形態デザインの最新動向

2.2. Digital Fabration

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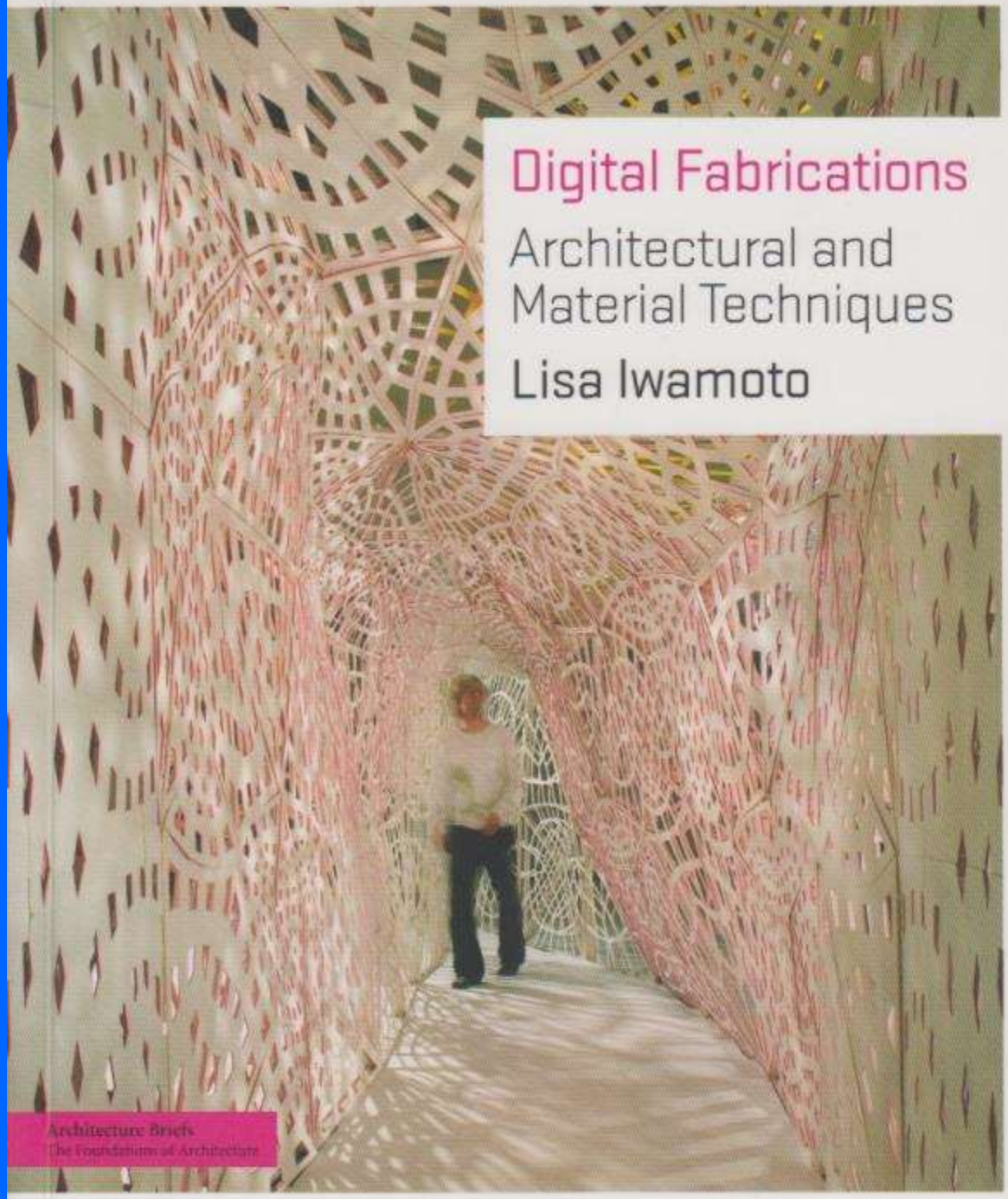
お話の流れ

1. 歴史変遷・概説

2. Algorithmic Design
   - 2.1 Form Design
   - **2.2 Digital Fabrication**
   - 2.3 Shape Optimization(形態最適化)

3. S-art(Sart)理念

4. 関連研究成果の報告


Digital Fabrications
Architectural and Material Techniques
Lisa Iwamoto
Architecture Briefs
The Foundations of Architecture

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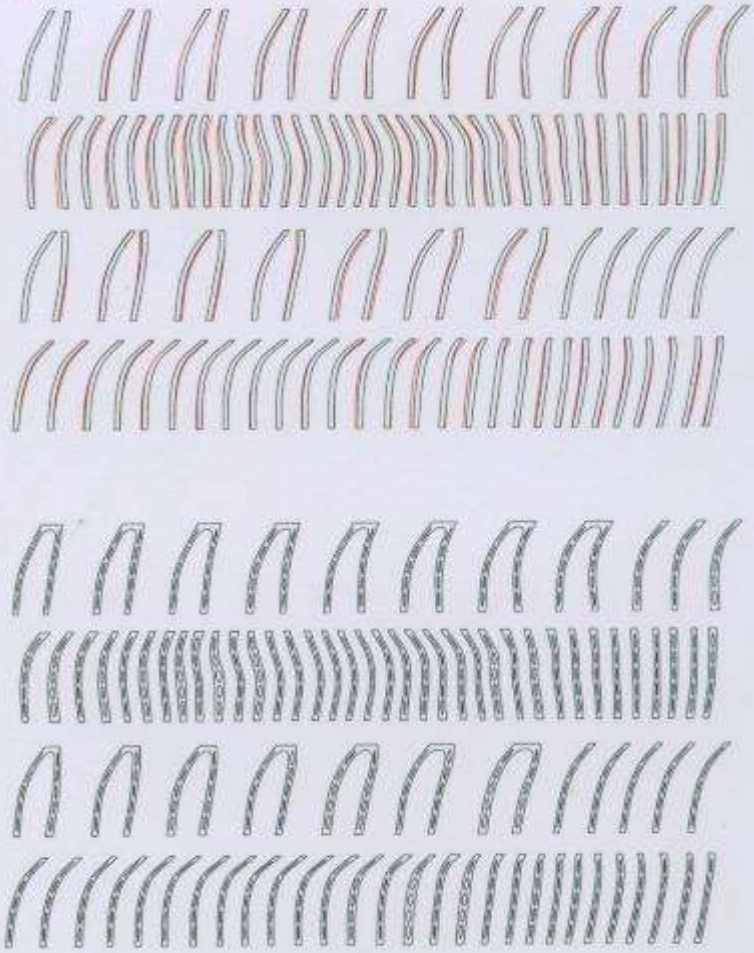

UC Berkeley students with Lisa Iwamoto, *Digital Weave*, 2004.

1 Rhinoceros model of overall surface enclosure.

2 Section cuts shown in plan.

3 Ribs extracted and translated into AutoCAD. Original rib profiles and adjusted profiles in red match adjacent rib edge.

4 Rib profiles laid out on four-by-eight-foot templates for water-jet cutting.

5 Final full-scale mock-up.

6 Full-scale mock-up testing acrylic compression struts.

7 Water-jet cutting at Lawrence Berkeley National Laboratory Design and Engineering shop.

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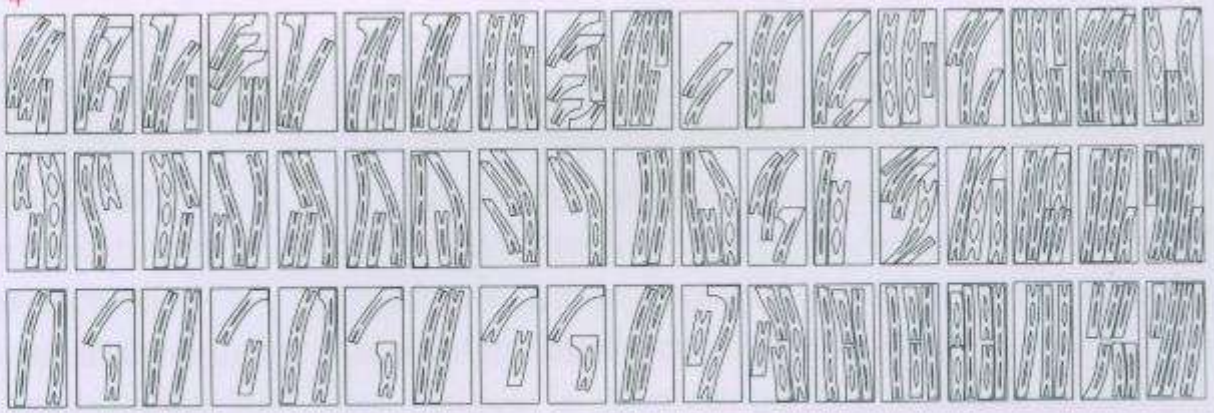

