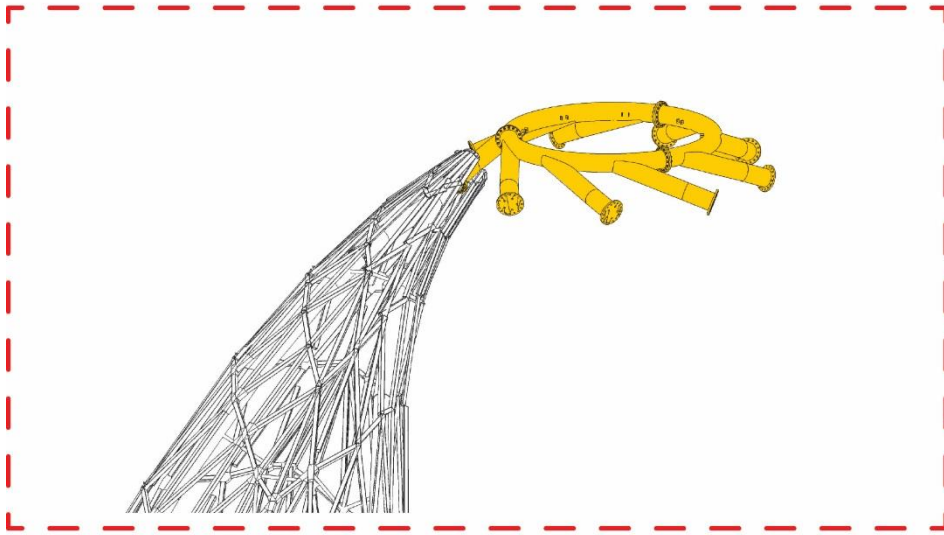
W 2660 1174

2x VPW 2658 1071

W 2659 1176



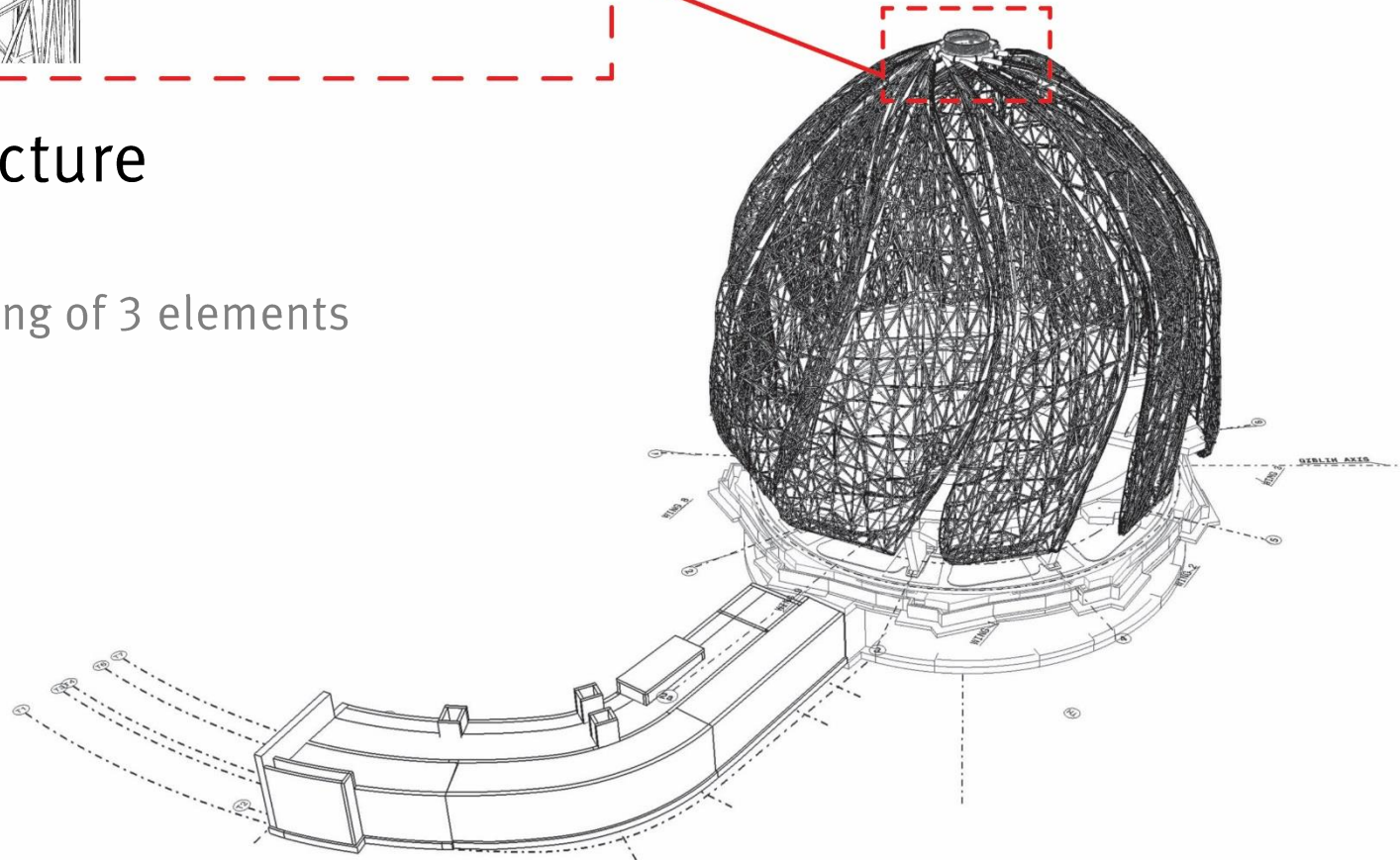




Steel Structure

Oculus

1 ring consisting of 3 elements

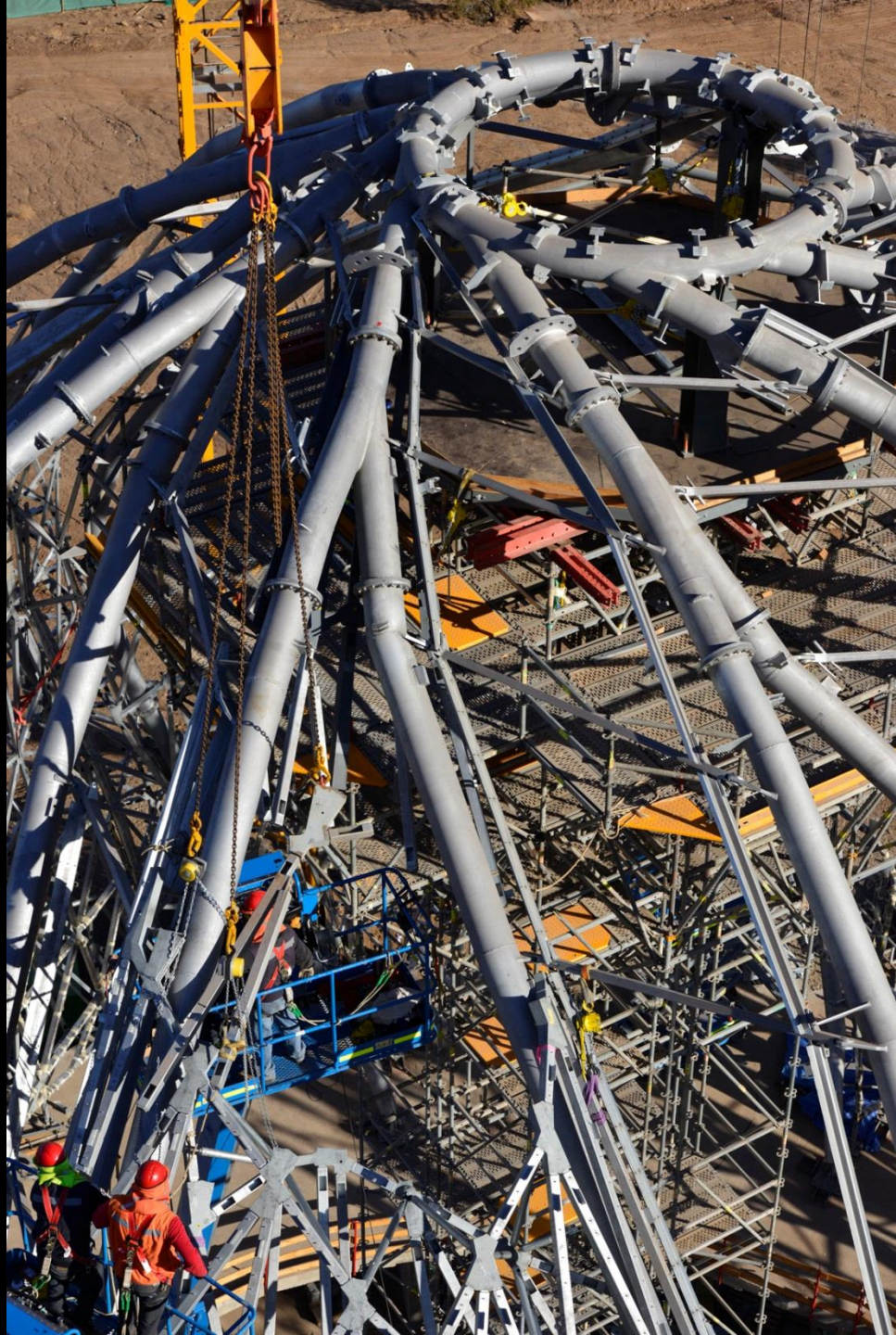












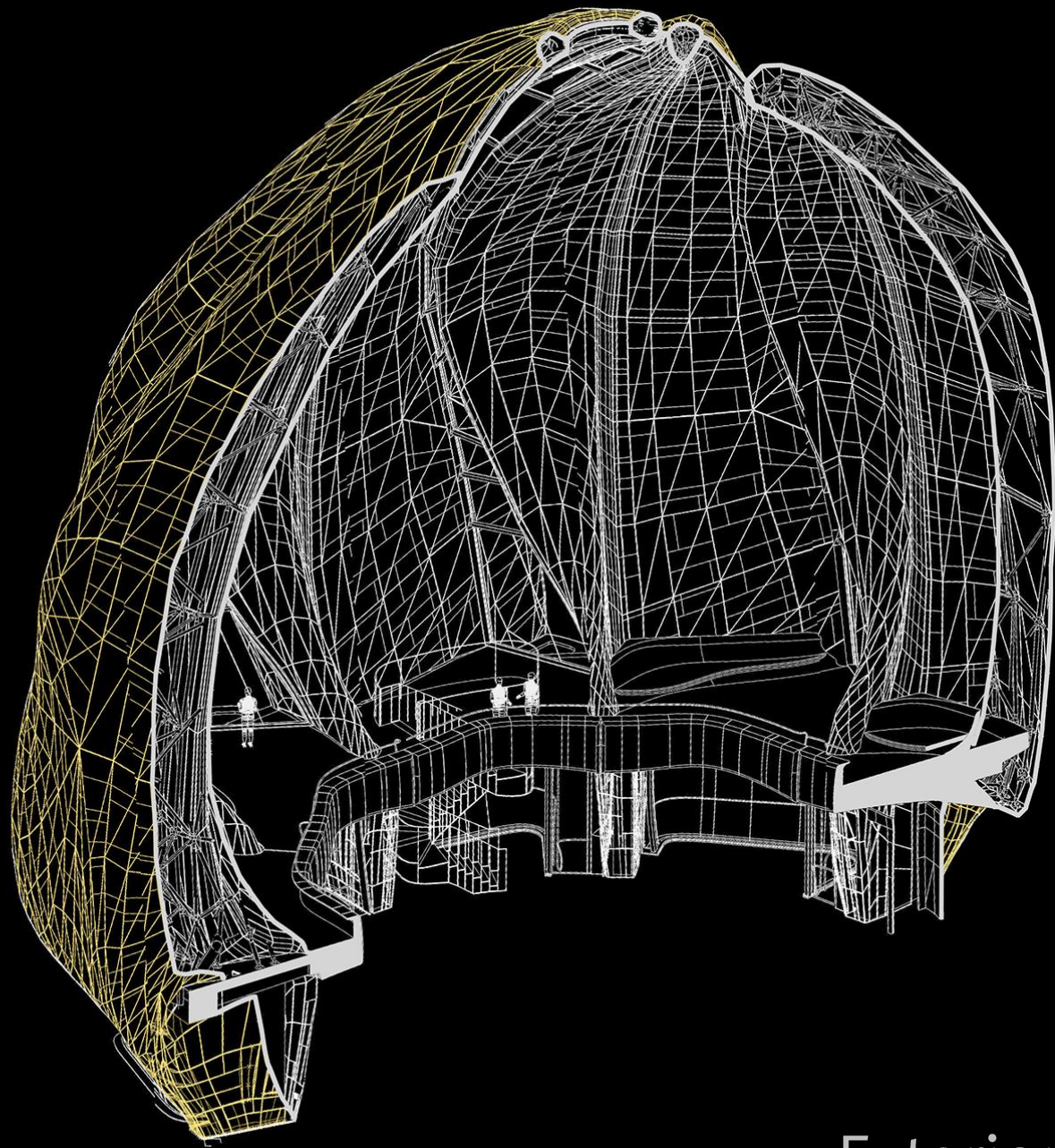




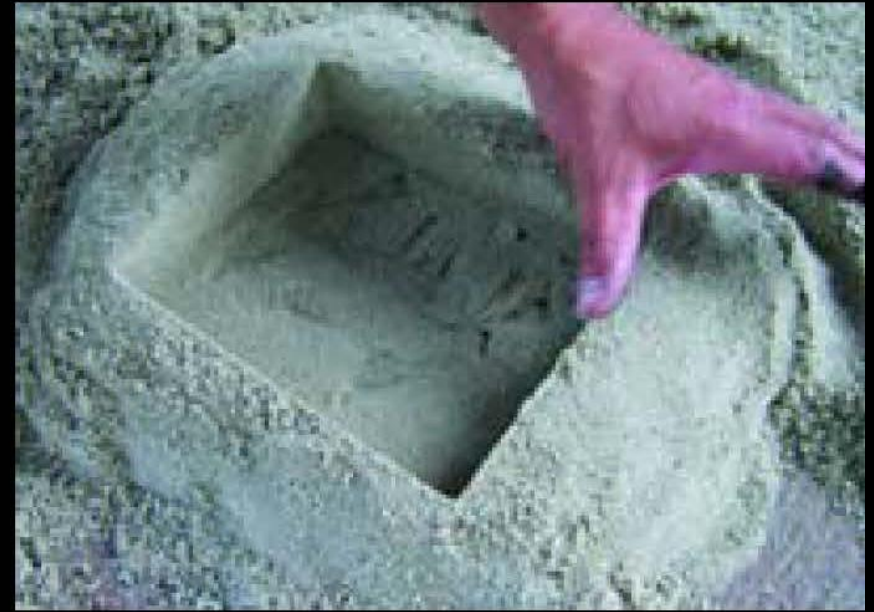








Exterior Cladding- Cast Glass









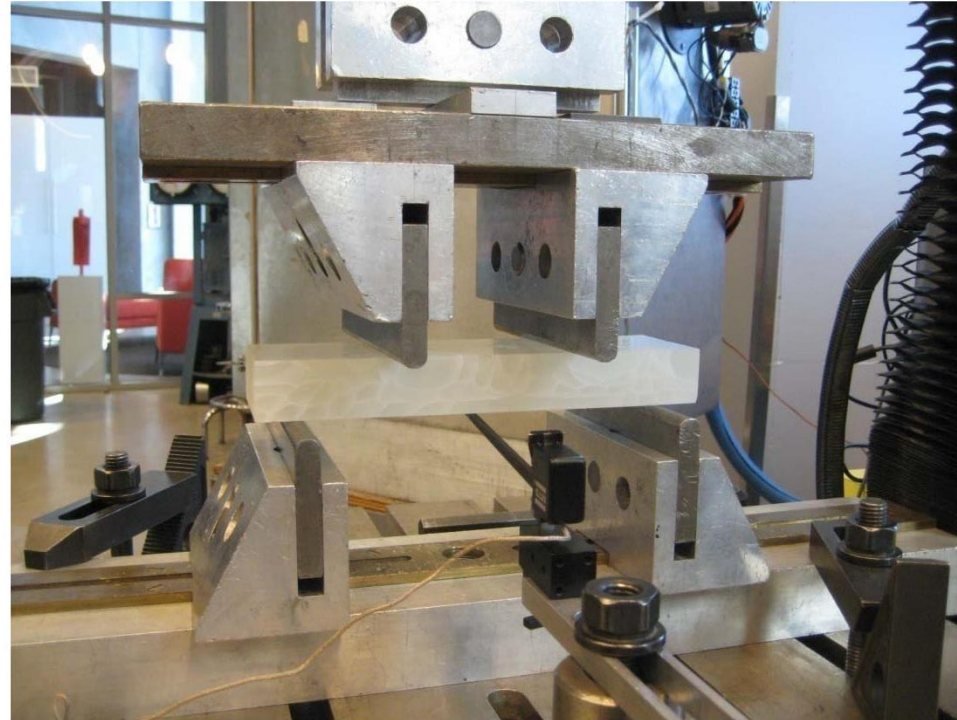
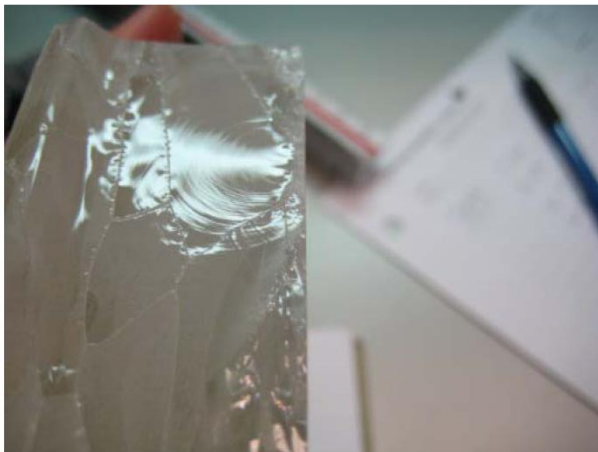




Testing

Methods

- ASTM C156- Strength of Glass by Flexure
