Polski Komitet Narodowy Międzynarodowej Rady Ochrony Zabytków ICOMOS

FONDAZIONE ROMUALDO DEL BIANCO

SAPIENZA UNIVERSITÀ DI ROMA

POLITECHNIKA LUBELSKA

UNIVERSIDAD POLITÉCNICA MADRID

SAPERE AUDE VILNIUS GEDIMINAS TECHNICAL UNIVERSITY

FONDAZIONE FLAMINIA RAVENNA

Sustainable Urban Rehabilitation in Europe

Historical building adaptation to modern function

Erasmus+

Sustainable Urban Rehabilitation in Europe

3rd Semester

Susana Mora Alonso-Muñoyerro
Ignacio Mora Moreno
David García García
Carolina Hernández Martínez
Camila Burgos Vargas

Historical building adaptation to modern function

3 ECTS

SH

Sustainable Heritage

EC

Elective Courses

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SURE
SUSTAINABLE URBAN REHABILITATION IN EUROPE

UNIVERSIDAD POLITÉCNICA DE MADRID

Sustainable Urban Rehabilitation in Europe

Historical building adaptation to modern function

3 ECTS

SH

Sustainable Heritage

EC

Elective Courses

01 Introduction to building adaptation
02 Typology: big to big & small to small adaptations
03 Typology: big to small & small to big adaptations
04 Programme: extensions
05 Programme: bubbles
06 Programme: other adaptations
07 Circulations: horizontal circulations
08 Circulations: vertical circulations
09 Enclosure: protective enclosure
10 Enclosure: lightweight roofs, façades and finishings
11 Systems: climatization
12 Systems: fire protection, water supply and evacuation
13 Illumination: natural lighting
14 Illumination: artificial lighting
15 Illumination: lighting systems

Sustainable Urban Rehabilitation in Europe

Historical building adaptation to modern function

3 ECTS

LESSON 10: LIGHTWEIGHT ROOFS, FAÇADES AND FINISHINGS

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SURE
SUSTAINABLE URBAN REHABILITATION IN EUROPE

UNIVERSIDAD POLITÉCNICA DE MADRID

THE ENCLOSURE

- PROTECTIVE ENCLOSURE
- **LIGHTWEIGHT ROOFS**
- FAÇADES

This section will review the possibilities of lightweight constructive systems in the intervention on historical buildings. There have been detected two different opportunities:

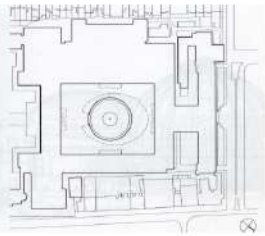
- the extension of the building into their patios and courtyards. Covering this spaces allow to incorporate functions into this element that previously just provided light and fresh air. The main solution is the use of glassed systems.
- Covering existing building which have lost their roofs, or those where a new translucent roof would bring more light into the building. Both glass and textile solutions can be appropriate for this matter. Textiles (PES-PVC, ETFE, silicone, PVDF, waterproof, etc.) These could provide some thermal insulation and light control.

Protective enclosures 1: glass

Interior courtyard of the British museum

London, United Kingdom. 2015

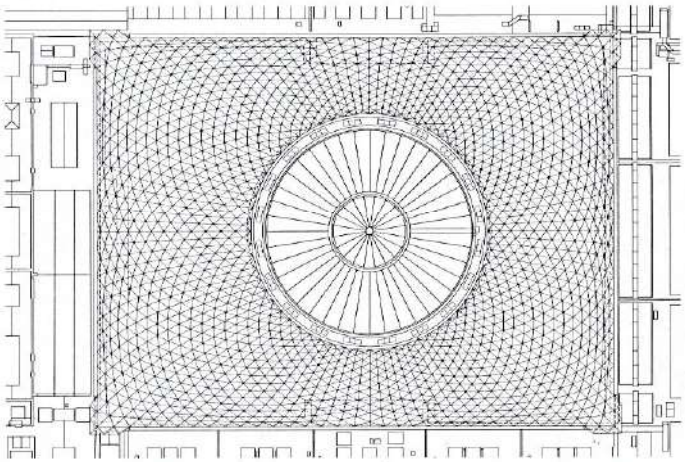
Foster & Partners.