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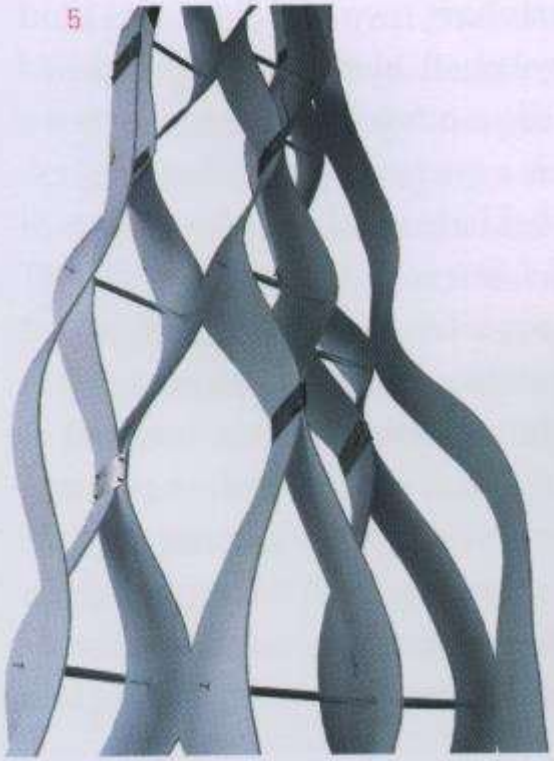

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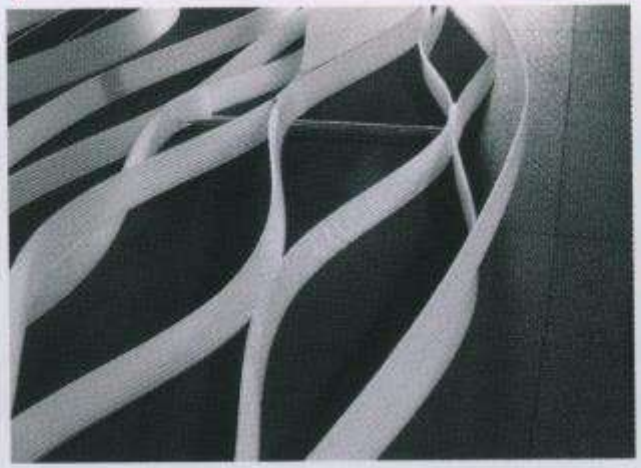

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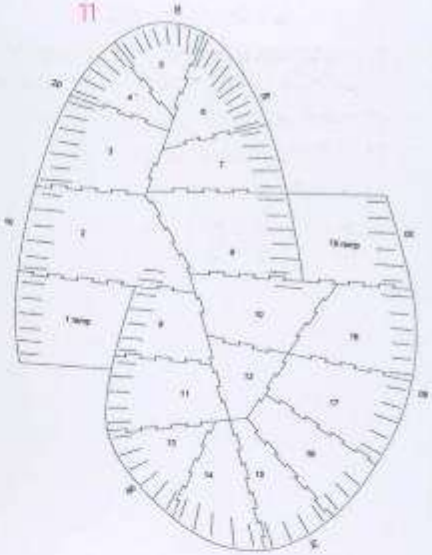

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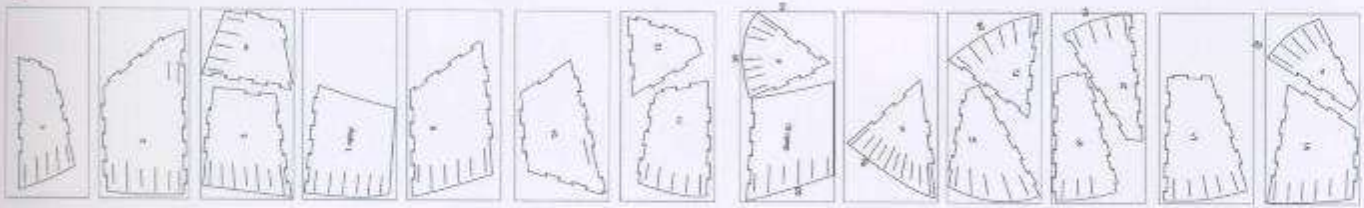

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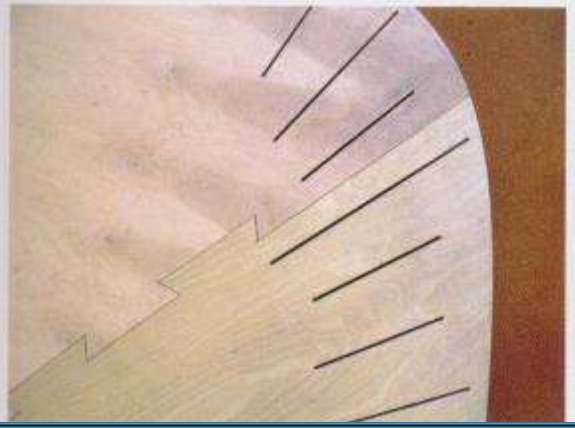

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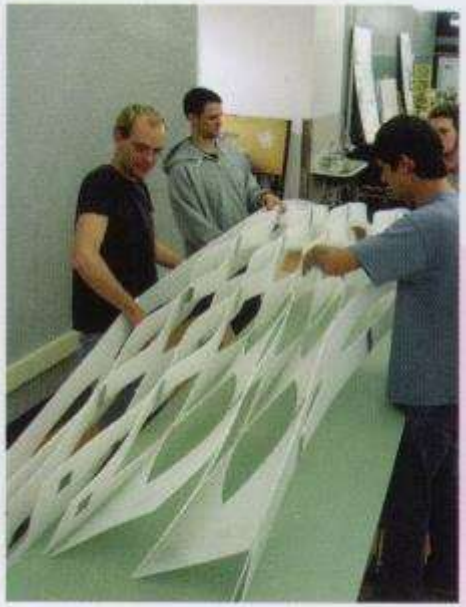
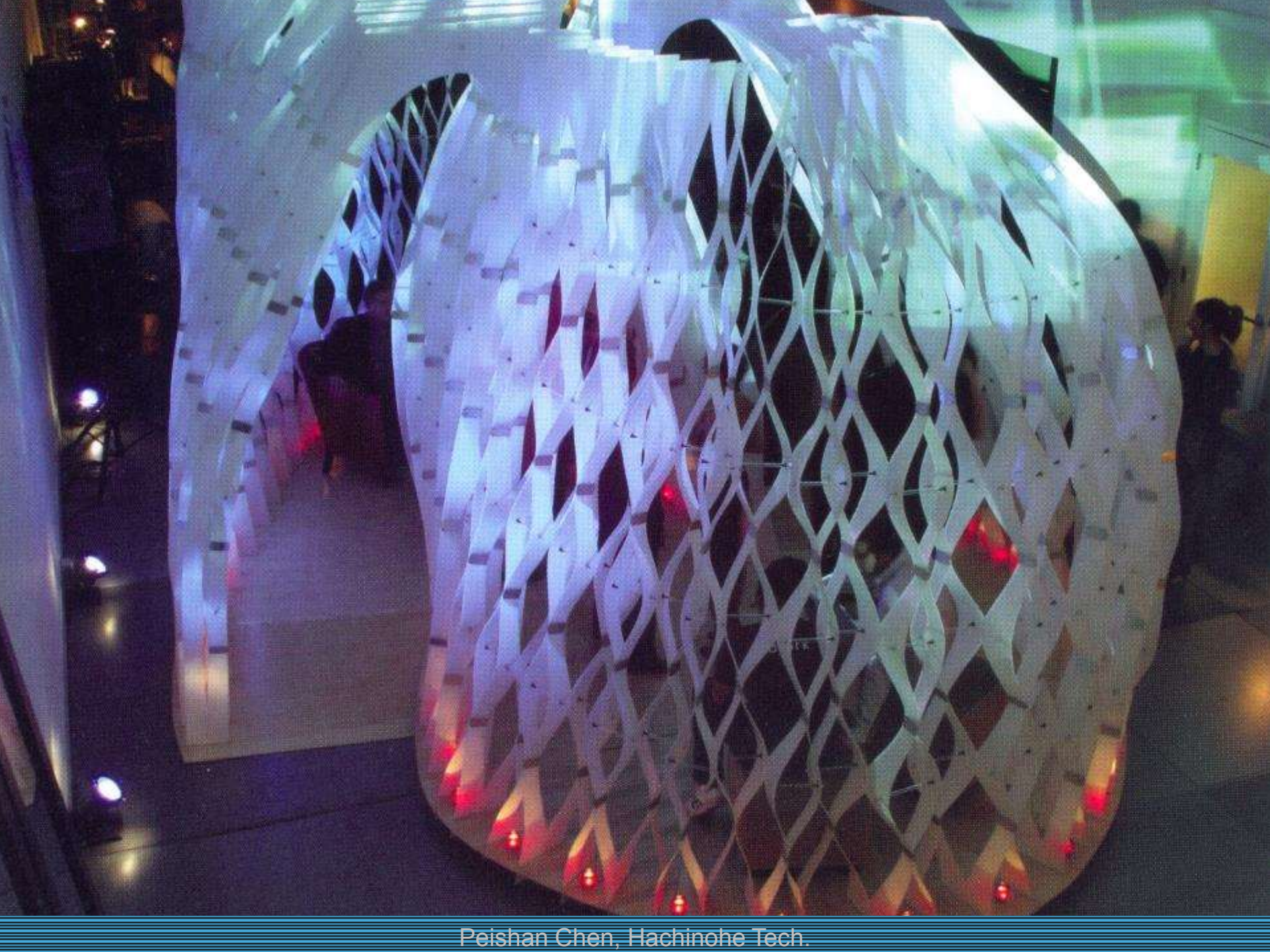
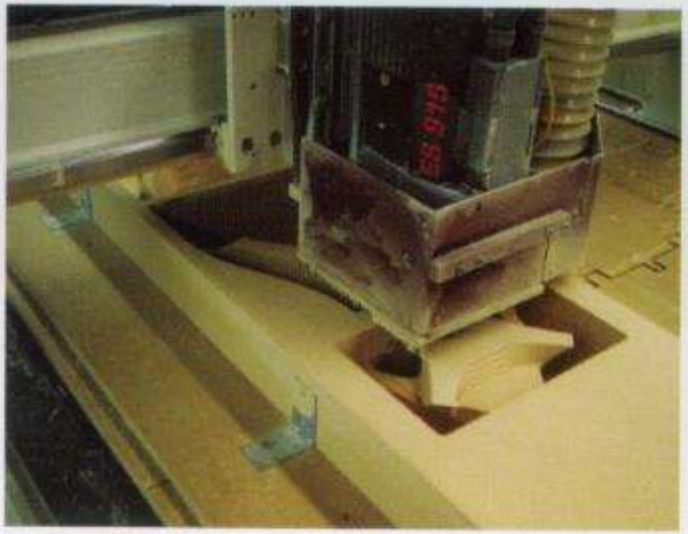