(Conditioned and Unconditioned)
- C666- Resistance to Rapid Freezing and Thawing
(100 and 200 cycles)
- Moisture exposure including dye penetrant Resistance

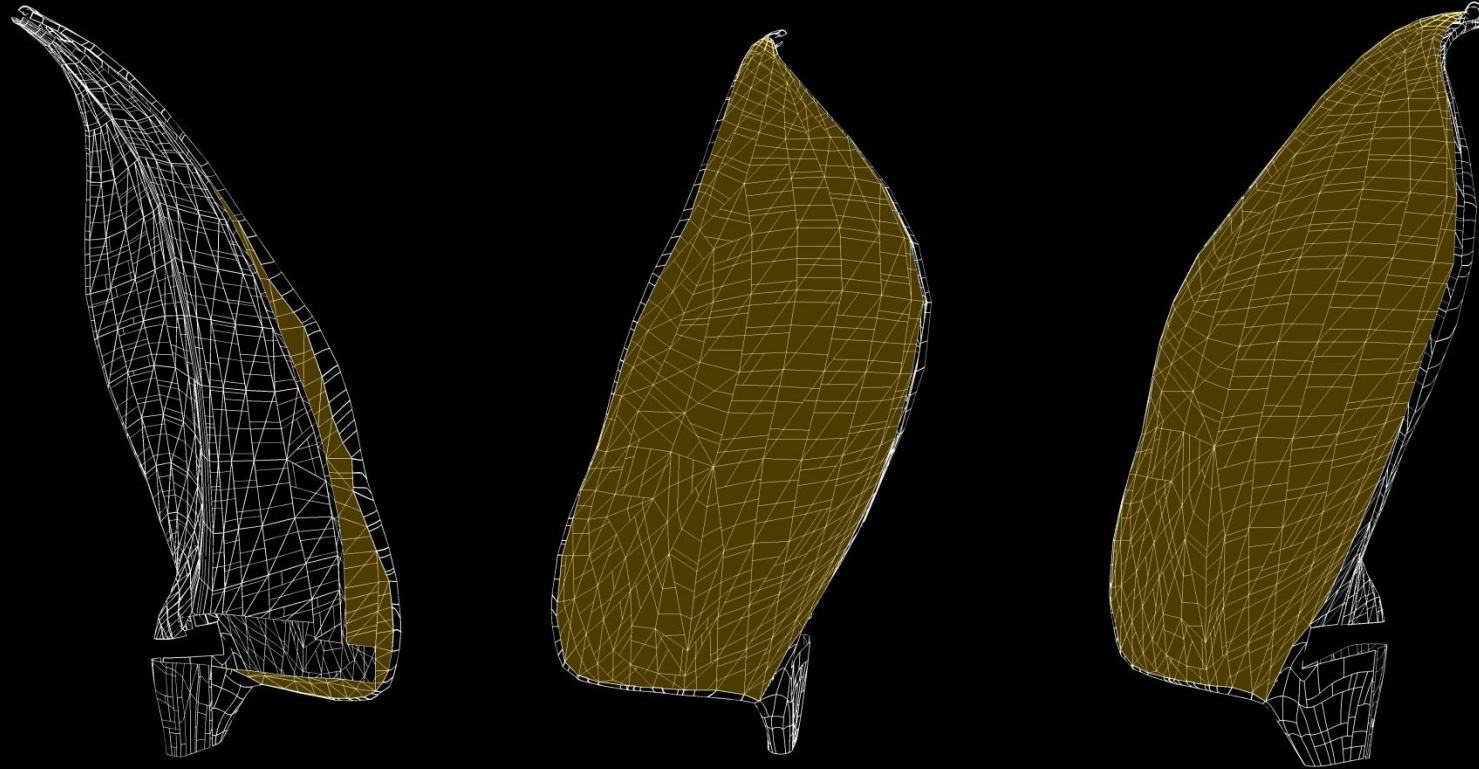


- **Borosilicate (Pyrex)**
- Clear
- Durable
- Chemical and Heat Resistant
- Resistant to Thermal Shock





Exterior Cladding - Flat Cast Glass Panels



Per wing:

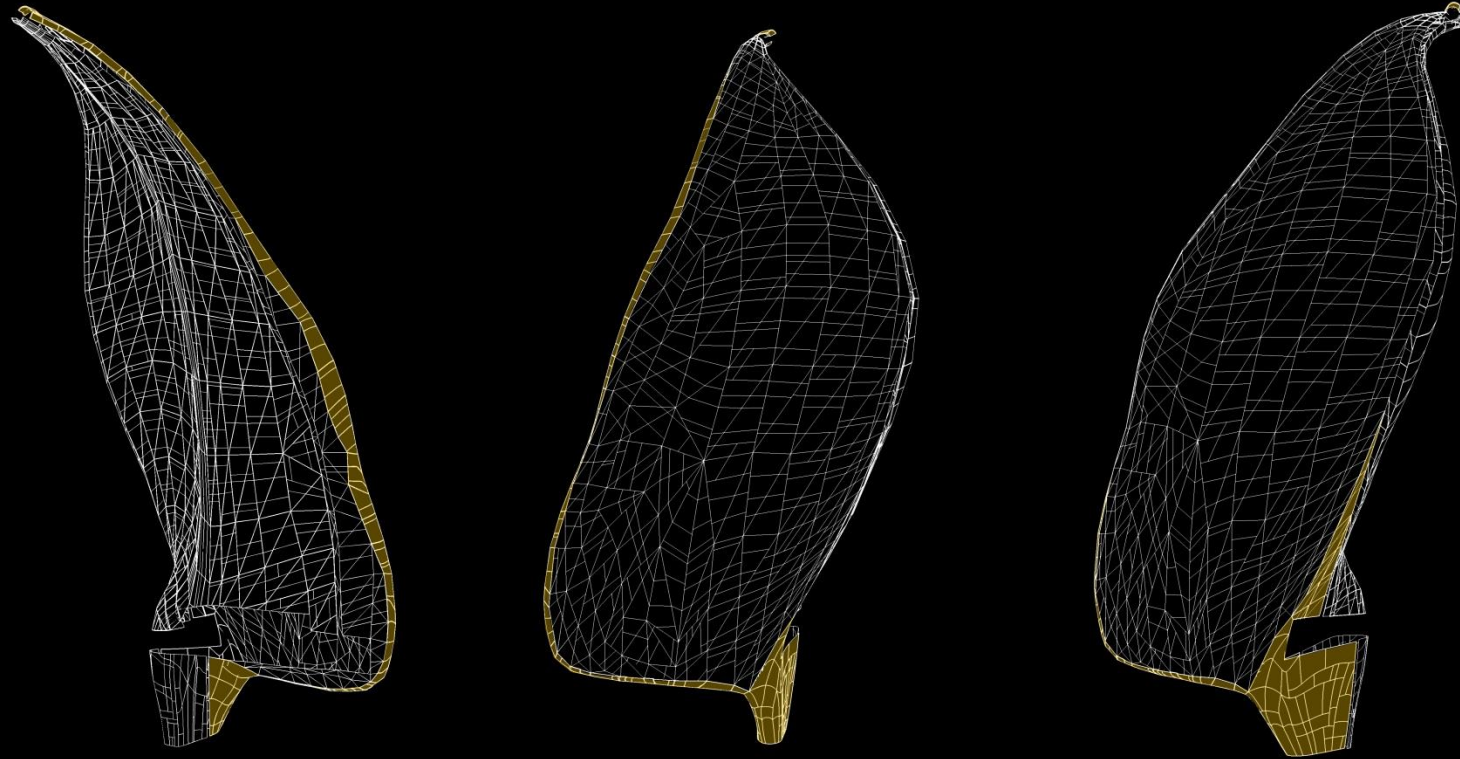
345 Flat Panels w/ Aluminum Frames

Consisting of

978 unique glass pieces



Exterior Cladding - Curved Cast Glass Panels



Per Wing:

105 Curved Panels w/ Aluminum Frames

Consisting of

151 Unique Curved Glass Pieces







3379-2

W-3379-2

86

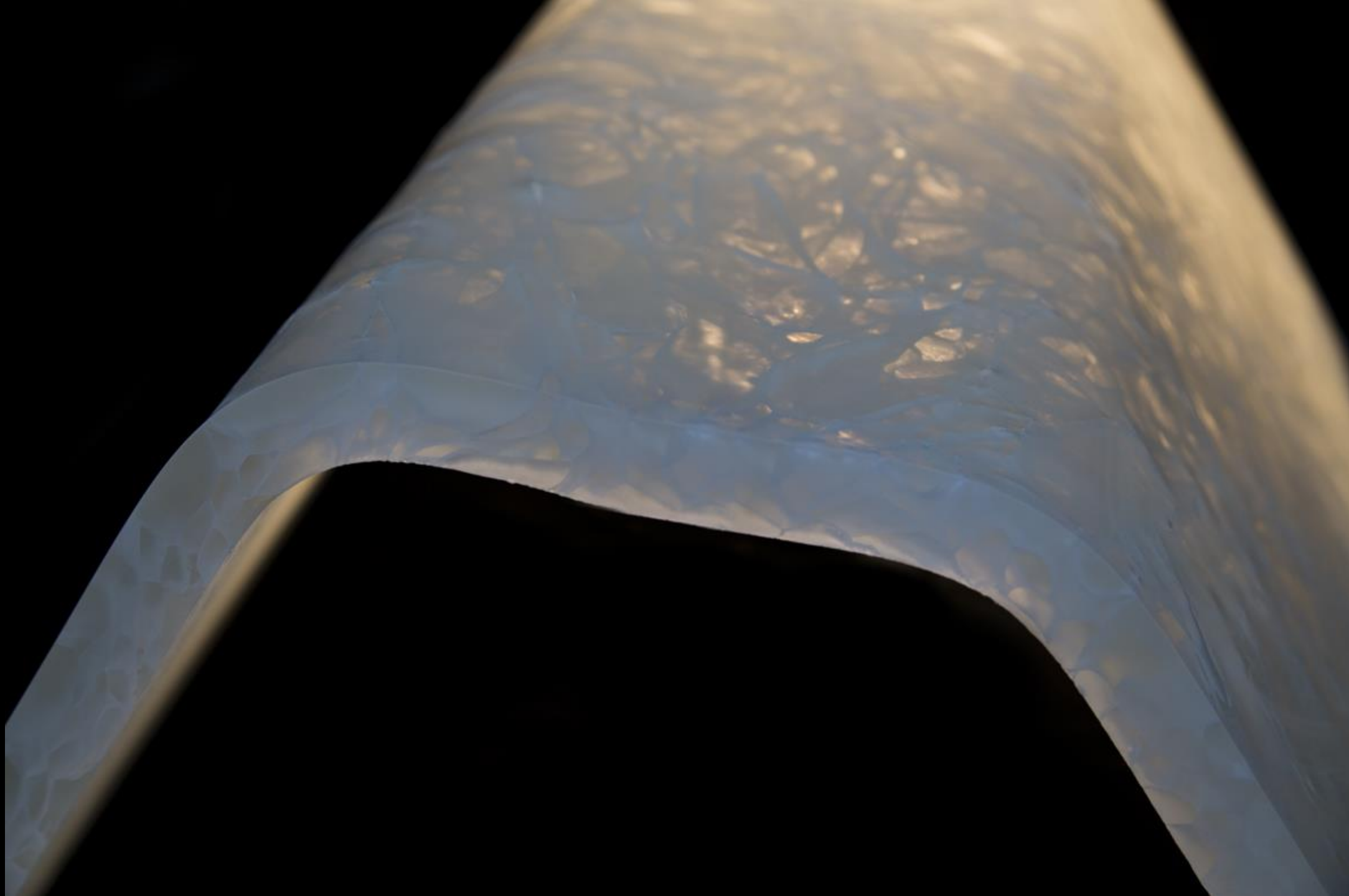
Plastspan

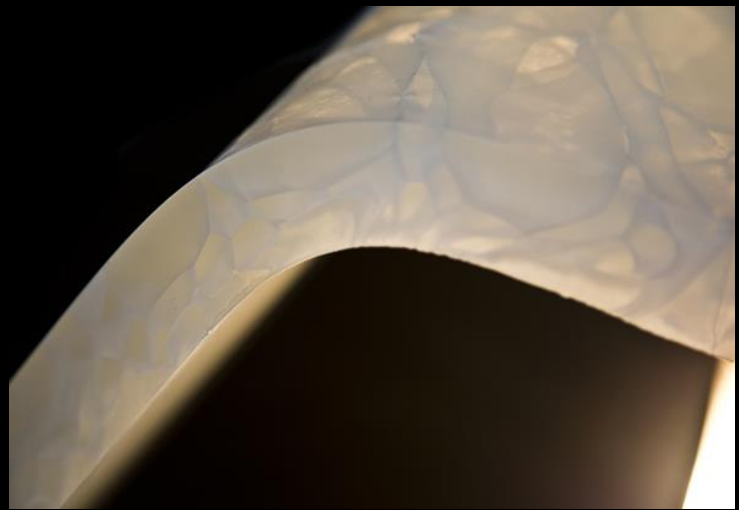


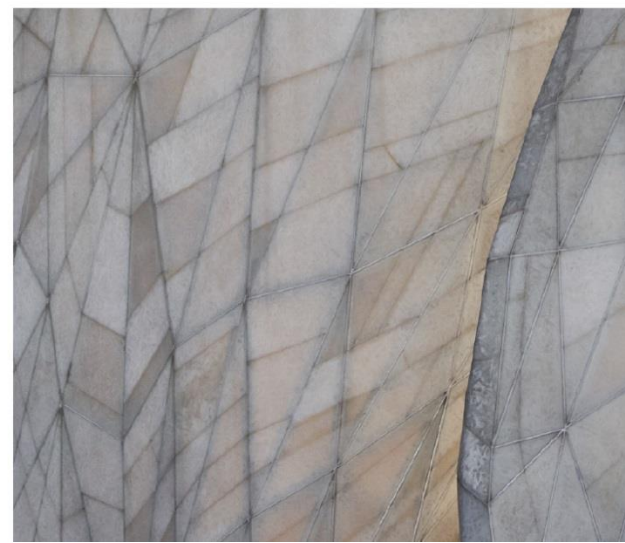
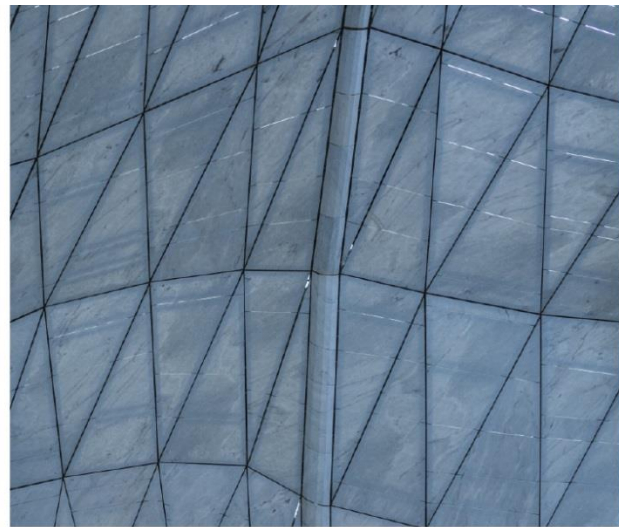
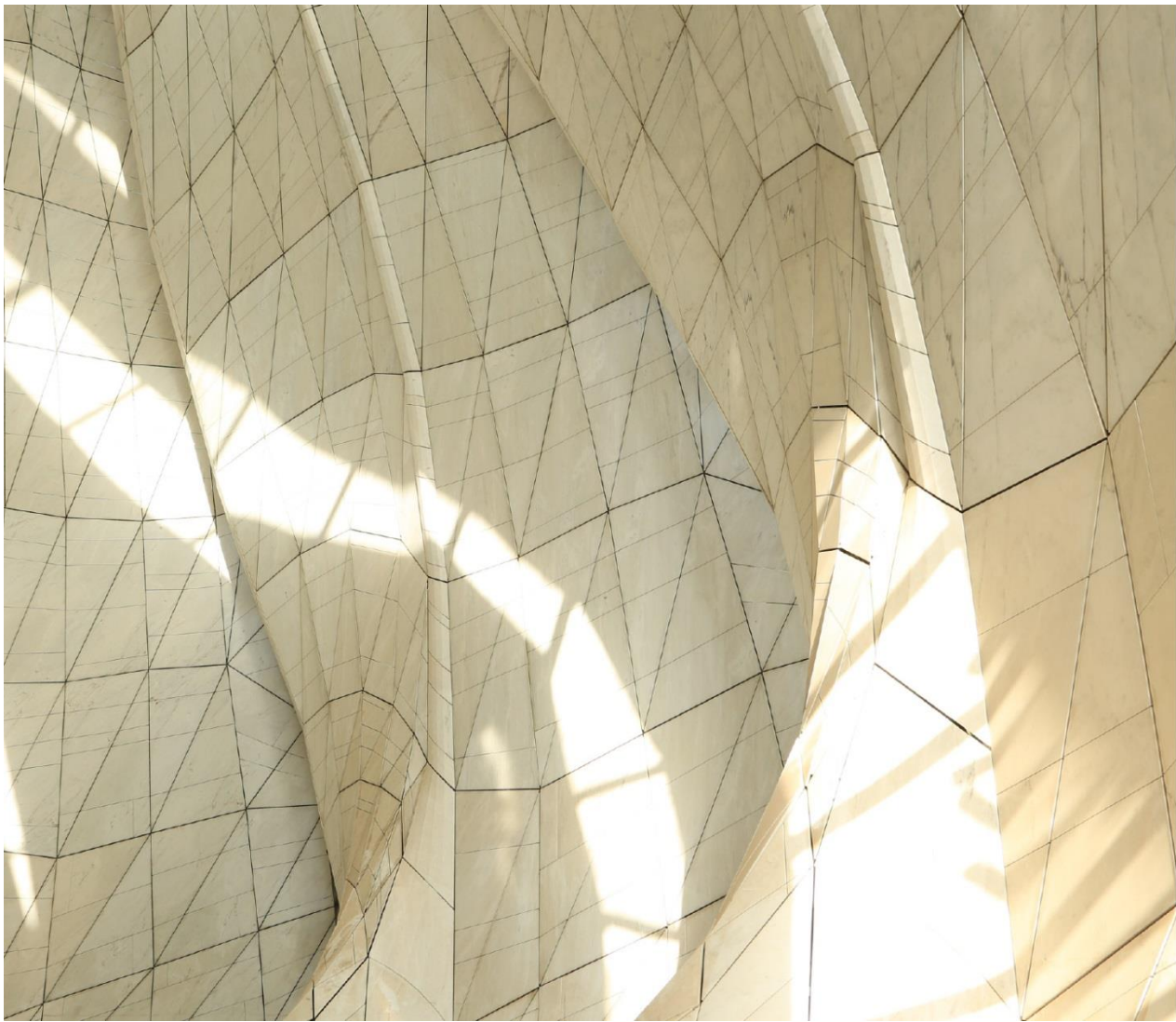