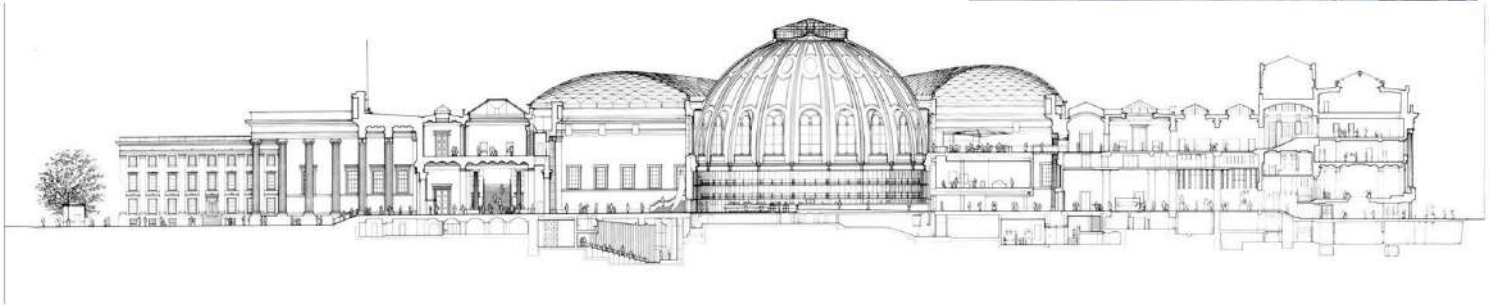


Plano de situación
Escala 1:4000

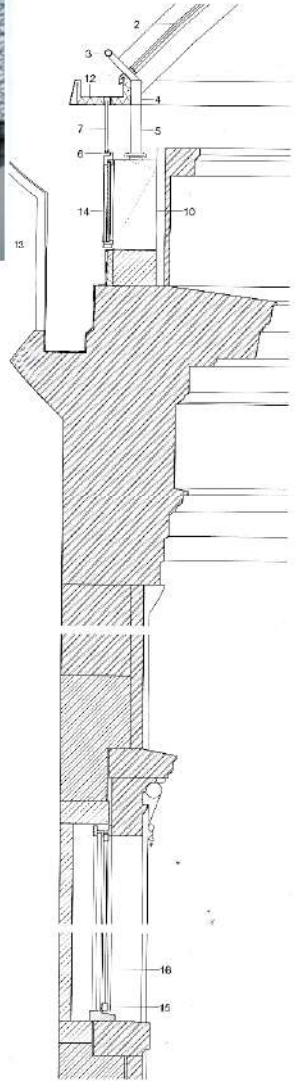
Vista cenital de cubierta
Planta baja
Escala 1:1000

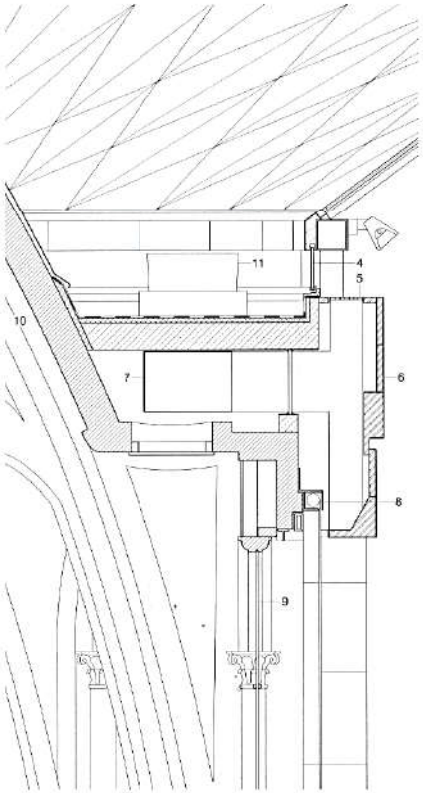
1 Entrada
2 Información
3 Escalera hacia el restaurante
4 Aseos
5 Sala de lectura
6 Tienda
7 Café

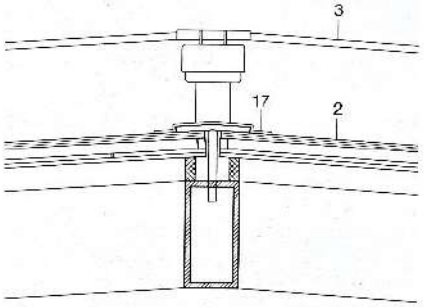


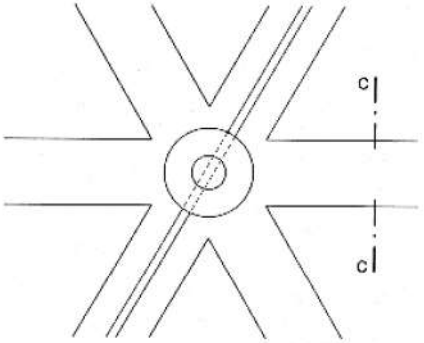


ENCLOSURE - LIGHTWEIGHT ROOFS AND FAÇADES





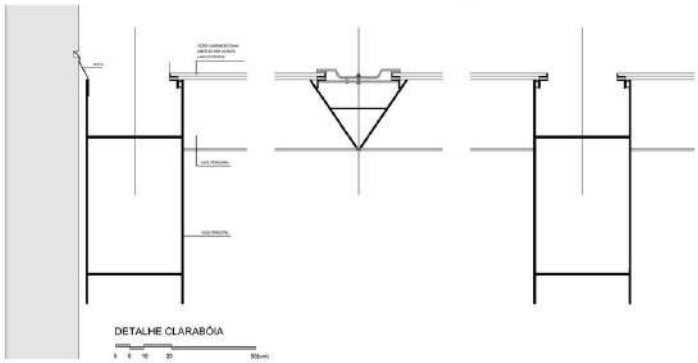




Lightweight enclosures 2: glass

Renovation of the Brasilian National Pinacotheque. Sao Paolo, Brazil.