8 Assembly of ribs into expanding accordion-like system.
9 Portion of woven rib surface expanded using acrylic compression struts.
10 Trial setup of *Digital Weave* in studio at UC Berkeley.
11 Plan of floor divided into sections for transportation.
12 Floor sections laid out on four-by-eight-foot templates for water-jet cutting.
13 Detail of floor edge with slots to insert ribs.
14 Floor assembly.
15 Project assembly.





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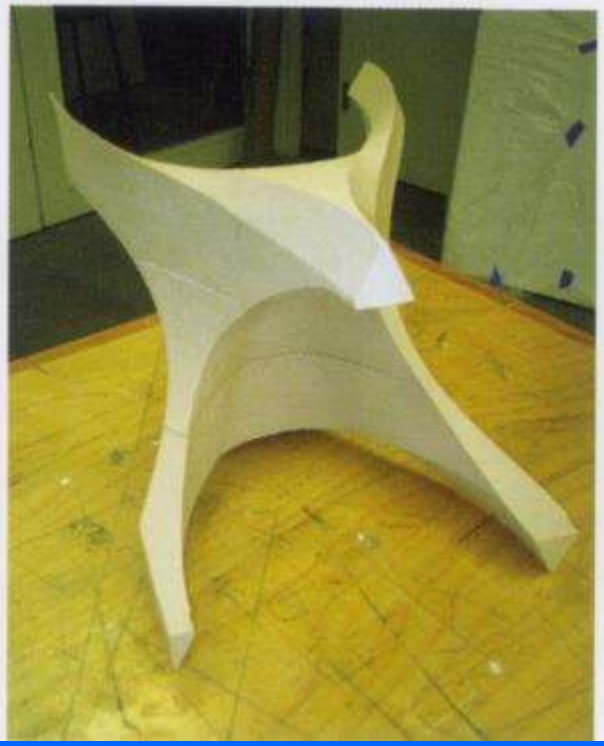

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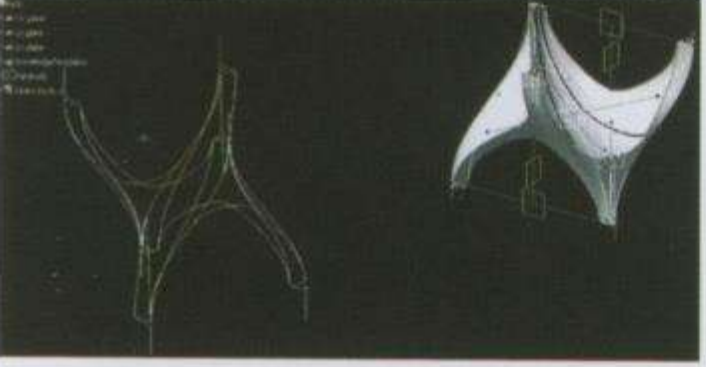

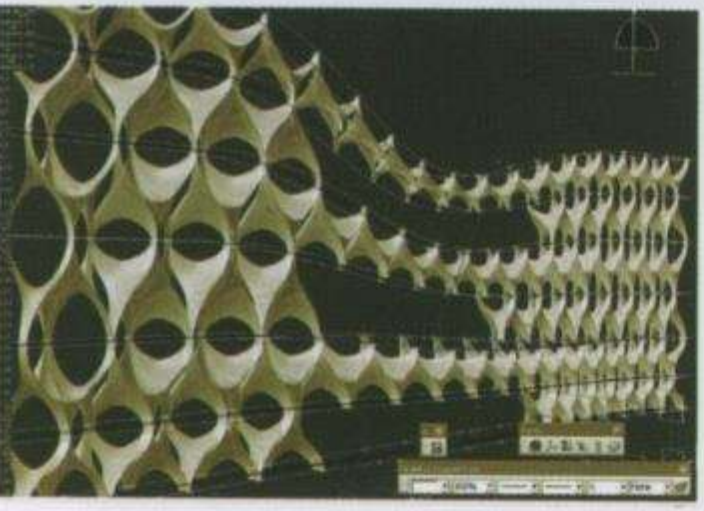

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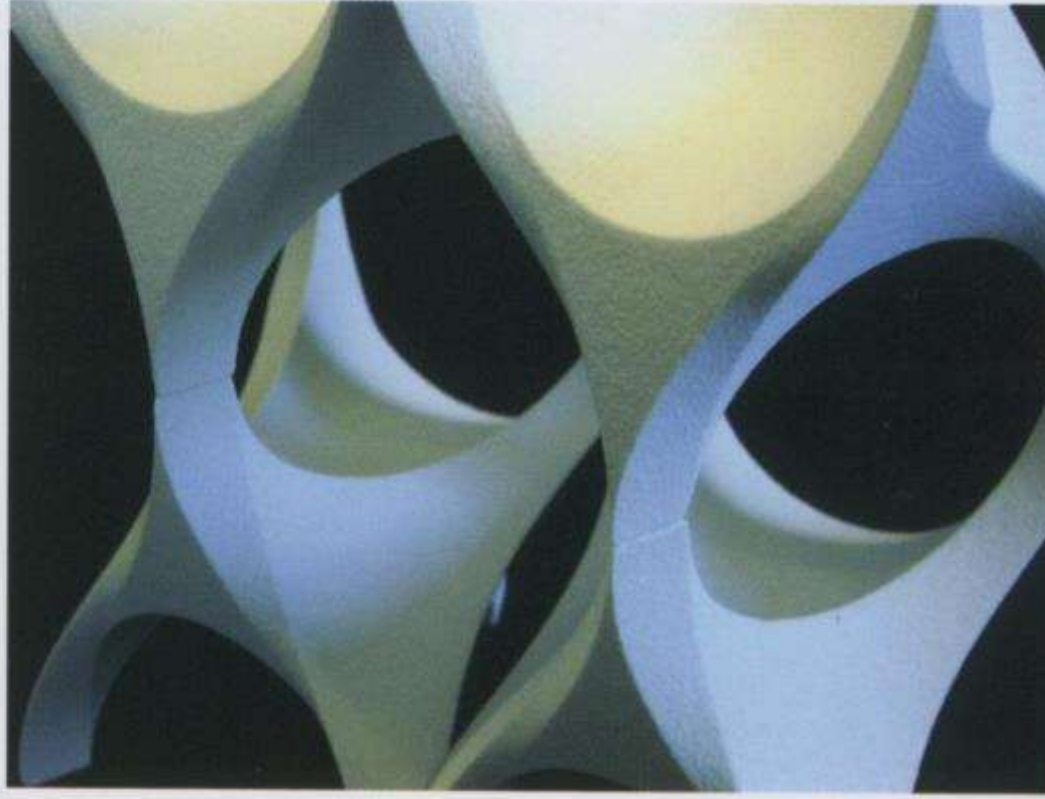
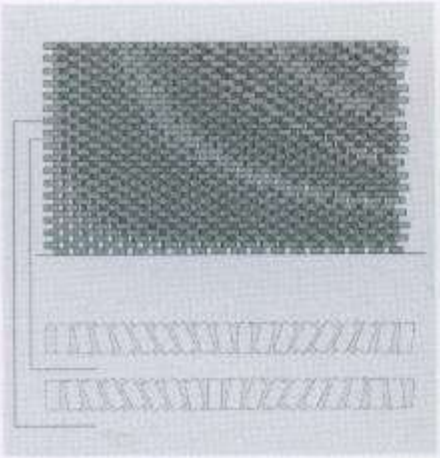
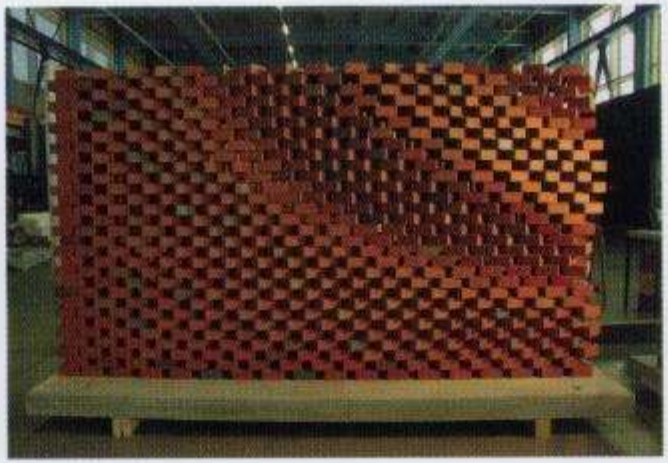