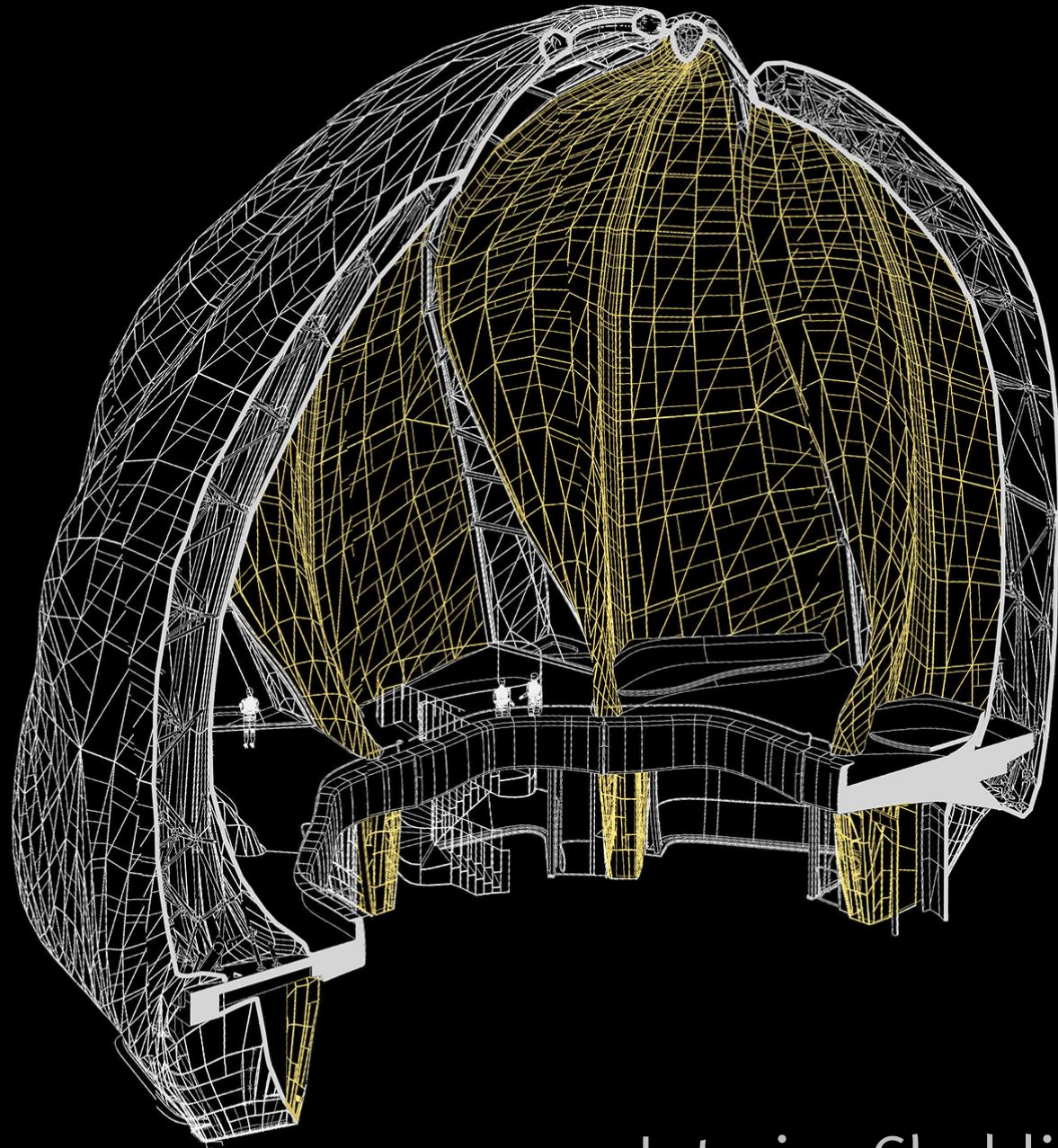












Interior Cladding- **Translucent Marble**

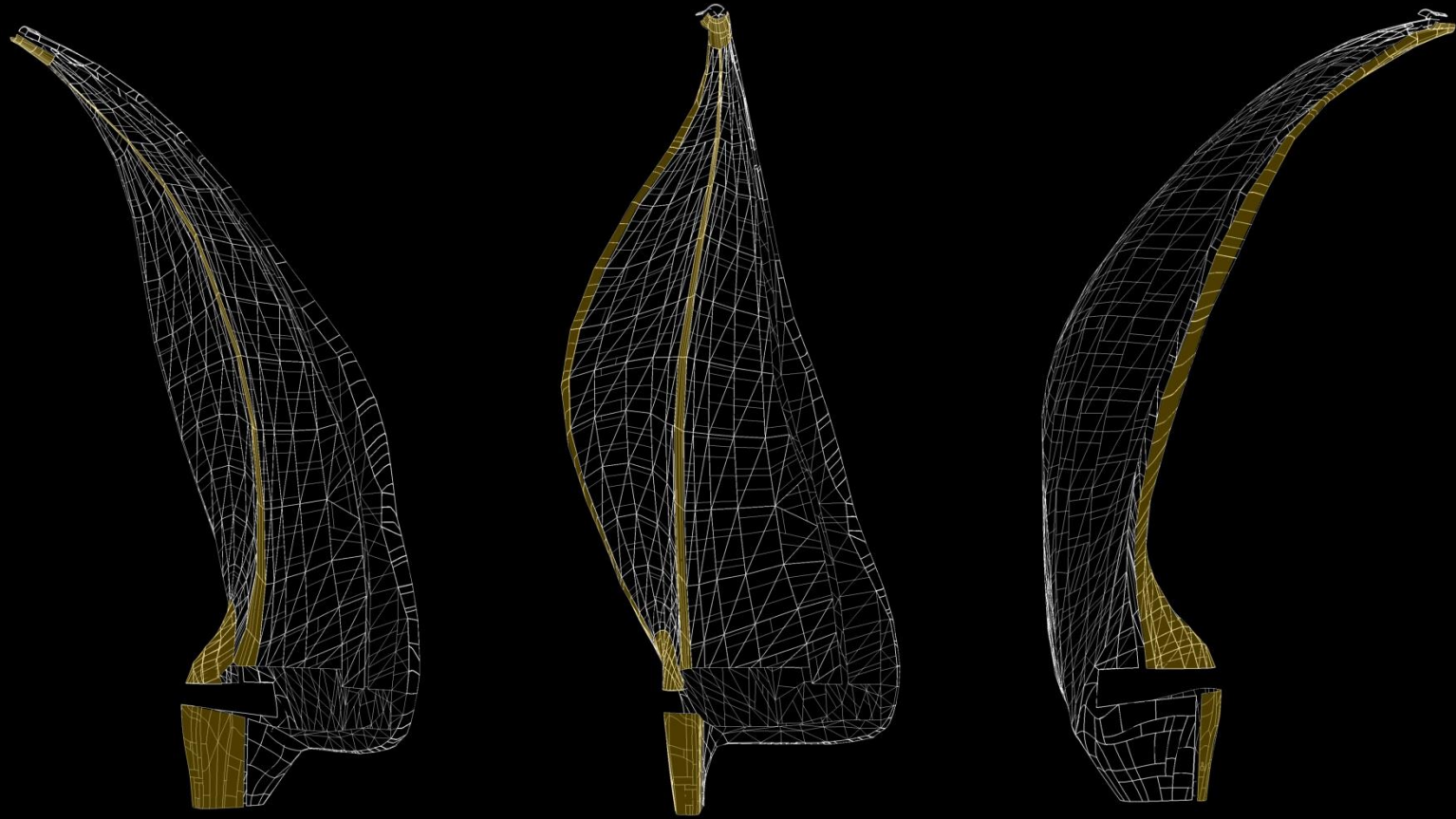








Interior Cladding – Curved Stone Panels



Per Wing:

86 Curved Stone Panels w/ Aluminum Frames

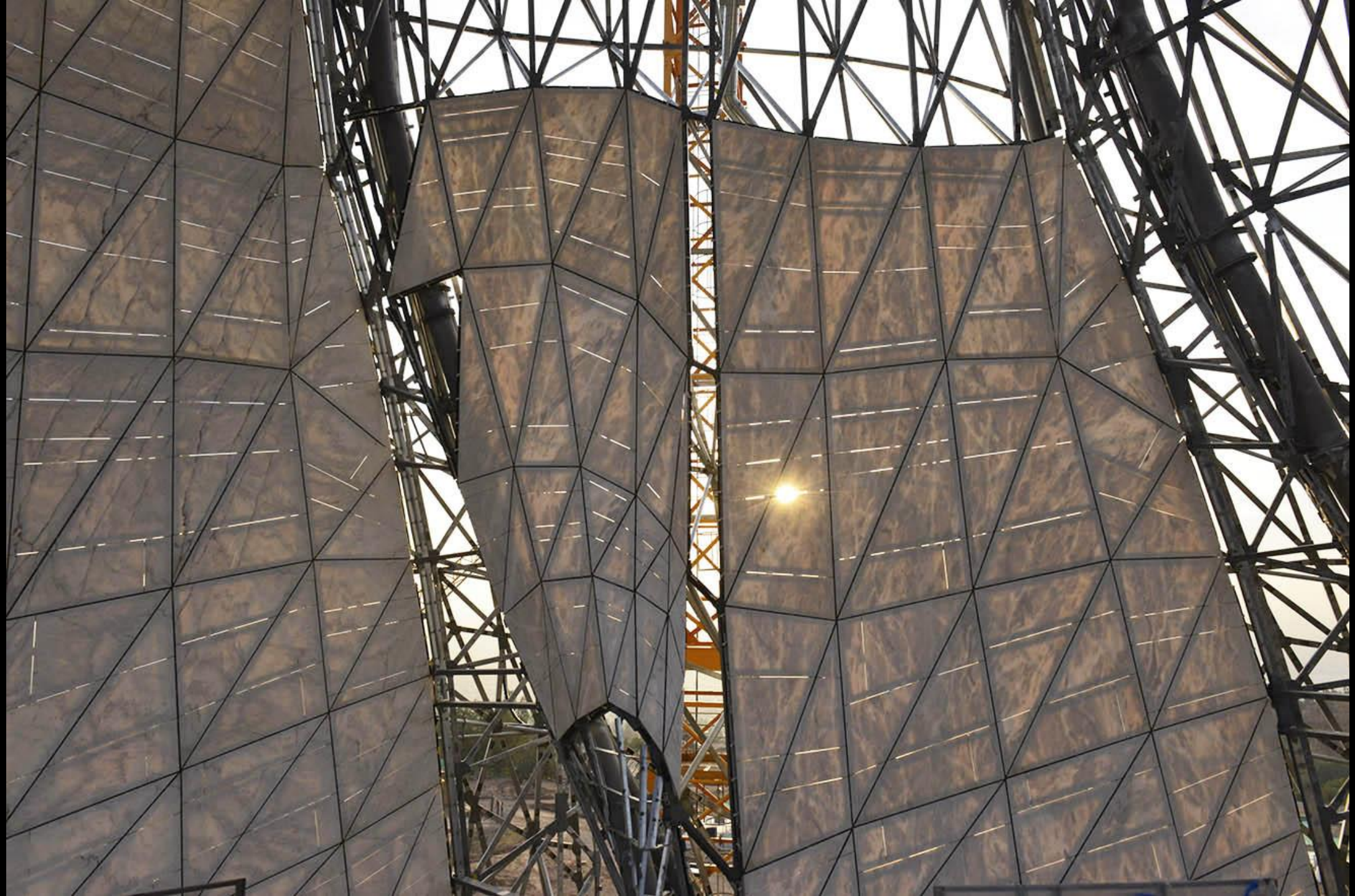
Consisting of

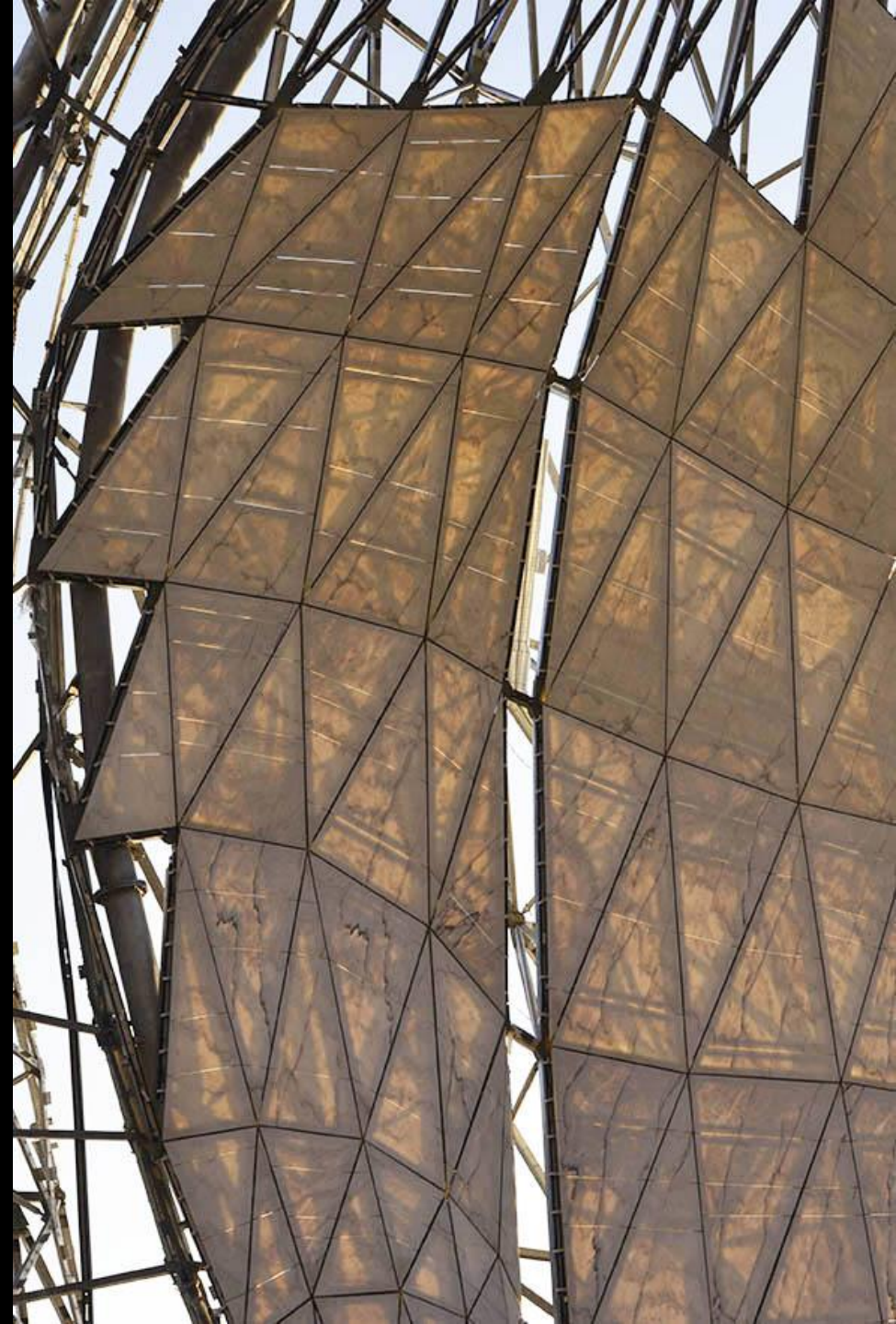
221 Unique Stone Pieces



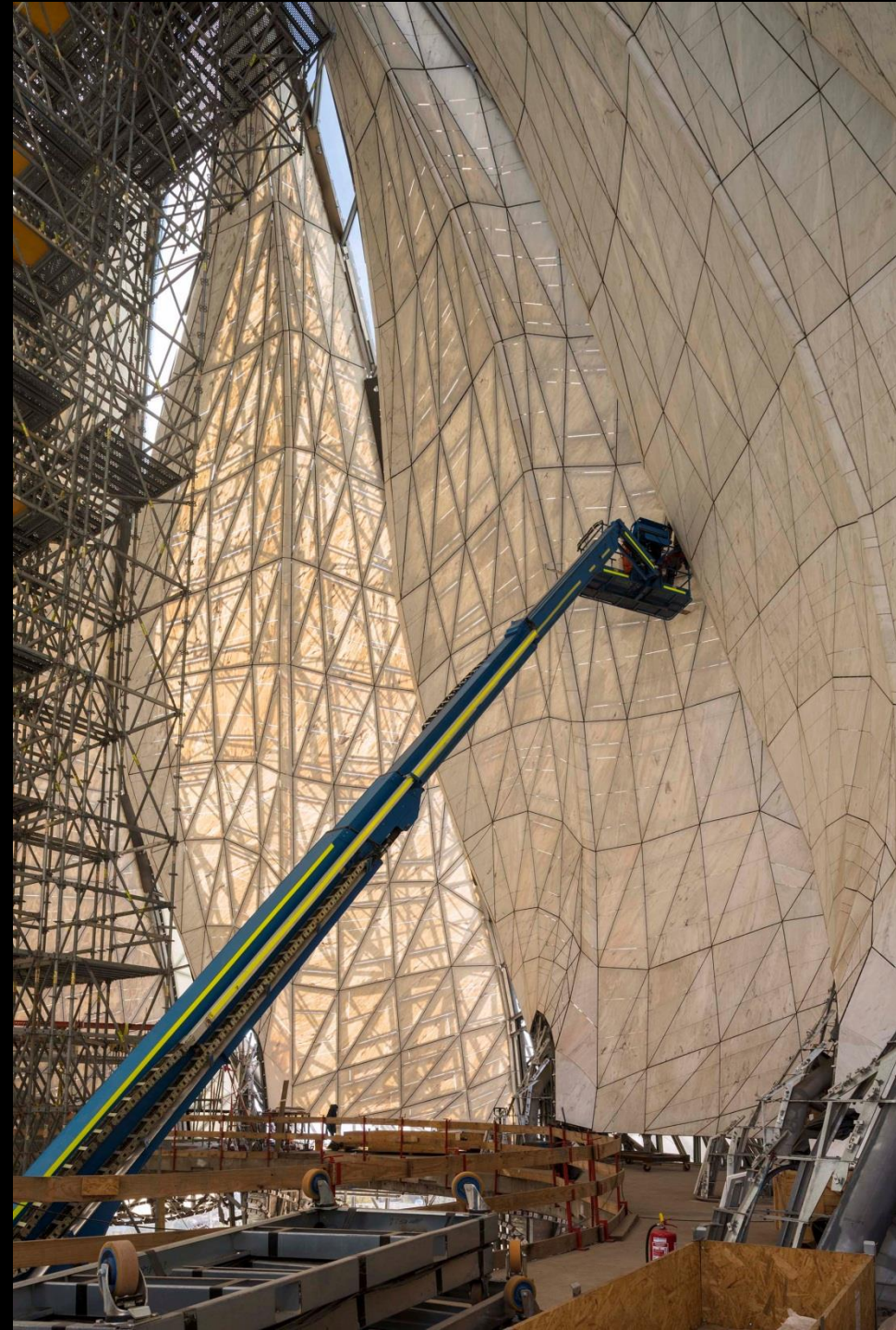






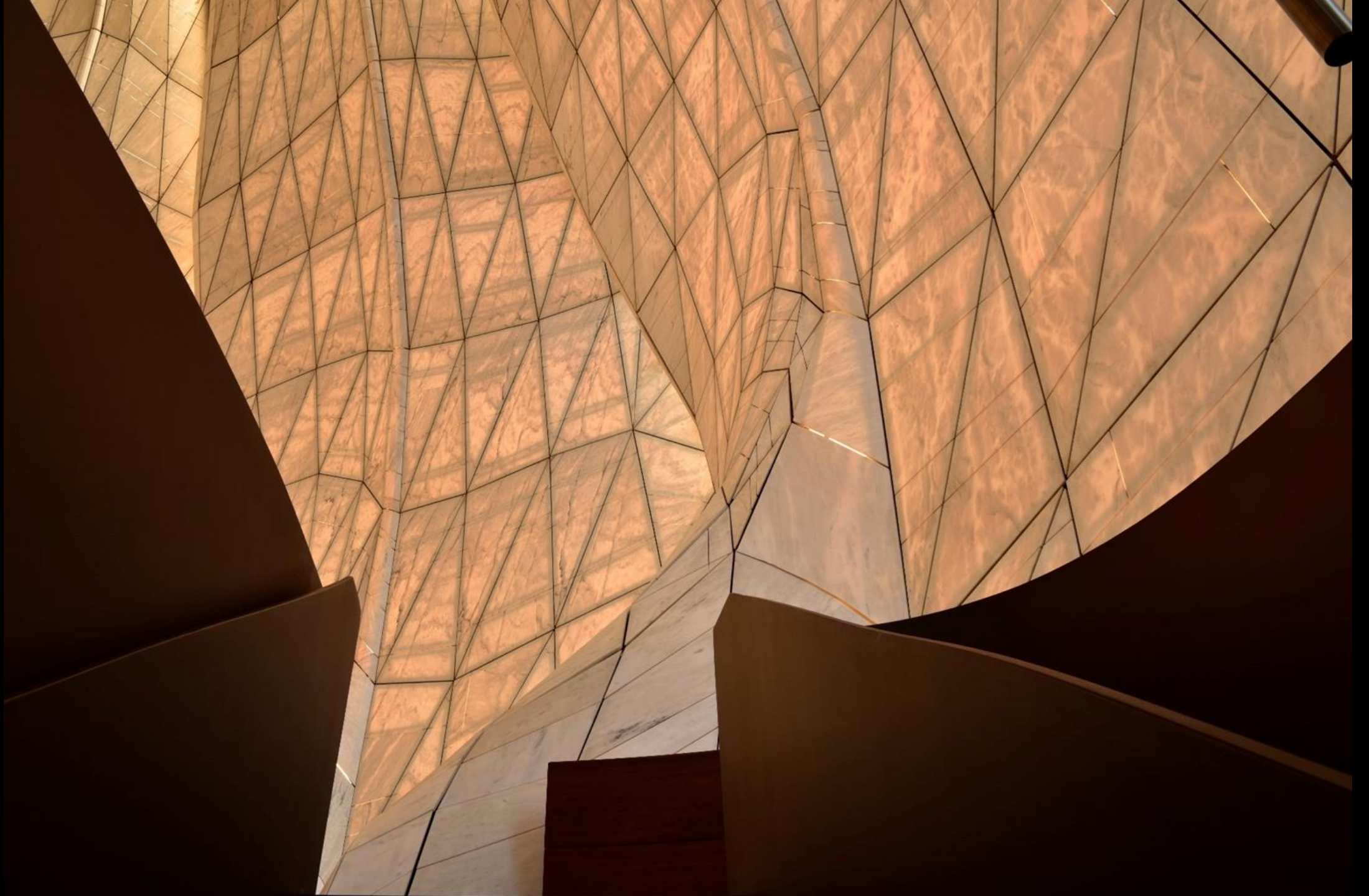














بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ





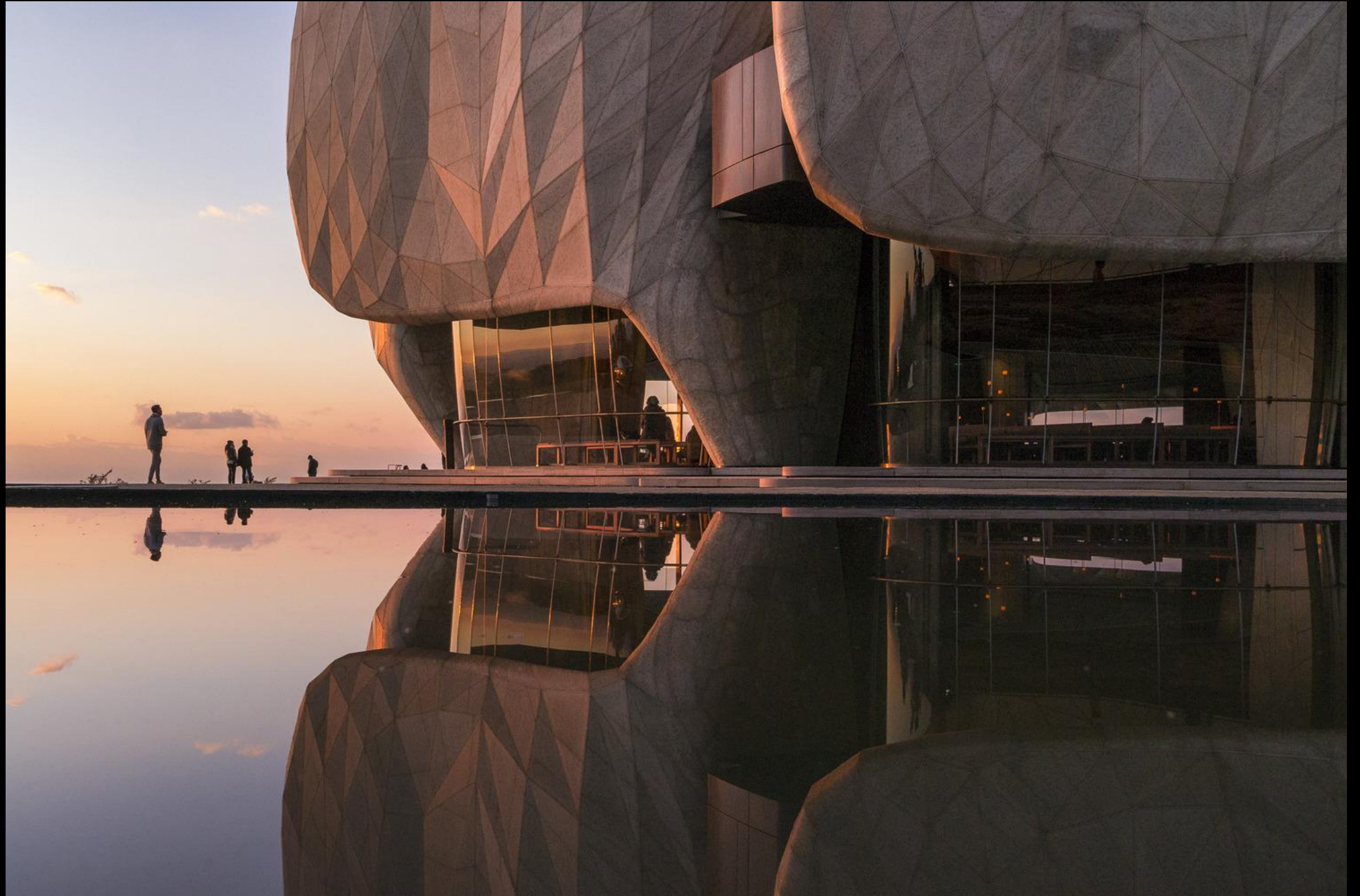






















Façade Tectonics:

Toronto, Ontario

Session #1

8:45 – 10:15 am

By John Kooymans

May 3, 2019

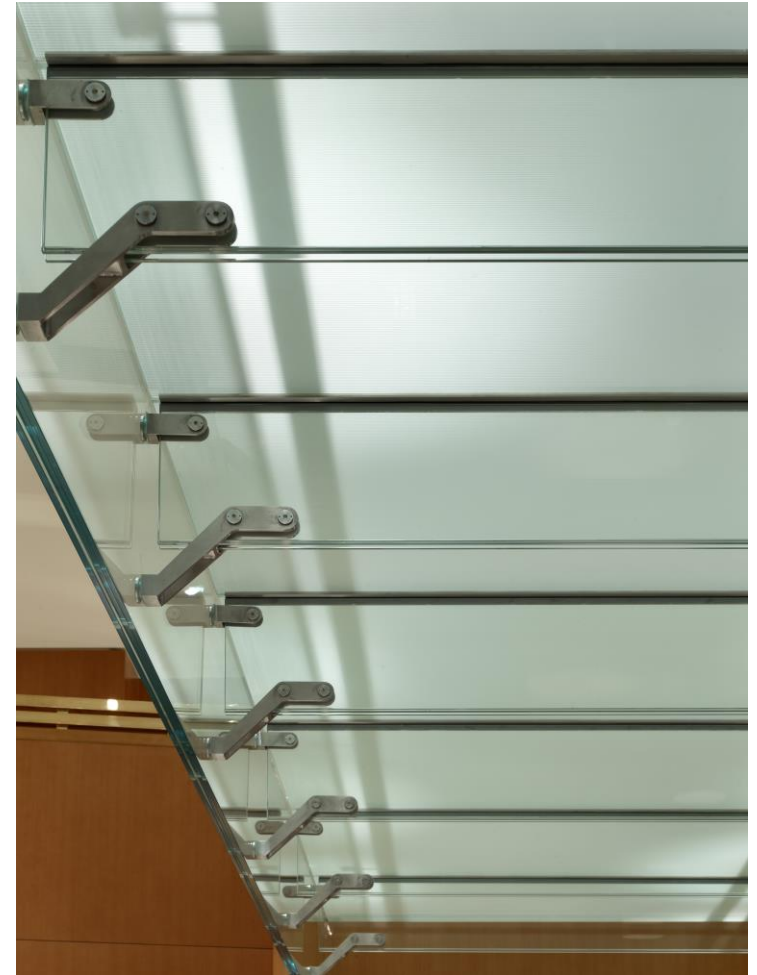
Read Jones Christoffersen Ltd.

Creative Thinking **Practical Results**

The image features a large, stylized lowercase logo 'rjc' in white, positioned on the right side of the blue background. The letters are bold and modern, with the 'r' and 'j' having a distinctive shape.

Three Compassions:

- **Design Issues**
 - What makes a good design
- **Code Issues**
 - Not clear enough
 - Too much dependency on trades
- **Protecting the Design**
 - Knowing what is possible/right

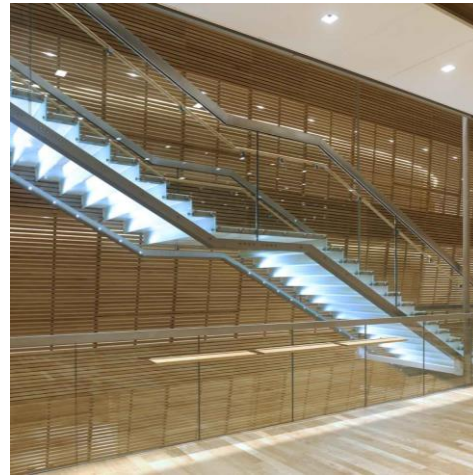


Design Issues

- Transparency
- Performance
- Availability
- Connection Types
- Redundancy
- Post Breakage
- Exposure
- Thermal Modeling
- Splice Details
- Constructability