Paulo Mendes Da Rocha



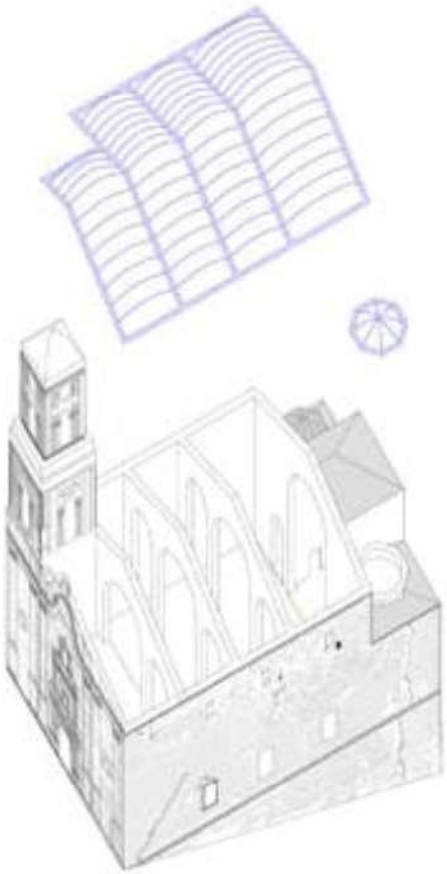
Lightweight enclosures 3: textiles

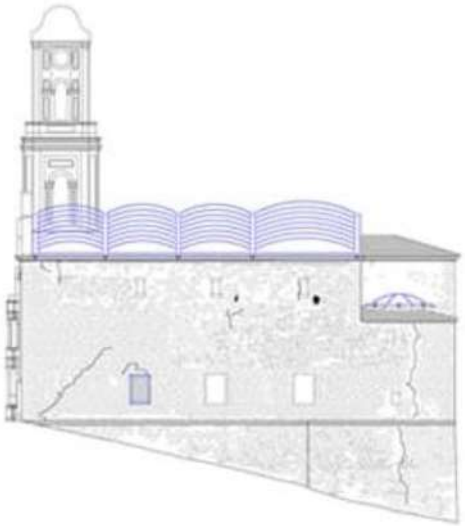
Sant Pere de Corbera d'Ebre

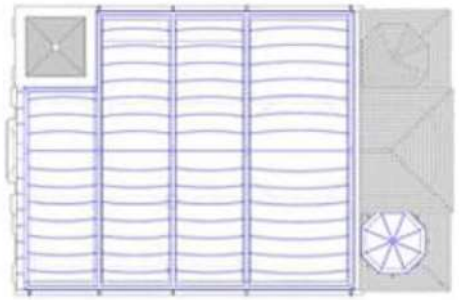
Tarragona, Spain

Ferran Vizoso - Nuria Bordas

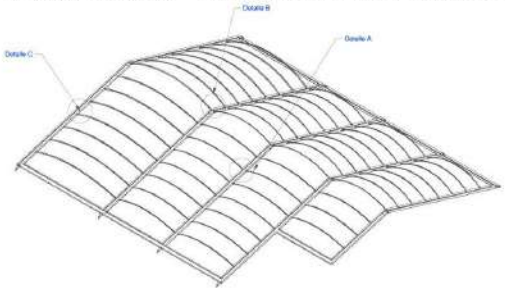
ENCLOSURE - LIGHTWEIGHT ROOFS AND FAÇADES





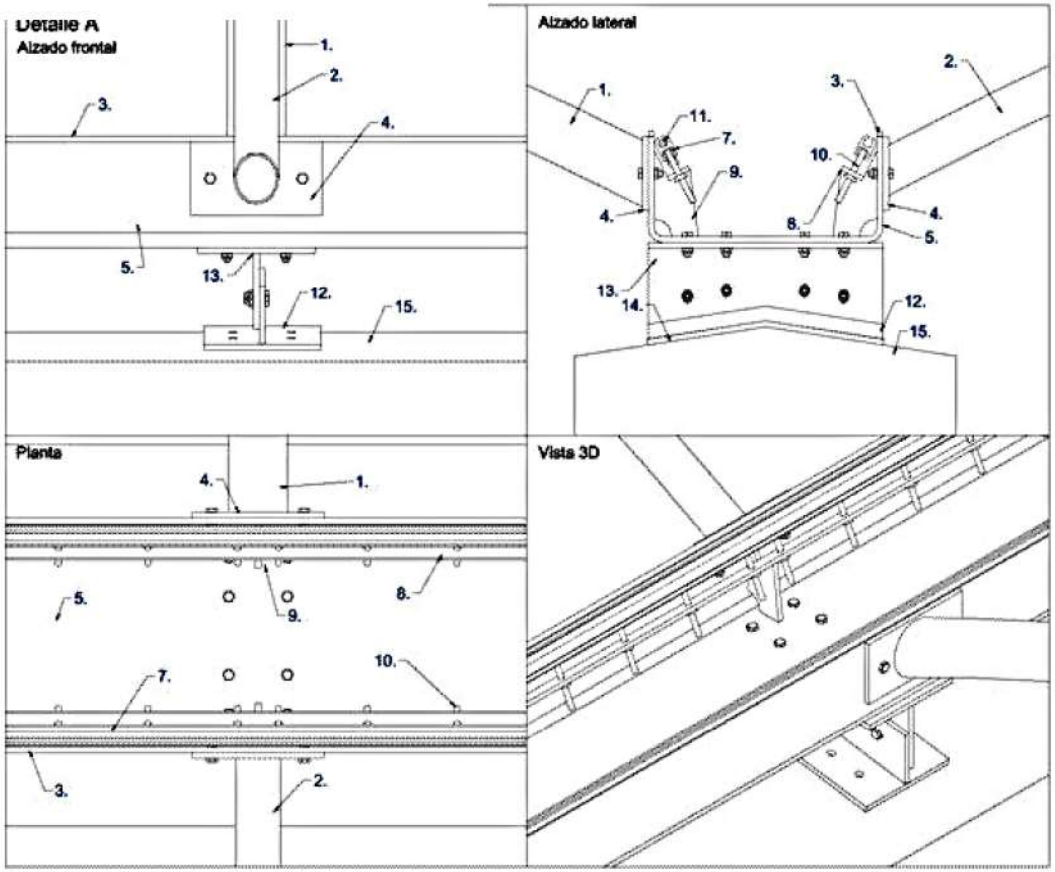


ENCLOSURE - LIGHTWEIGHT ROOFS AND FAÇADES



LEYENDA

1. Arco medio. Tubo Ø 101.6x4.6
2. Arco medio. Tubo Ø 76.1x3.25
3. Tubo Ø 16
4. Pieza base
5. Correa 40x40x5x5
6. Angulo correa canal
7. Perfil serie de aluminio extruizado
8. Varilla lenticular de acero inoxidable
9. Cartela
10. Balon
11. Macperlin, sujeción tipo
12. Pieza 1
13. Pieza 2
14. Colocación anclajes con varillas M12 (h=170)mm y resina tipo HILTI RE-500, con mortero
15. Hormigón existente