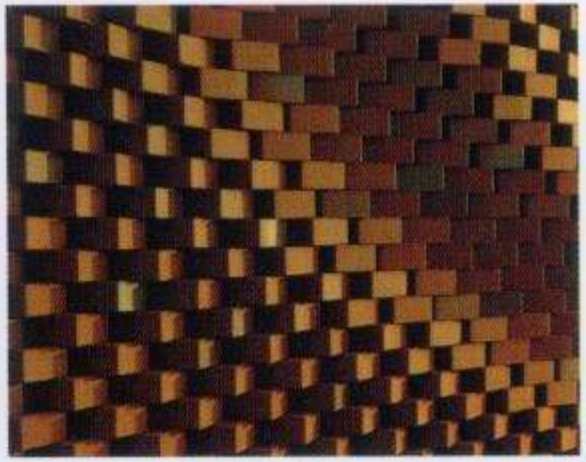
1 CATIA model of "powercopy."
2 CATIA screen grab describing instantiation of powercopy.
3 Scaled 3D print of portion of wall.
4 CATIA production model for routing modules in sections to fit Z axis of machine.
5 CNC routing of MDF modules.
6 Routed modules ready to be cut out from MDF block.
7 Assembly process.
8 Modules.
9 Wall assembly.

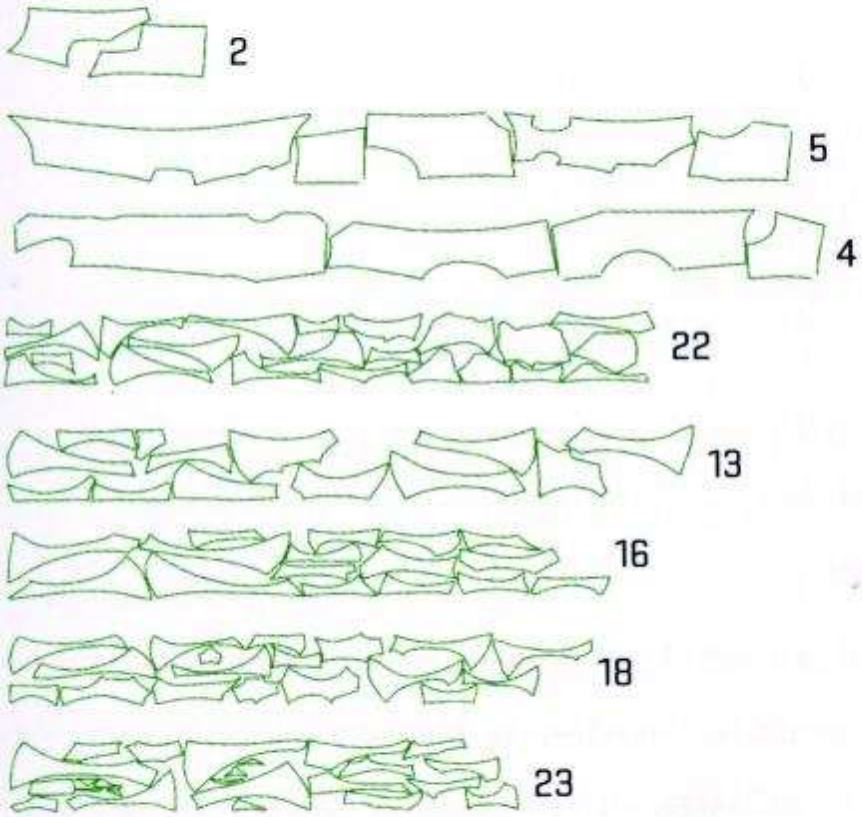
Photos: Joe MacDonald



Fabio Gramazio and Matthias Kohler, *Domoterra Lounge*, ETH Zürich, 2007.
Plan and elevation; industrial robot laying brick; completed project.
Photos: Gramazio & Kohler



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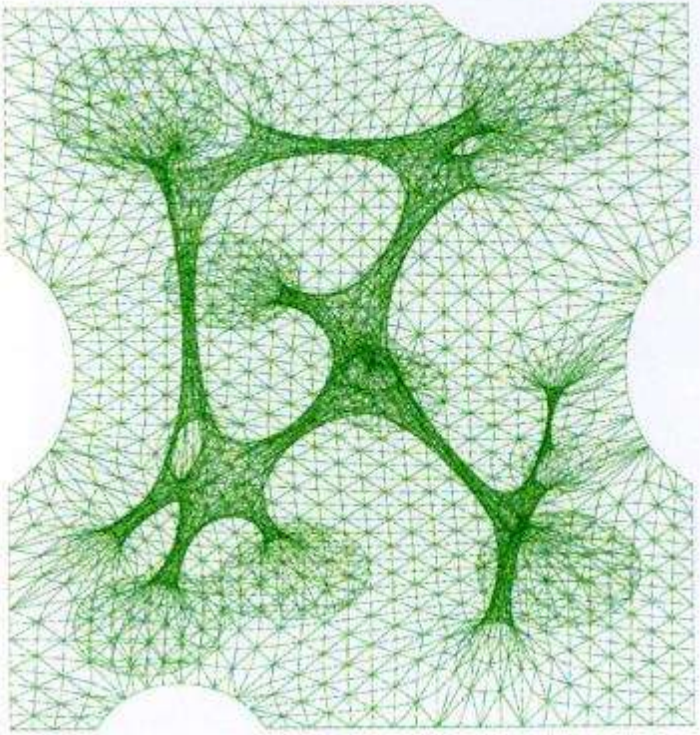
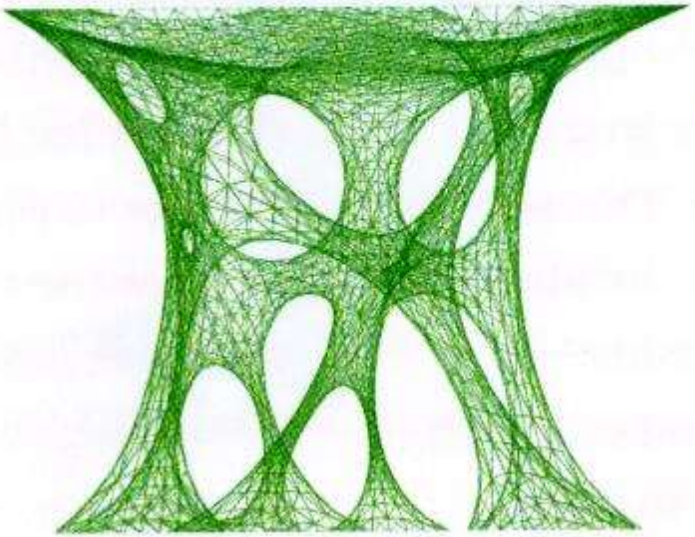
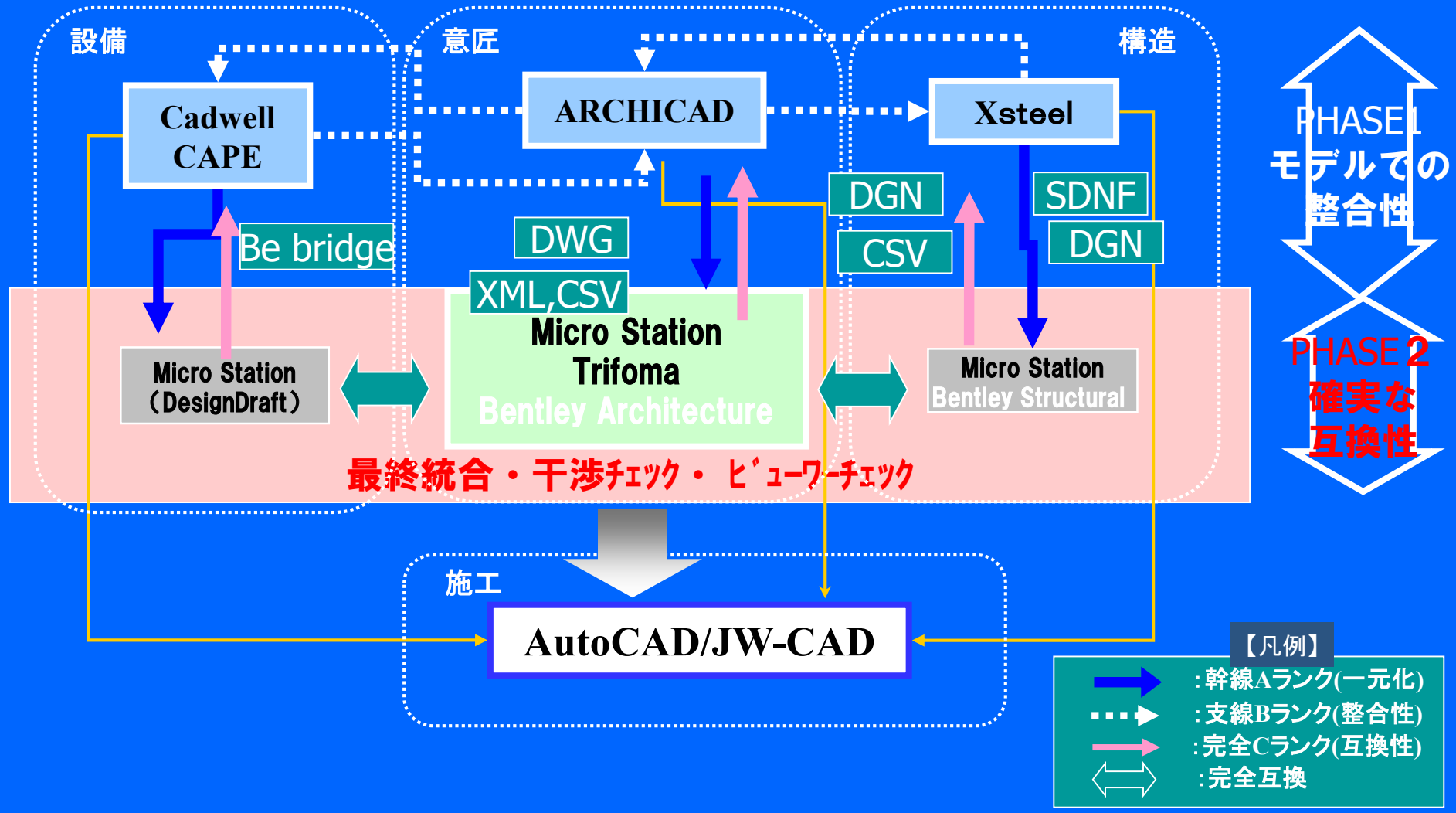