- Replacement
- Aesthetics
- Renewable Energy
- Load Types
- Interlayer Type/Contribution
- Glass Type
- Tie-in Details
- Glass Size

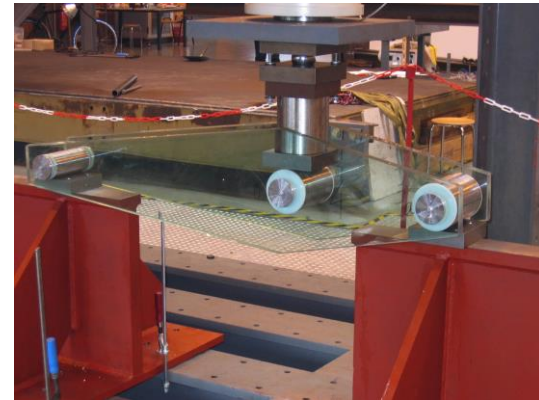
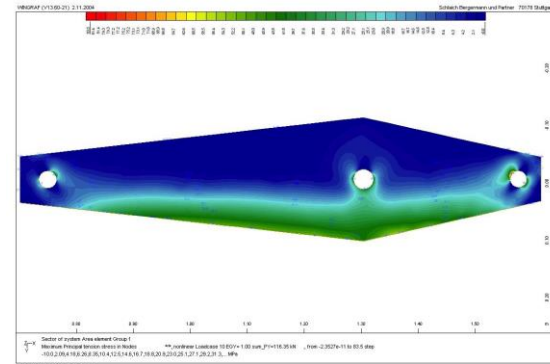
Code Issues

- Lack of Clarity/Guidance
- Some Outdated
- Don't Address Post-Breakage
- Lack of Understanding at the Municipal Level



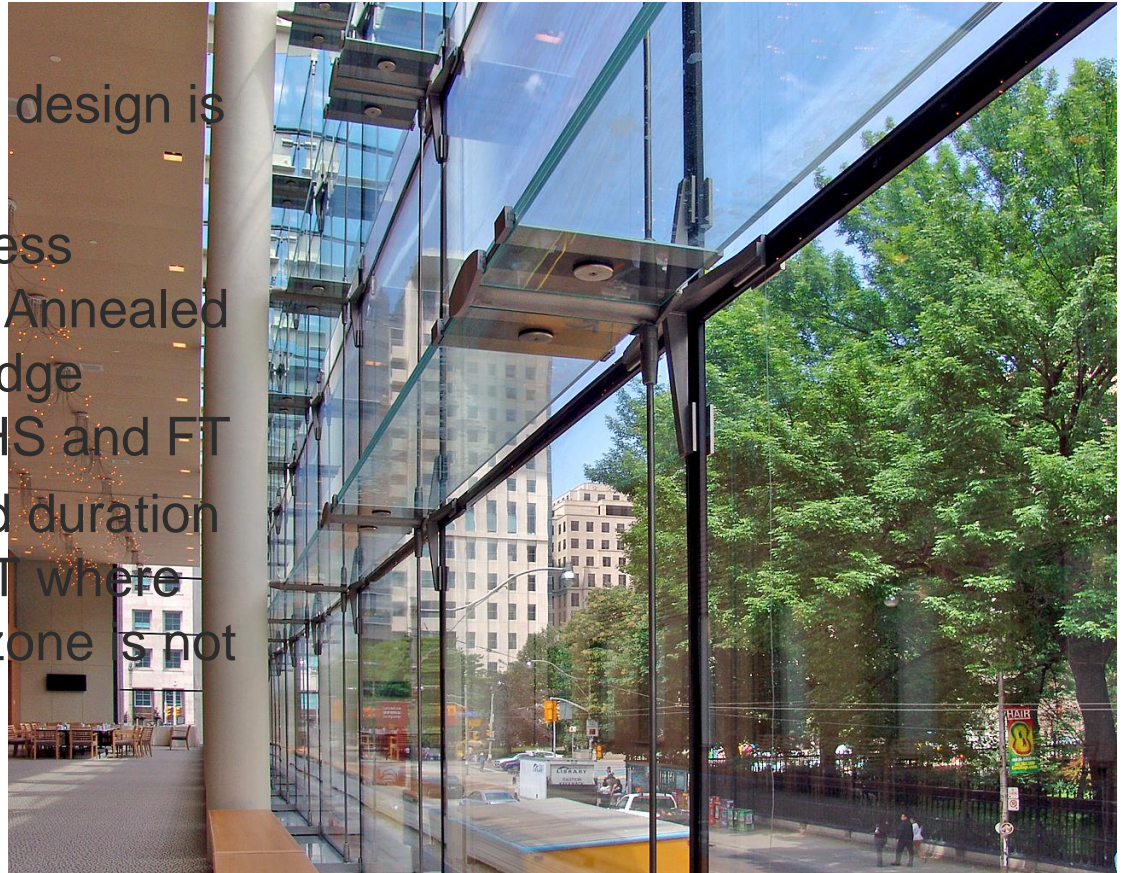
Code Issues

- Canadian code certainly outdated
- Canadian code is more conservative
- ASTM standards are being reviewed and supplemented (very slowly)
- Fudge factor introduced in NBCC to account for differences, but only for window design



Code Issues

- Actual structural glass design is still not addressed
- All allowable glass stress designs are based on Annealed glass research with fudge factors to account to HS and FT
- Does not address load duration properly for HS and FT where the pre-compression zone is not affected by time

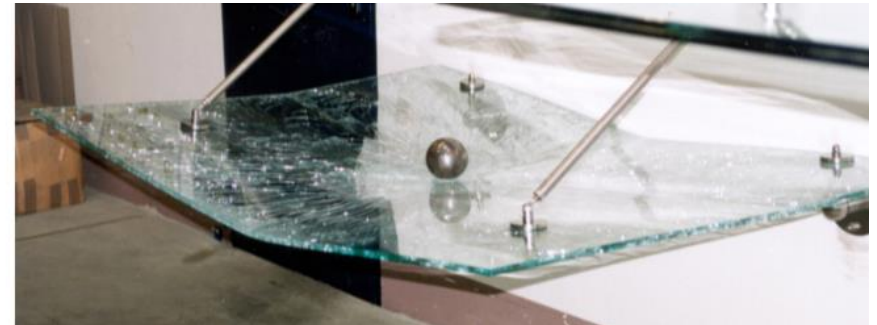


Code Issues

- Eurocodes moving towards superimposing allowable stress by combining Annealed properties with heat treated properties to get correct value.
- Eurocode also moving towards using “consequence factors” for allowable stress reduction due