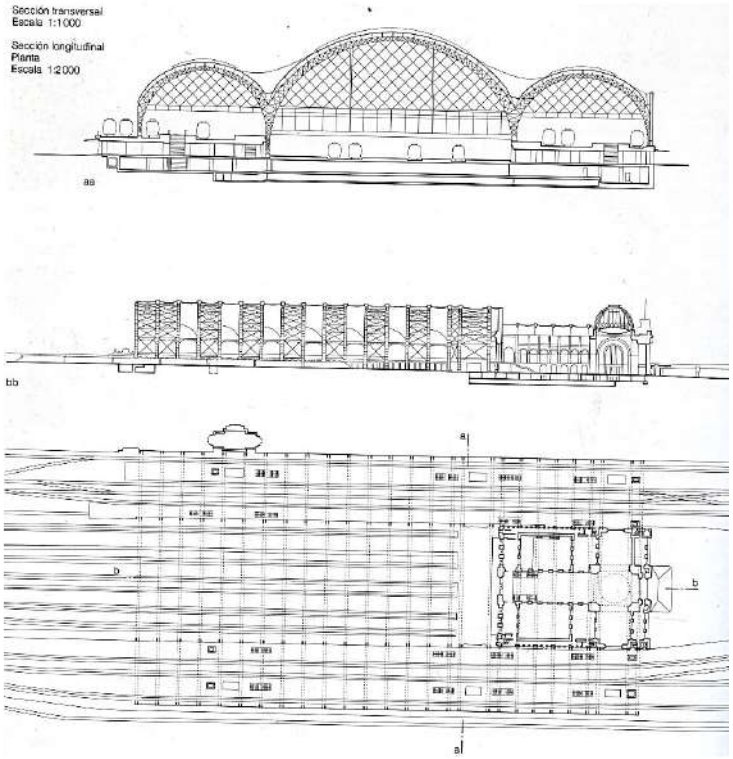


Lightweight enclosures 4: textiles

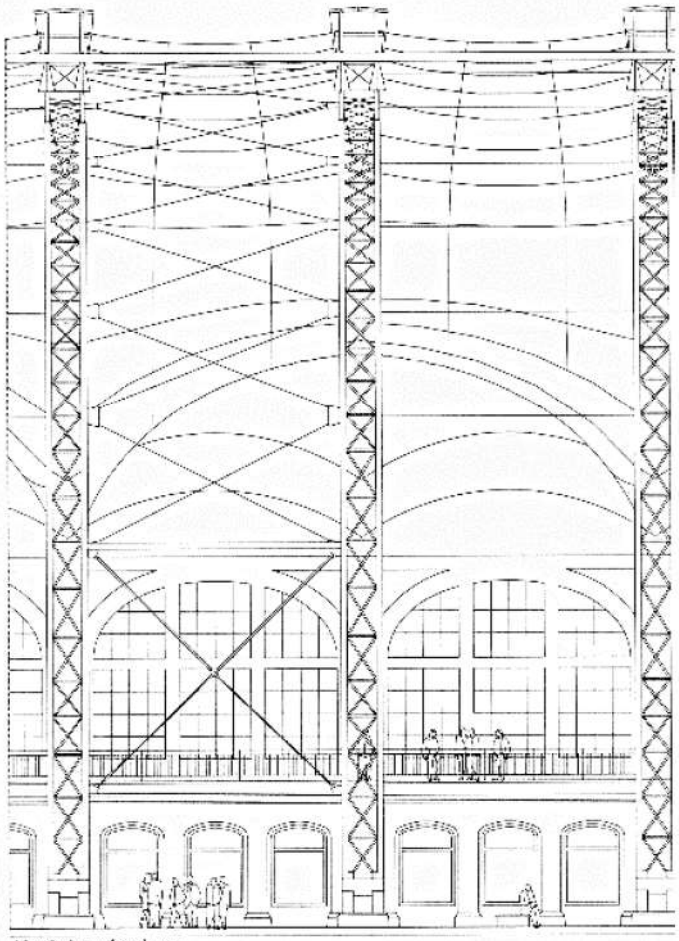
Dresde station renovation.

Dresde, Germany. 2002

Foster & Partners.