設計施工管理3D-CADシステム BY前田建設工業



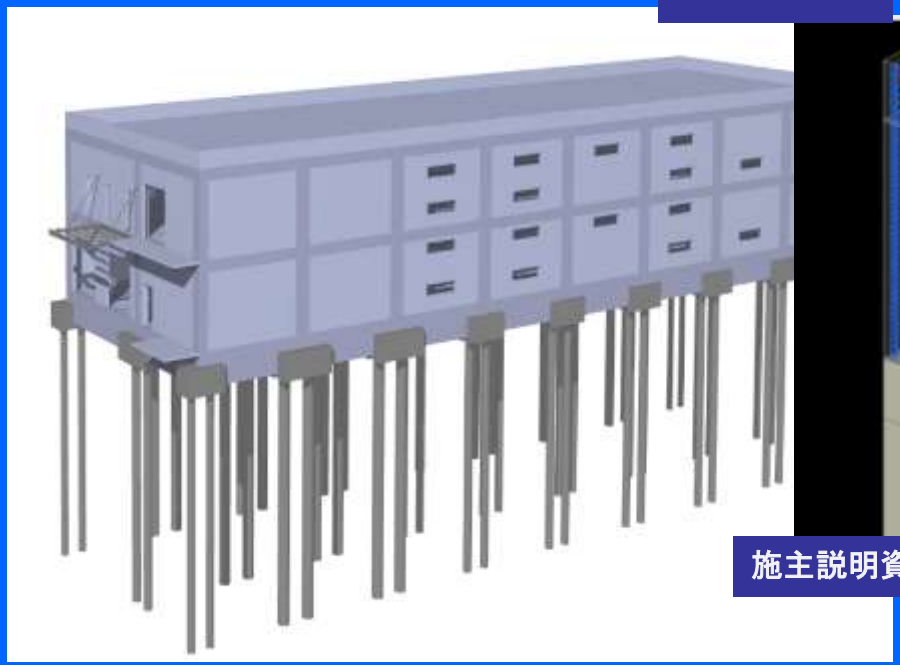
構造モデル(Xsteel)

計算データ DEMOS → 計算データ TOMASに変換 追記・修正 → Xsteel モデル作成 → Archibald 変換 → 意匠との整合性

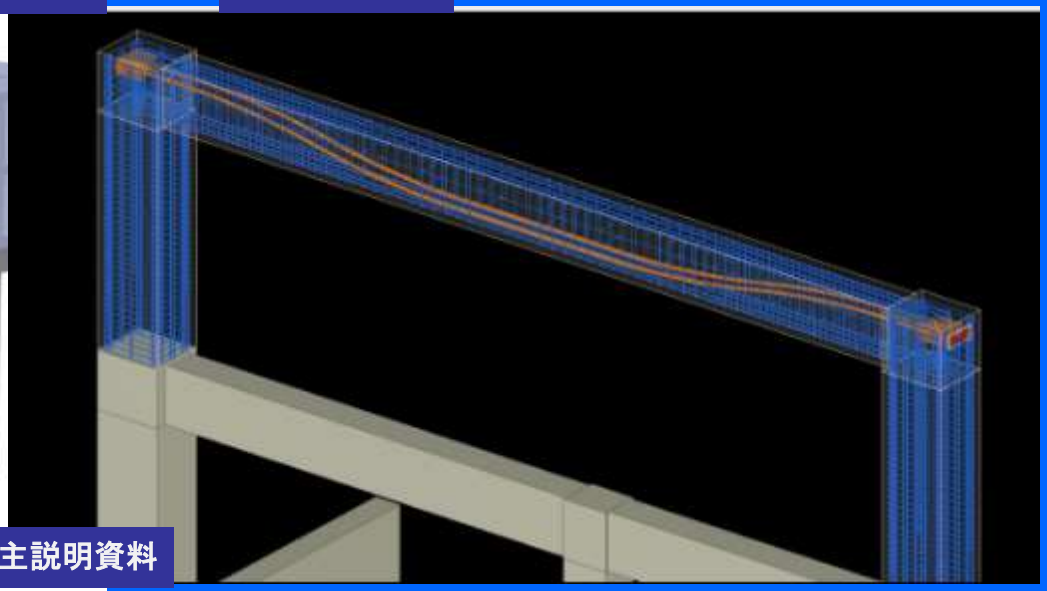
Xsteel モデル作成 → 構造図作成 (伏図・軸組図) (ラーメン図元図)

