Catia: Master Geometry Surface Model

Construction:
Face of cladding (titanium)
= Master Geometry Surface Model
Catia: Structural Wireframe

Construction: Steel Frame & Masonry Back-Up System
Design Models: Documenting the Evolution of the Design Process
Digitizing the Physical Model
Catia Screen Dumps:
Surface Geometry Rationalization
Weisman Art Museum: Descriptive Geometry Drawings
Catia:
Structural Wireframe Mapping 3M Intervals

SOM Structural Drawings
Successive Stages of Construction:

Primary Structure
Secondary Structure
Sheathing

Colocación de chapa galvanizada en "M-5: Boot"
M-Elements Enclosure Assembly System:
Primary Steel = Straight Sticks
Secondary Structure = Curved Pipes & Mtl Studs

Unistrut Adjustable Stand-off System
Montaje Envolvente de Chapa Galvanizada en el "M-3: Fish".

Vista Parcial de Obra.

Montaje Envolvente de Chapa Galvanizada en el "M-3: Fish".

Envolvente de Chapa Galvanizada en el "M-3: T-1000".
Dubai
One Zabeel: 2 Million Square Feet Mixed Use Development
Retail / Residential / Office / Hotel
Atrium Skylight Enclosure Measuring 150ft x 900ft long (3 football fields)
Driving Goals

1. Transparency
   Maximize Visibility & Daylight
   Eliminate Visual Clutter

2. Geometry = Structure
   1:1 Correspondence Between Form and Structure.

3. Adaptable Structure
   Ability to Adapt to Various Programmatic, Environmental & Site Conditions
Pleating = Structure
Pleating Enabled a Logic that could mediate between Floors, Sidewalls & Skylights
Adaptability

The shell system that satisfied the principles of transparency and the equivalence between geometry & structure also satisfied the principle of adaptability. There were several programmatic, structural and environmental conditions that the project was required to negotiate. The shell structural system enabled the form to modify and adapt to accommodate the various conditions.
System Expands to accommodate Adjacent Program Uses
Structural Analysis & Prototype Models
Iterative Development of Enclosure Geometry
Final Geometry:
One Continuous Net No Differentiation Between Members; Girders, Beams, Columns
System Rules

The rules for the system were based on a series of triangular faces with the leg of each triangle divided into twelve equal segments. This established a consistency between faces that were modulated to accommodate the various conditions.
Nodal Conditions
Primary Structure Member Size = 150mm = 6in
Total Enclosure Depth = 320mm = 12.5in
Soumaya Museo
Floor Plans
Program Organization

- Exhibition Hall 5
- Green area
- Exhibition Hall 3
- Exhibition Hall 2
- Exhibition Hall 1
- Offices+Library
- Main Hall
- Museum Services + Art storage
- Temporal Exhibition 4
- Auditorium+ Cafeteria+ Shop
- Museum Services
- Underground Parking
Circulation Pathways

- User’s circulation
- User’s elevator
- Emergency exit
- Employees’ elevator
- Electric escalators
- Art Freight elevator
Primary Structural Frame:
52cm dia Steel Pipe
Offshore Oil Platforms:
Carlos Slim Subsidiary
Column Connections
Secondary Structure
Secondary Structural Drawings: Geometrica
Enclosure Assembly
Enclosure Assembly Development
Master Design Surface A
Top Center of Hexagon
IASA Hexagon Panel
IASA Panel Support Arms
IASA Hub with Hexagon Base
Master Design Surface B
Top Center of Node
Geometrica Node
Geometrica Channels
Geometrica Framing Members
Geometrica Threaded Stud Keyed to IASA Hexagon Base
Skin Assembly Exploded Axon

Building Skin Components Separated by Fabricator
IASA: Aluminum Fabricator for Telemex Communications (Carlos Slim Company)
Panel Installation
Building Skin Installation
Soumaya Completed
Cladding Rules:
Base Termination
Cladding Top Termination: No Coping