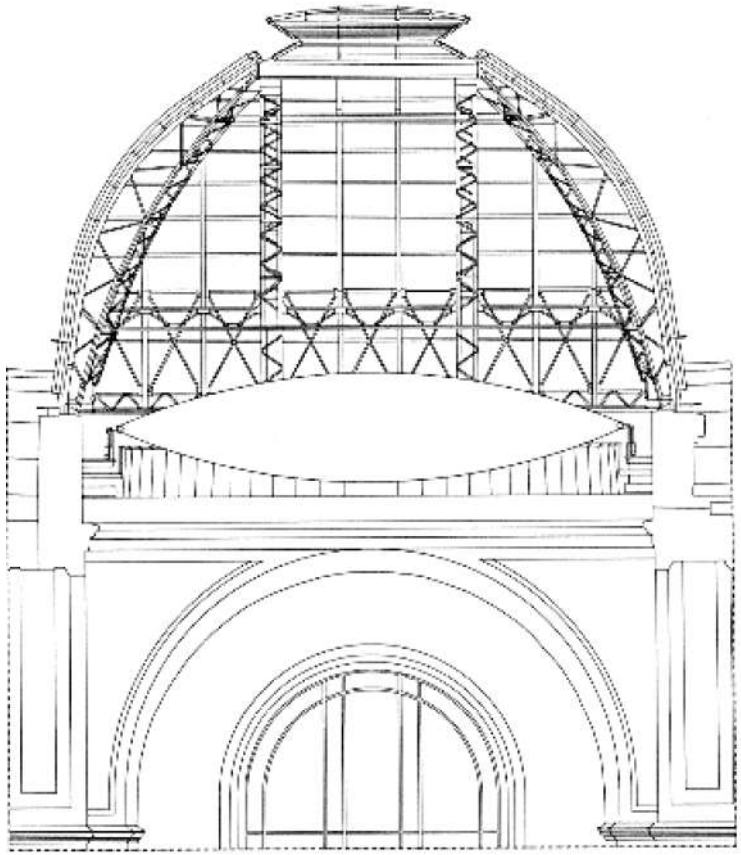


ENCLOSURE - LIGHTWEIGHT ROOFS AND FAÇADES



Alzado lateral andenes

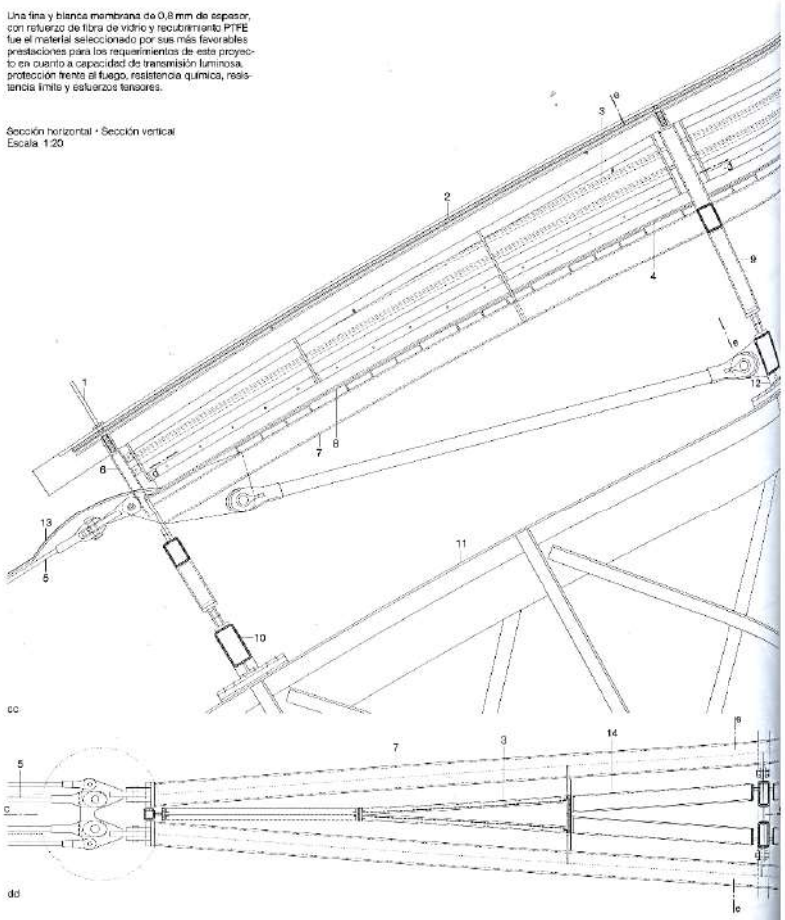
ENCLOSURE - LIGHTWEIGHT ROOFS AND FAÇADES



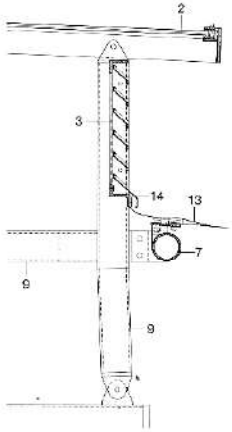
ENCLOSURE - LIGHTWEIGHT ROOFS AND FAÇADES

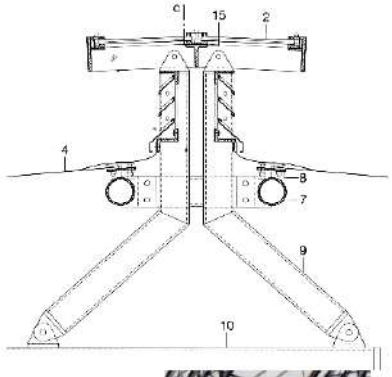
Una fina y blanca membrana de 0,8 mm de espesor, con refuerzo de fibra de vidrio y recubrimiento PTFE fue el material seleccionado por sus más favorables prestaciones para los requerimientos de este proyecto en cuanto a capacidad de transmisión luminosa, protección frente al fuego, resistencia química, resistencia límite y esfuerzos tensores.

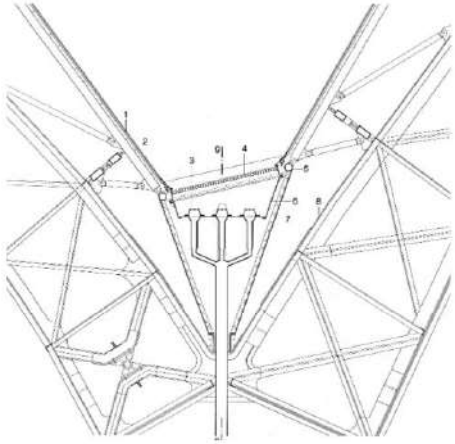
Sección horizontal · Sección vertical
Escala 1:20

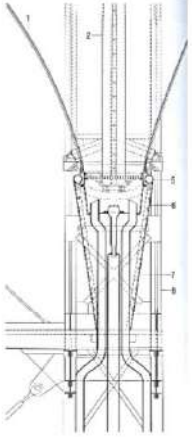


1 Pararrayos:
Tubo de acero Ø 10 mm
2 Vidrio laminado de seguridad 16 mm
3 Bastidor con chapa de aluminio perforado y lamas perfiladas
4 Membrana de tejido de fibra de vidrio, blanca, 0,8 mm recubrimiento PTFE,
Peso: 1,2 kg/m²,
Cordón resistente a tensión de 14.000/10.000 kg/m
Factor de transmisión: 12,5%
Factor de reflexión: 73%
5 Cable en espiral de acero galvanizado Ø 22 mm
6 Tubo de acero Ø 50/4 mm
7 Tubo de acero Ø 114,3/12,5 mm
8 Anclaje de membrana
Pletina de aluminio 115/10 mm
9 Tubo de acero □ 120/80/12,5 mm
10 Correa:
Perfil de acero □ 200/100 mm
11 Cordón superior en arco (existente):
Angular de hierro 2x 100/12 mm
→ Pletina de hierro 12 mm
12 Correa adaptadora para compensar tolerancias
Chapa de acero 10 mm, soldada
13 Membrana, fabricada in situ
14 Bastidor apoyo:
Perfil de acero Z 80 mm
15 Perfil de acero 90 mm