Xsteel モデル作成 → 躯体数量算出

Archibald 変換 → 施主説明 資料作成

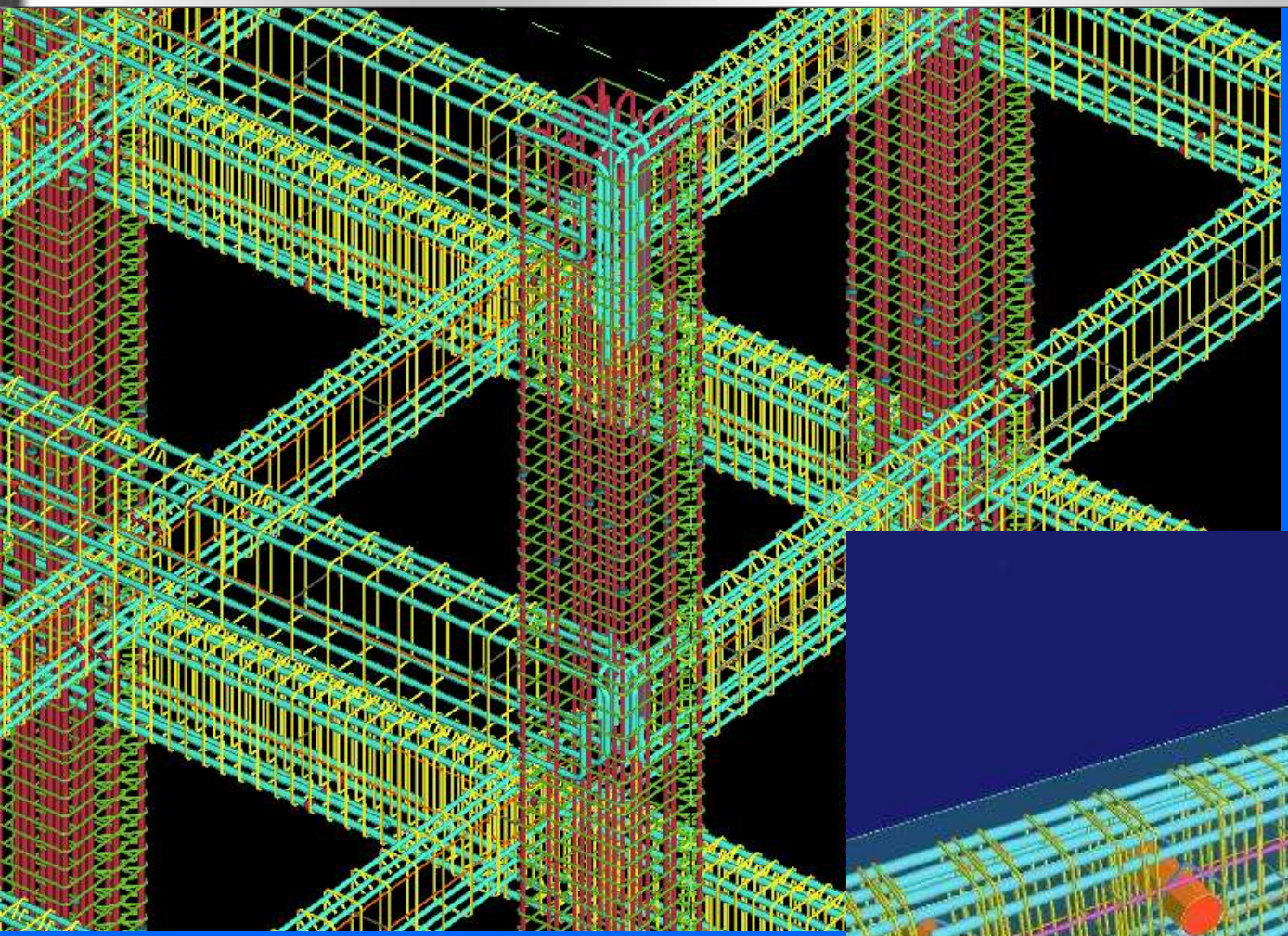


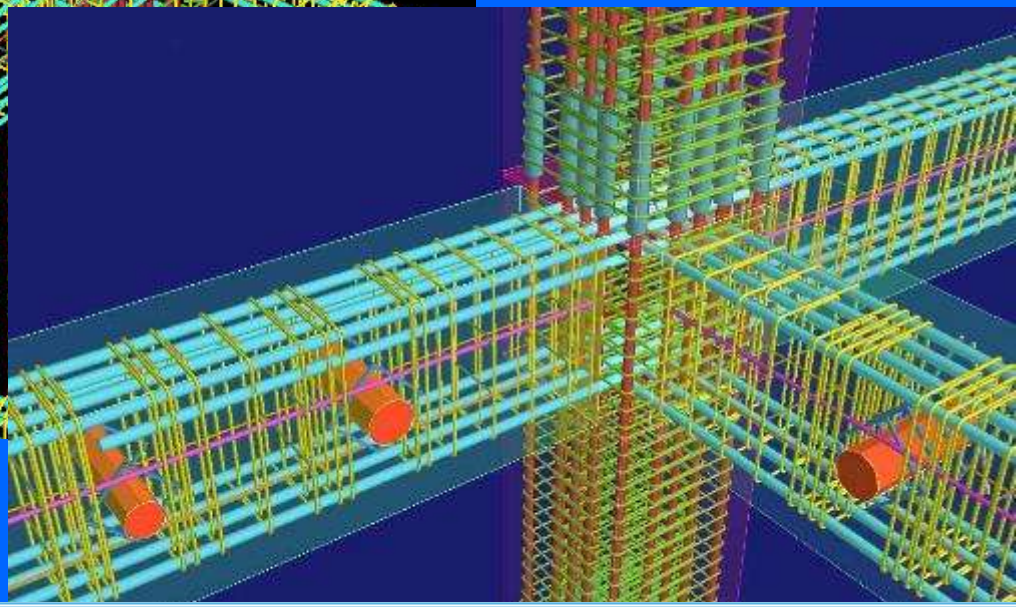
施主説明資料



プレストレス梁

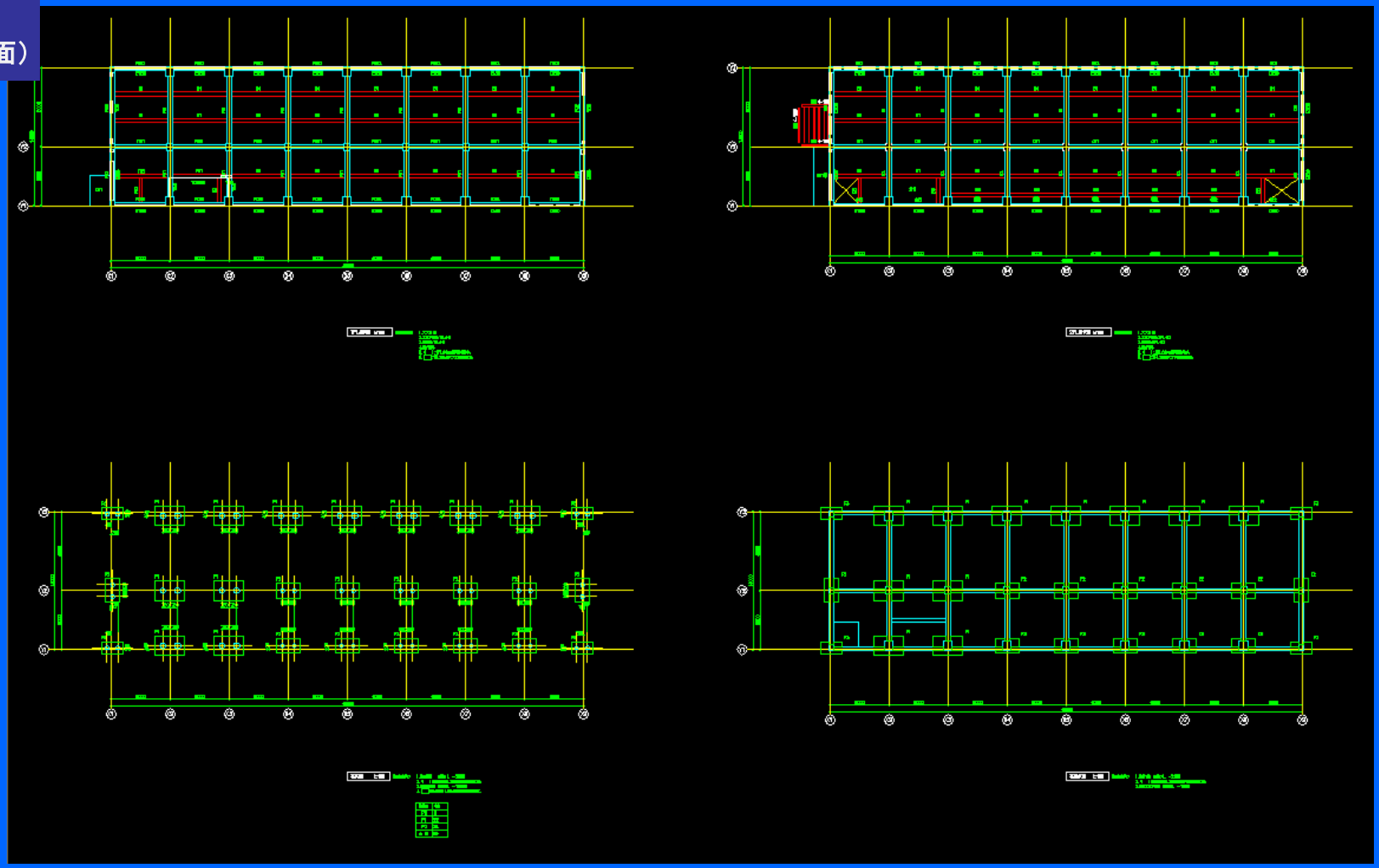
構造モデルの作成



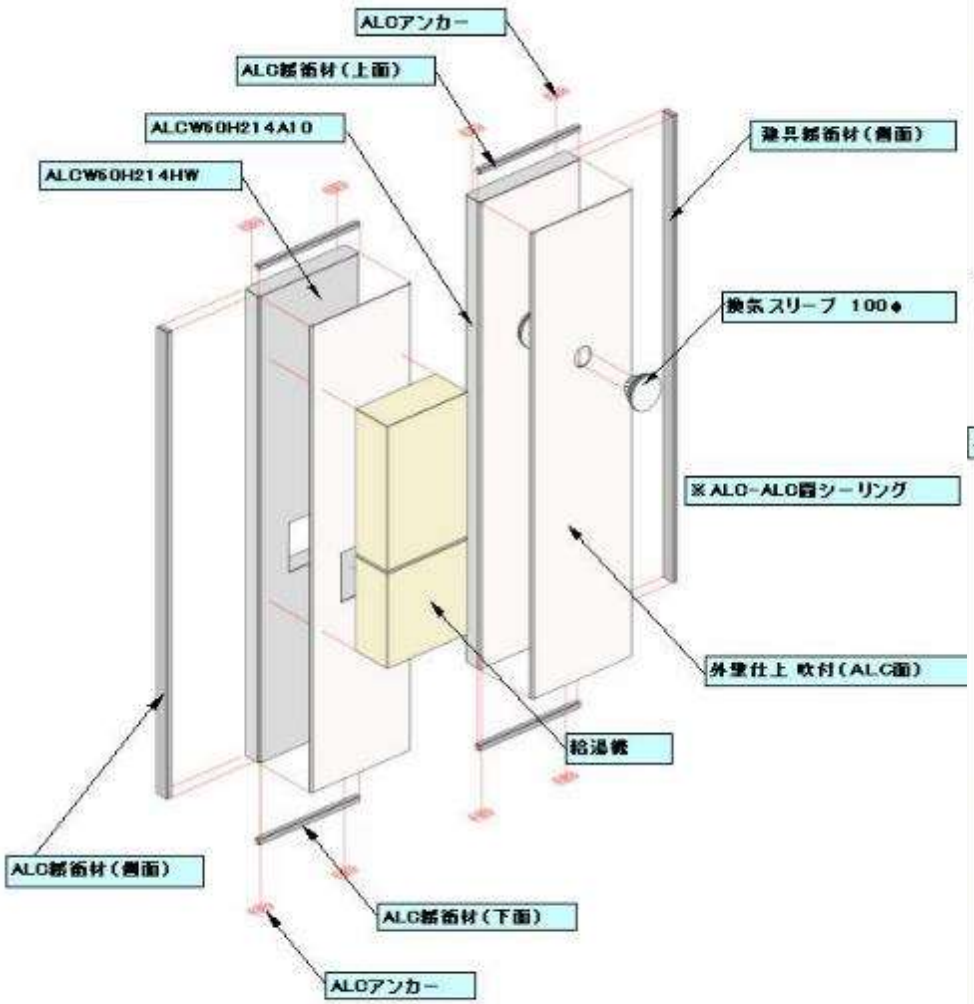


構造図面の作成

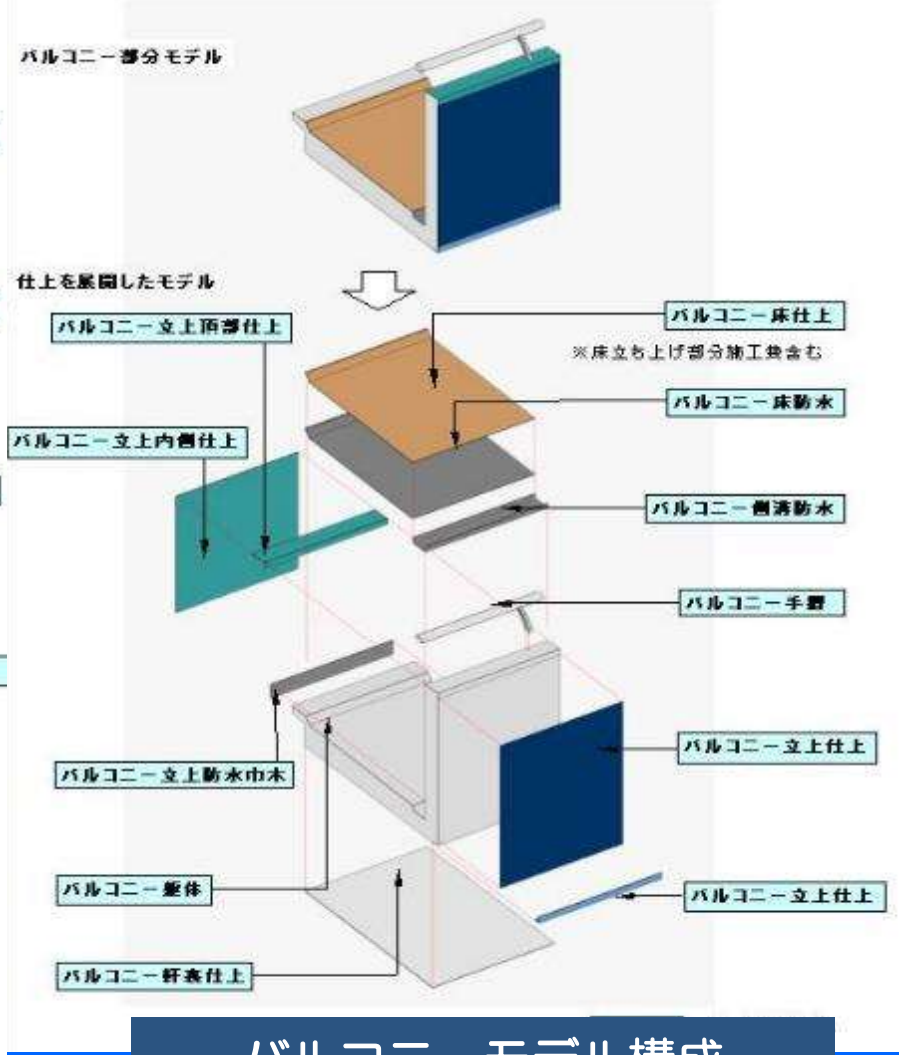
構造図
（Xsteel図面）



モデル構成

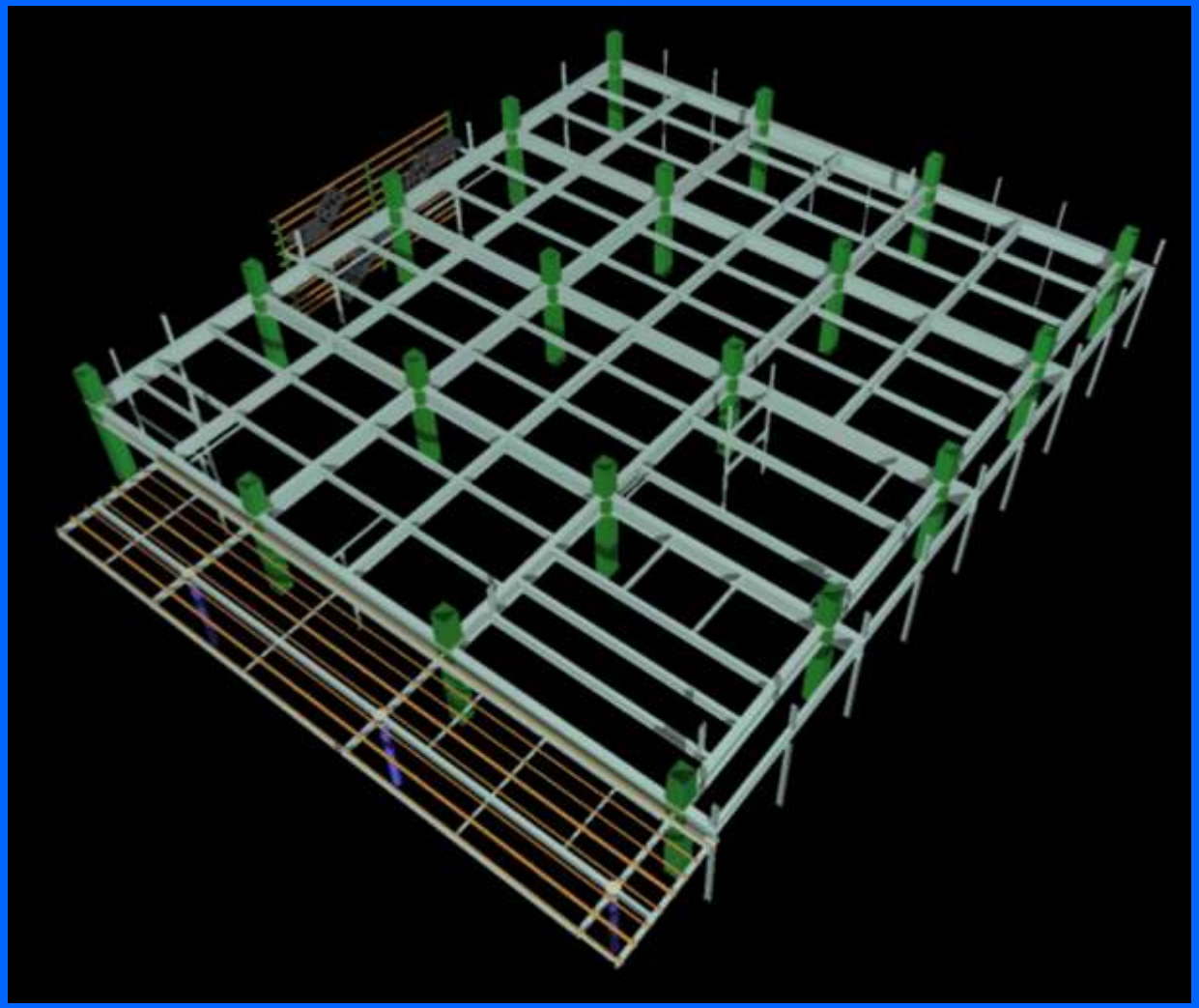


外壁モデル構成

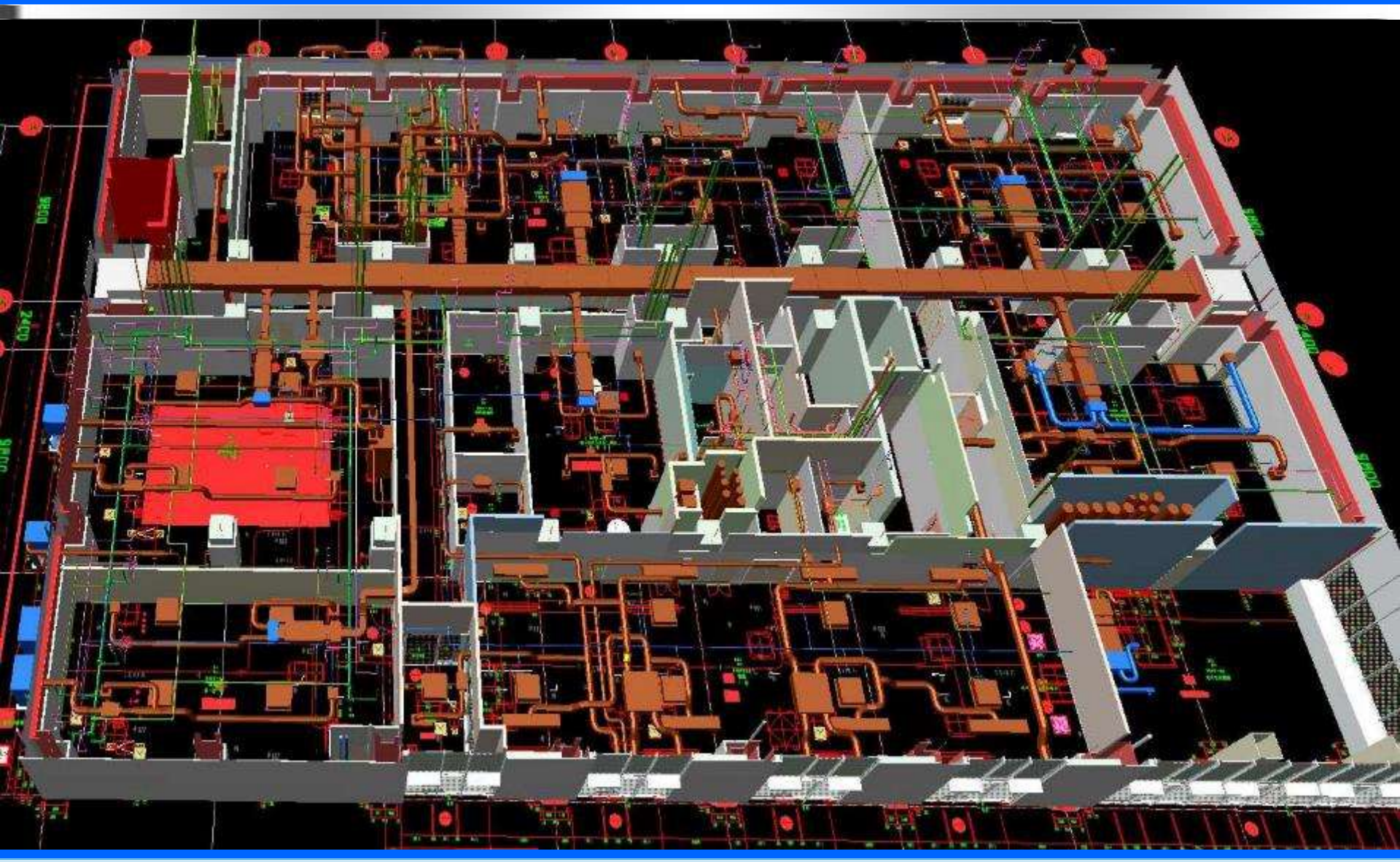


バルコニーモデル構成

Arch-CADへの変換



設計モデル



外装を自動集計

Part Family	Part	Componen	Componen	Component Description	Part Description	Quantity	Unit
27150							
G-外装下地ALC	ALC W30H214C	27150	922715004	外壁 ALC 高層 ロッキング構法 CS75φ W300mmH2140(	W300mmH2140mmT100mm	7.599624	pc
G-外装下地ALC	ALC W30H214C	27150	92271501(	取付金物費 イナズマプレート	W300mmH2140mmT100mm	12	pc
G-外装下地ALC	ALC W30H214C	27150	92271501(	取付金物費 ロッキングプレート	W300mmH2140mmT100mm	12	pc
G-外装下地ALC	ALC W30H214C	27150	92271501(	取付金物費 ボルト	W300mmH2140mmT100mm	12	pc
G-外装下地ALC	ALC W30H214CA10	27150	922715004	外壁 ALC 高層 ロッキング構法 CS75φ・AS100φ 加工 W	W300mmH2140mmT100mm	87.56272	pc