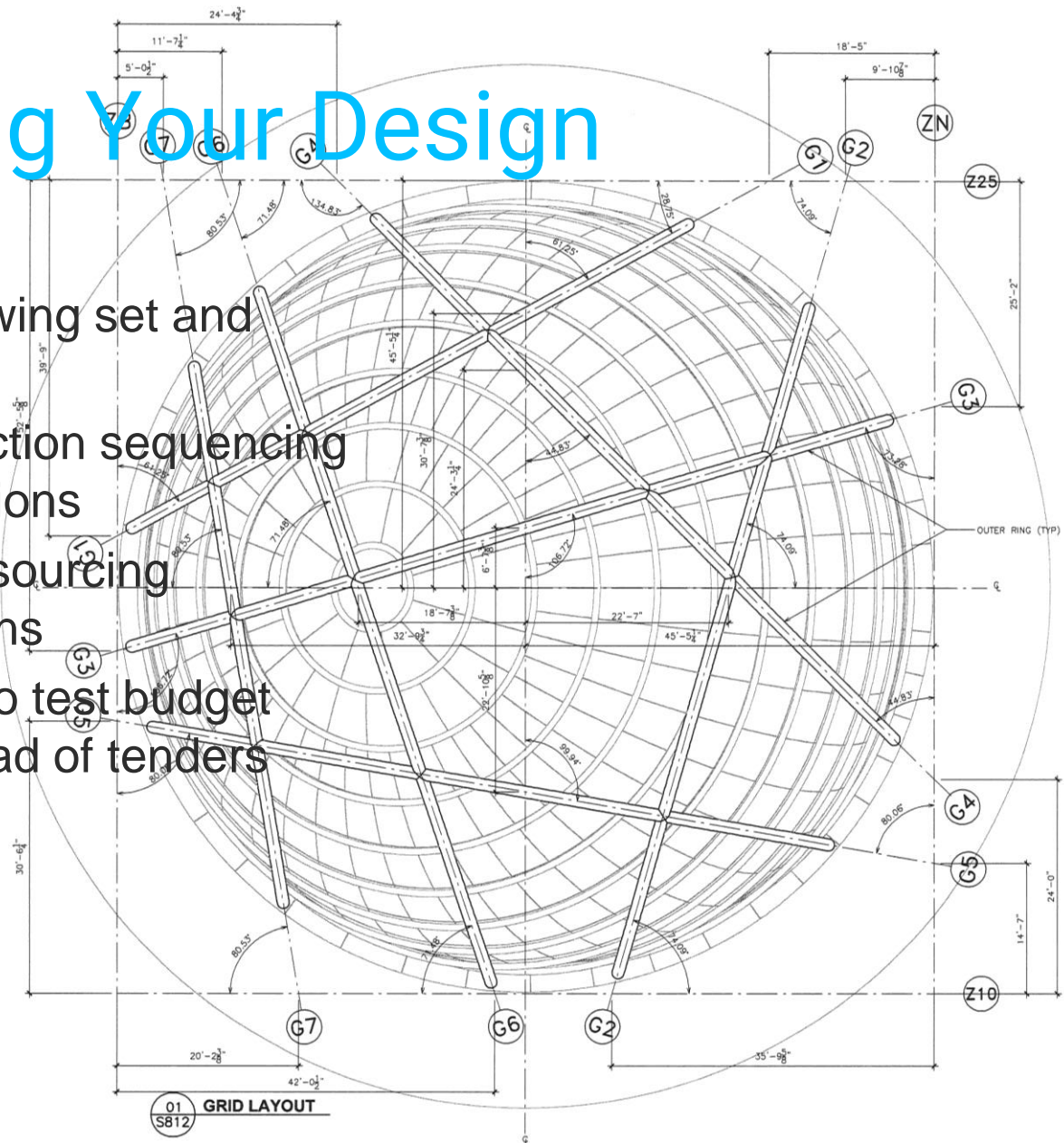
to impact a failure can have on a system

- **IT IS TIME TO REWRITE OUR CODES!!**



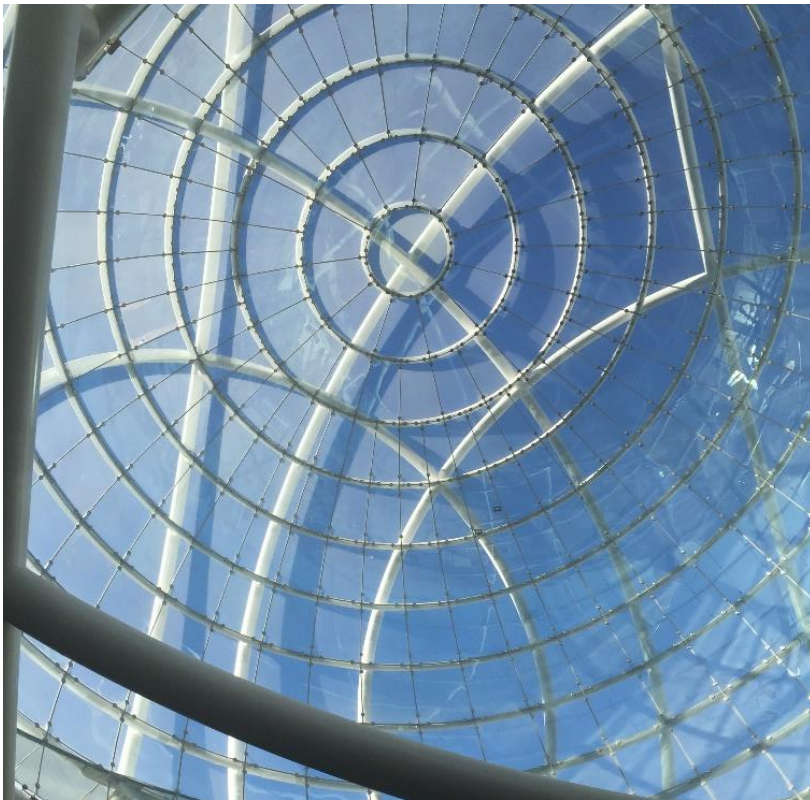
Protecting Your Design

- Provide full drawing set and specifications.
- Suggesting erection sequencing and splice locations
- Understanding sourcing limitations/options
- Using network to test budget the system ahead of tenders



Protecting Your Design

- Fully engineered and detailed for tighter bids



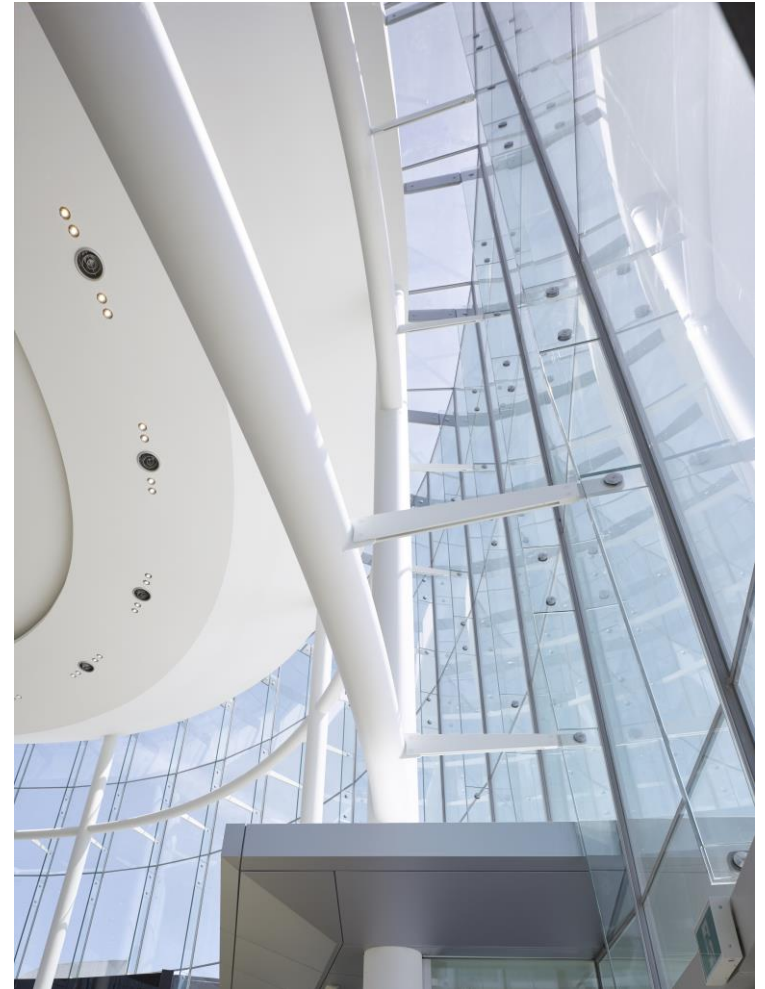
Protecting Your Design

- Offer design options with budget assistance



Protecting Your Design

- Set out testing requirements so they become part of the bid



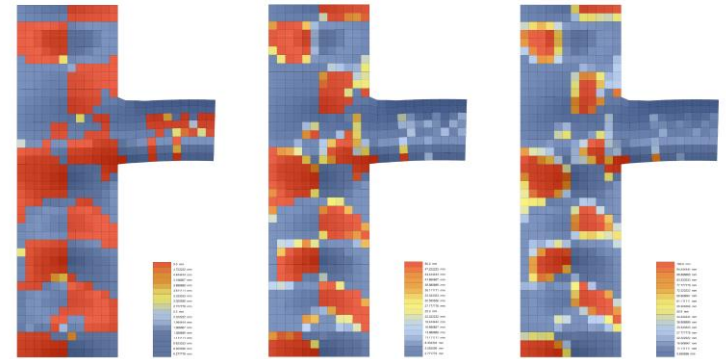
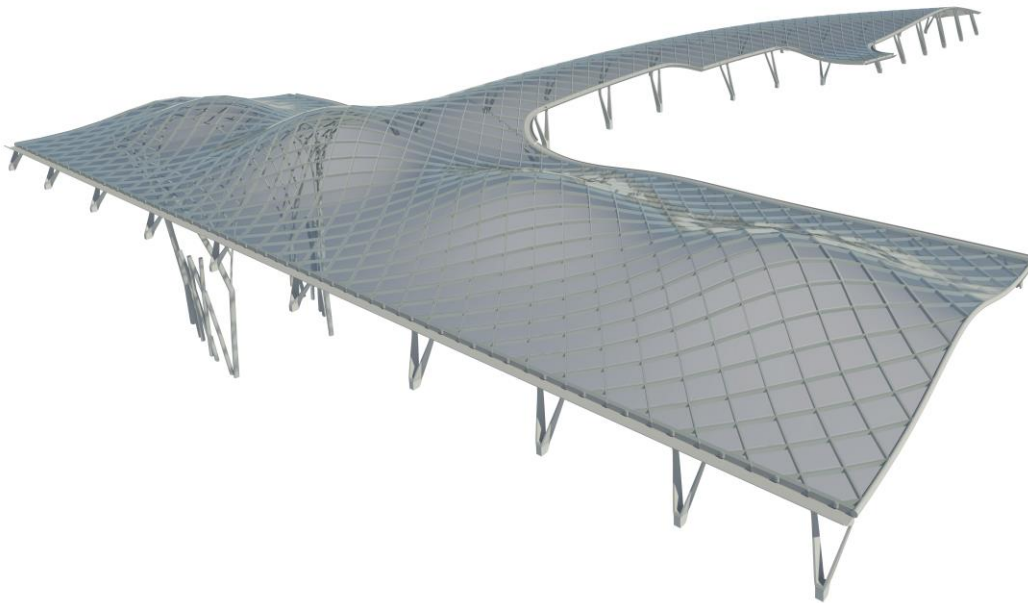
Protecting Your Design

- Work through fire protection with the design



Protecting Your Design

- Identify design criteria with material quantities



Thank you
for your attention

The Changing Landscape

Rob Quattrociocchi

 **EllisDon**



To provide technical leadership in addressing project risk, developing and implementing construction advancements, and disseminating knowledge.



building for higher performance





“We’re going to introduce legislation to ban the glass and steel skyscrapers that have contributed so much to global warming. They have no place in our city or on our earth anymore”

Bill De Blasio, Mayor of New York City

HIGHER PERFORMANCE?



R2-3



R3-4



R19 to ??



How do we get there?