THE ENCLOSURE

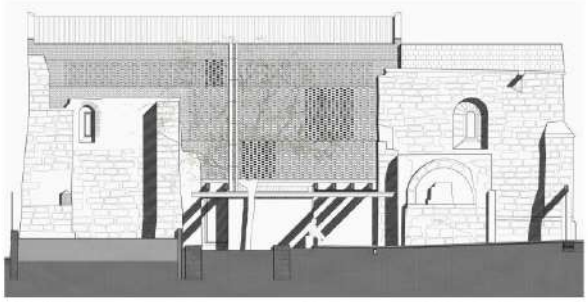
- PROTECTIVE ENCLOSURE
- LIGHTWEIGHT ROOFS
- **FAÇADES**

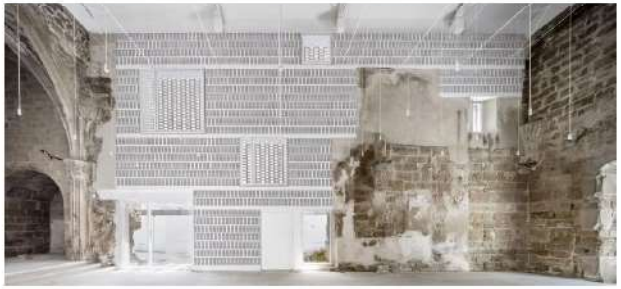
This section will review the interaction between building adaptation and vertical enclosures. The following concerns may be detected:

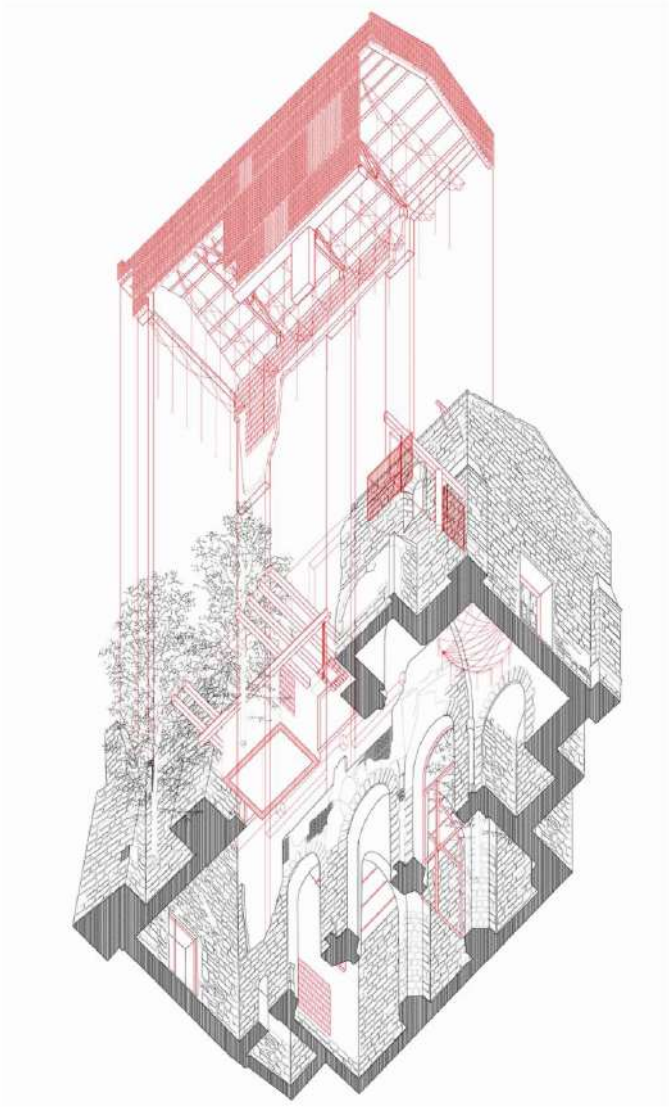
- **Volume completation:** buildings in ruin or with missing parts may require que construction of a new enclosure. This new element could need to be differentiated from the original piece.
- **Building extension:** extension do not necessarily have to meet strict image condition. Extensions and rehabilitation need to meet the same comfort and security requirements as modern constructions.
- **Thermal enclosure:** as seen previously, one of the enclosure tasks is regulating the temperature with the environment: thermal insulation. The implementation of insulation could be done through the exterior or the interior face of the walls, changing its aspect and needing a new finishing.
- **Interior and exterior finishes:** the new finishes needed should stablish some relation with the preexisting ones, either of contrast or to resemble the original surface. In each case, porous systems (brick, concrete, plaster, etc.) or compact systems (plastic, metal, etc.) may be used.

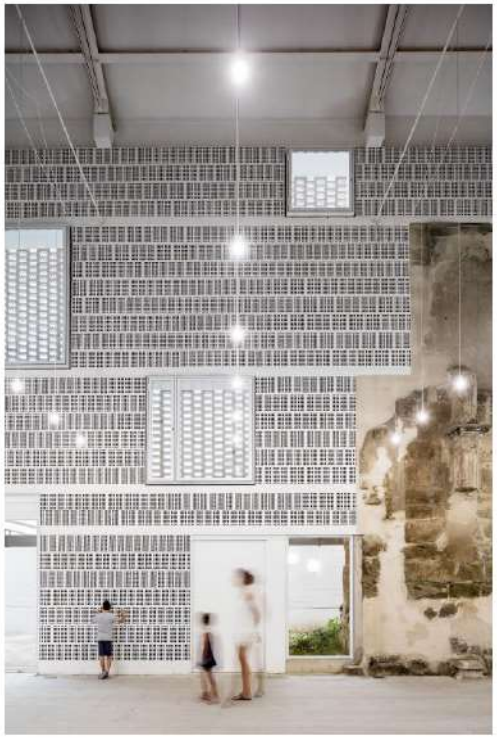
Façades.