G-外装下地ALC	ALC W30H214CA10	27150	92271501(	取付金物費 イナズマプレート	W300mmH2140mmT100mm	140	pc
G-外装下地ALC	ALC W30H214CA10	27150	92271501(	取付金物費 ロッキングプレート	W300mmH2140mmT100mm	140	pc
G-外装下地ALC	ALC W30H214CA10	27150	92271501(	取付金物費 ボルト	W300mmH2140mmT100mm	140	pc
G-外装下地ALC	ALC W30H237	27150	922715004	外壁 ALC 高層 ロッキング構法 100MM	W300mmH2370mmT100mm	12.71268	m2
G-外装下地ALC	ALC W30H237	27150	92271501(	取付金物費 イナズマプレート	W300mmH2370mmT100mm	18	pc
G-外装下地ALC	ALC W30H237	27150	92271501(	取付金物費 ロッキングプレート	W300mmH2370mmT100mm	18	pc
G-外装下地ALC	ALC W30H237	27150	92271501(	取付金物費 ボルト	W300mmH2370mmT100mm	18	pc
G-外装下地ALC	ALC W30H237CA10	27150	922715004	外壁 ALC 高層 ロッキング構法 CS75φ・AS100φ 加工 W	W300mmH2370mmT100mm	8.327856	pc
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G-外装下地ALC	ALC W30H237CA10	27150	92271501(	取付金物費 ロッキングプレート	W300mmH2370mmT100mm	12	pc
G-外装下地ALC	ALC W30H237CA10	27150	92271501(	取付金物費 ボルト	W300mmH2370mmT100mm	12	pc