Cannot sacrifice:

- Cost
- Schedule
- Quality

Answer: Offsite Construction



“Building a house on site makes as much sense as building a car in your driveway” – Kent Larson, MIT City Science Lab





cold formed steel frame
and/or aluminum
extrusion

sheathing

AVB material

mineral wool insulation

air space

punched windows
within a variety of
cladding types

install and connect like
curtain wall

size limited to transport



Courtesy of Island Exterior Fabricators



Courtesy of Island
Exterior Fabricators



Courtesy of Island
Exterior Fabricators



Brock Commons, UBC



300 Ashland Place

Brooklyn, NY

Façade Contractor: Eastern
Exterior Wall Systems

gasketed unitized system

faceted facade



The House at Cornell Tech

Roosevelt Island, NY

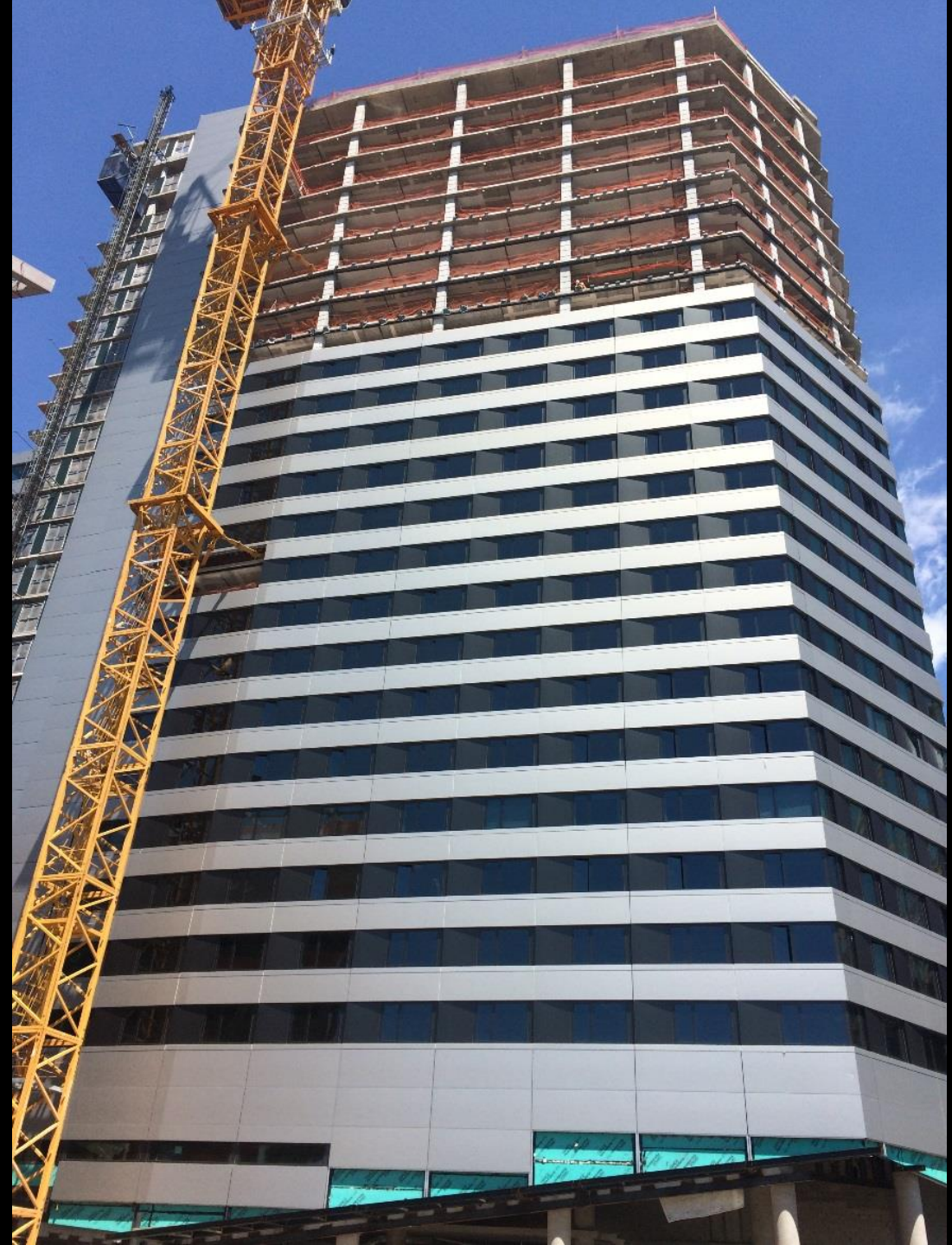
Façade Contractor: Eastern
Exterior Wall Systems

tallest certified Passive House
project in the world

triple-glazed windows w/
aluminum composite panel

gasketed unitized system

R-19 effective





quality of fabrication

schedule

gasketed system eliminates exterior work/
maintenance

higher thermal performance

single source

less waste

safety




lacking mature supply chain

cost

some limitations in building geometry

hybrid wall system

commitment at design concept stage



identifying the hazards



CAUTION

FALLING

ICE

OVERHEAD

MAXIMUM
40

REPMER ST
TO
SHEPHERD





Automotive Centre of Excellence

“Creating the perfect storm in the name of innovation”





BRAVIA

File Edit View Profile Scene Collection Tools Help

Controls

Start Streaming

Stop Recording

Studio Mode

Settings

Exit

Scenes

Micro

Micro

Sources

Video Capture Device
datendtime
TC
AirTemp
Heat Trace
Left



Airtemp -6.3
Dewpoint -5.8
RelHumidity 100.0

9:04:28 AM
2019-04-12

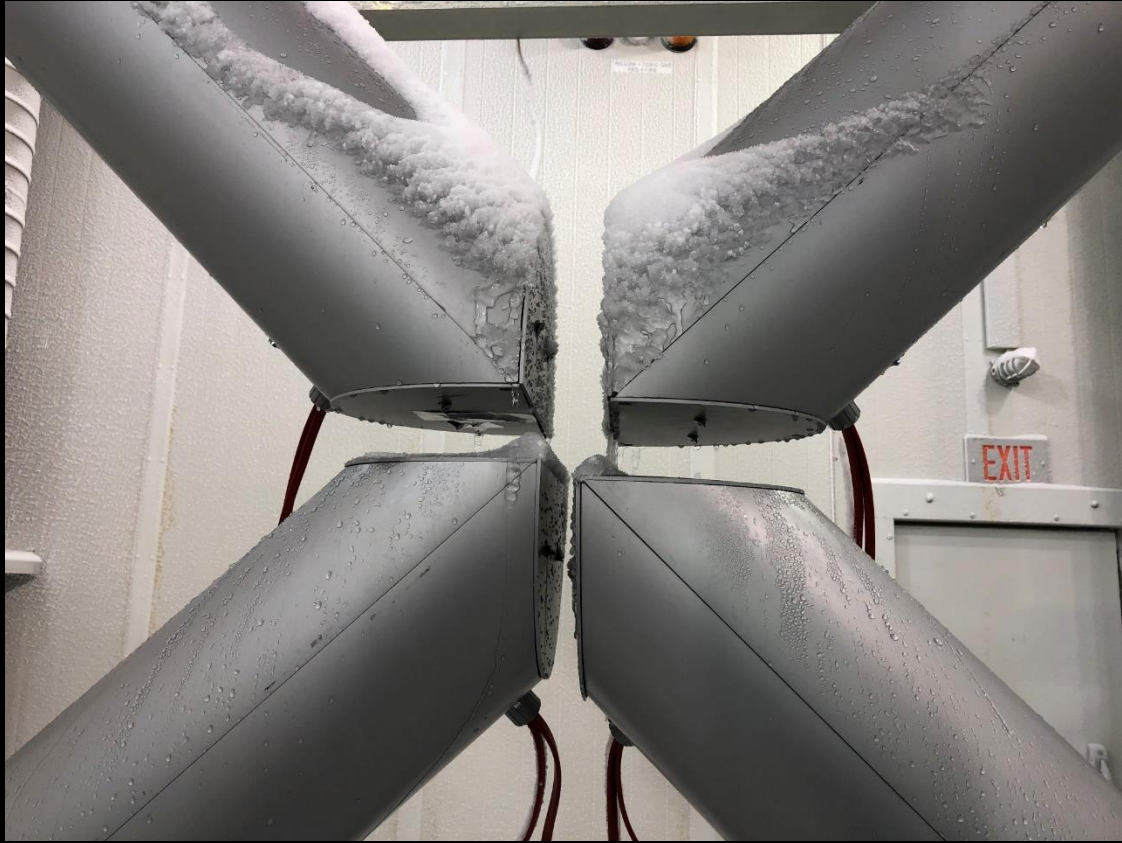
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Centre Upper	4.15
North Lower	6.42
North Upper	5.20
South Lower	6.33
South Upper	0.92

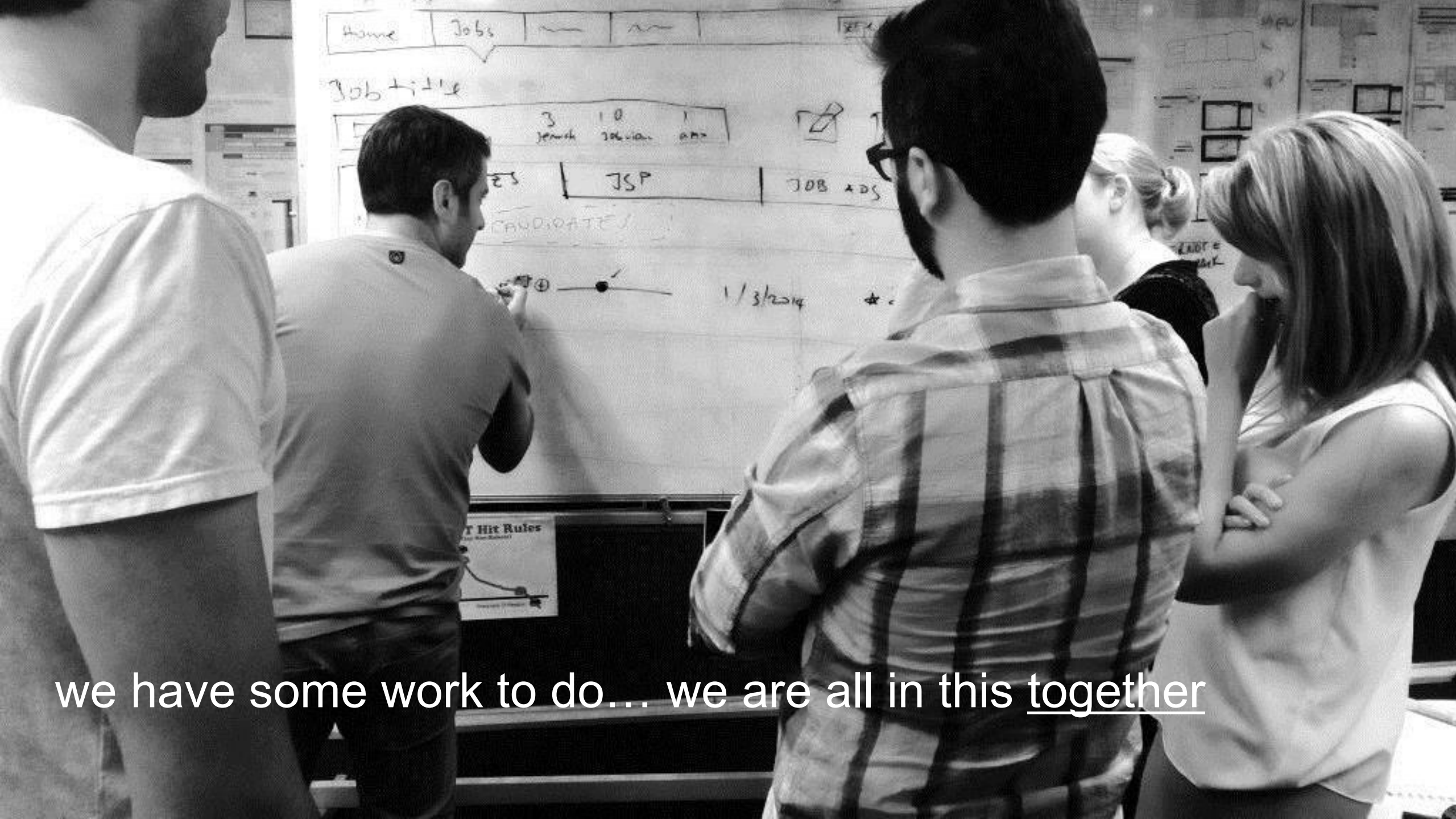
9:04:28 AM

SONY

Model No. KLV-40EX6000







we have some work to do... we are all in this together

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City of Toronto Design Review
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