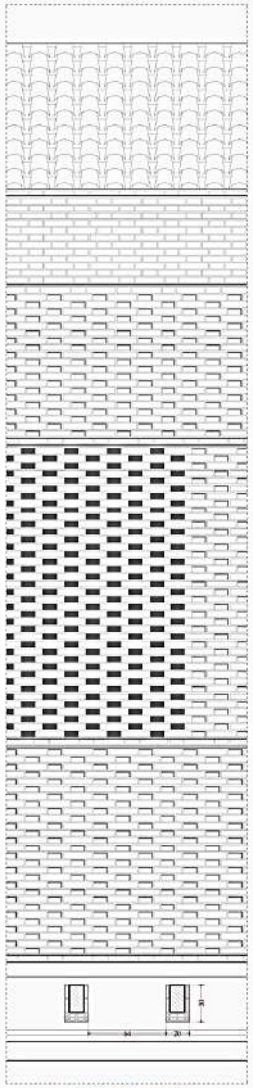
Santa María de Vilanova de la Barca por Alea Olea



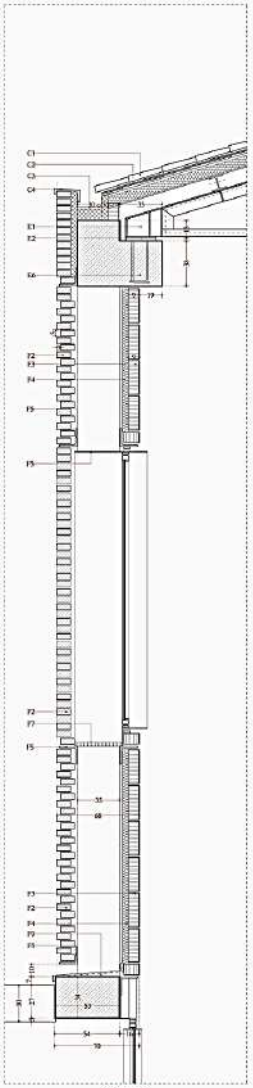




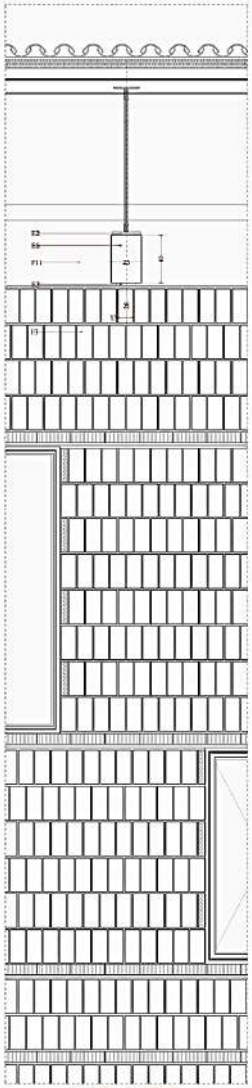




FAÇANA EXTERIOR



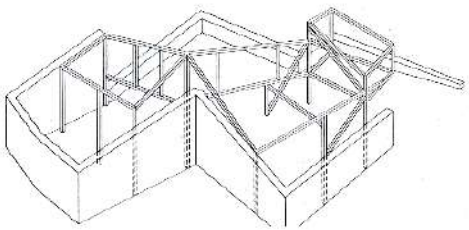
SECCIÓ

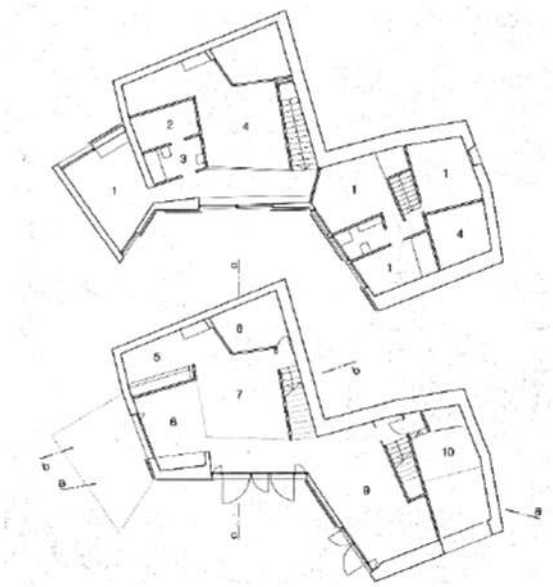


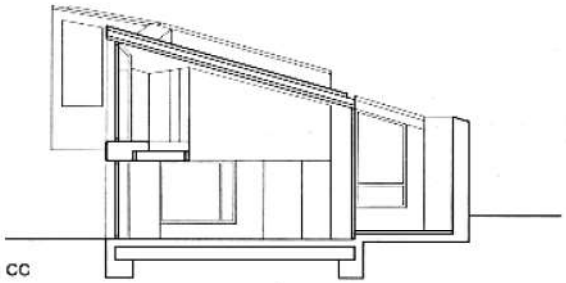
FAÇANA INTERIOR

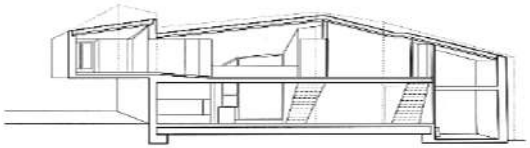
Façades.

House in Lles de Cerdanya.
Lles de Cerdanya, Barcelona, Spain.
Arturo Frediani.