G-外装下地ALC	ALC W315H214	27150	922715004	外壁 ALC 高層 ロッキング構法 100MM	W315mmH2140mmT100mm	8.03784	m2
G-外装下地ALC	ALC W315H214	27150	92271501(	取付金物費 イナズマプレート	W315mmH2140mmT100mm	12	pc
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G-外装下地ALC	ALC W315H214	27150	92271501(	取付金物費 ボルト	W315mmH2140mmT100mm	12	pc
G-外装下地ALC	ALC W31H214CA10	27150	922715004	外壁 ALC 高層 ロッキング構法 CS75φ・AS100φ 加工 W	W310mmH2140mmT100mm	7.762176	pc
G-外装下地ALC	ALC W31H214CA10	27150	92271501(	取付金物費 イナズマプレート	W310mmH2140mmT100mm	12	pc
G-外装下地ALC	ALC W31H214CA10	27150	92271501(	取付金物費 ロッキングプレート	W310mmH2140mmT100mm	12	pc
G-外装下地ALC	ALC W31H214CA10	27150	92271501(	取付金物費 ボルト	W310mmH2140mmT100mm	12	pc
G-外装下地ALC	ALC W325H214CA10	27150	922715004	外壁 ALC 高層 ロッキング構法 CS75φ・AS100φ 加工 W	W325mmH2140mmT100mm	8.147376	pc
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G-外装下地ALC	ALC W382H214CA10	27150	92271501(	取付金物費 ロッキングプレート	W382mmH2140mmT100mm	16	pc
G-外装下地ALC	ALC W382H214CA10	27150	92271501(	取付金物費 ボルト	W382mmH2140mmT100mm	16	pc