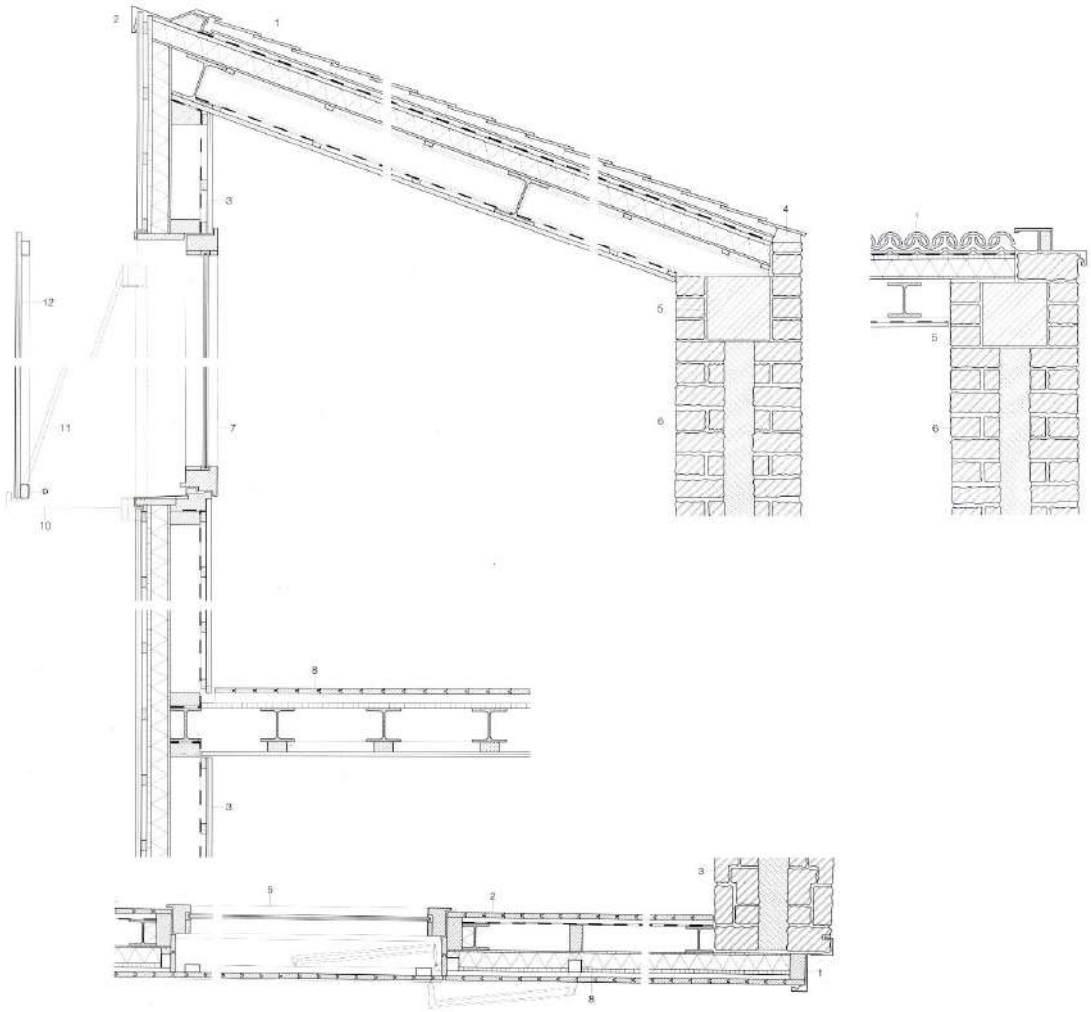


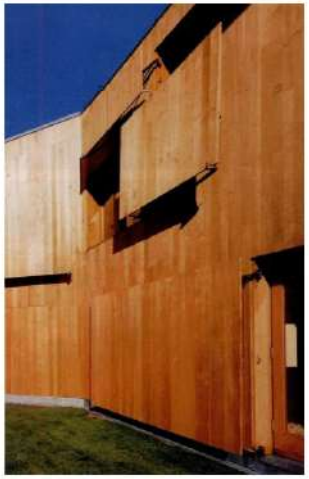






ENCLOSURE - LIGHTWEIGHT ROOFS AND FAÇADES

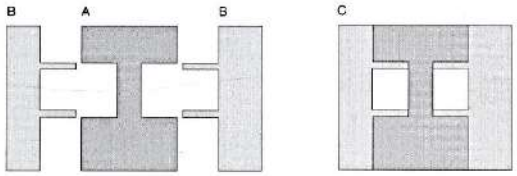


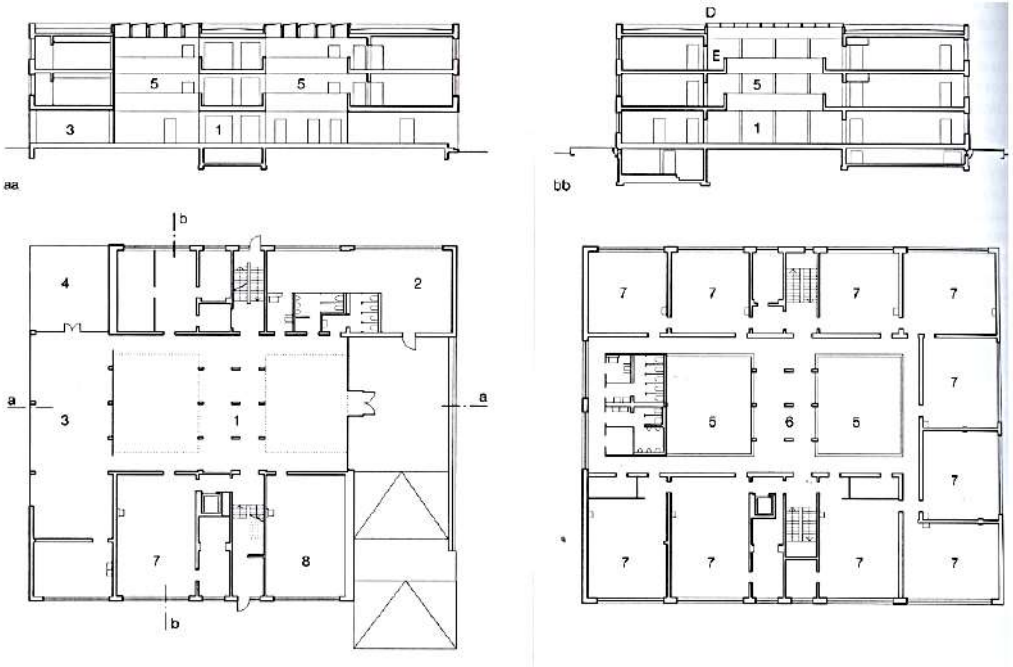


Façades.

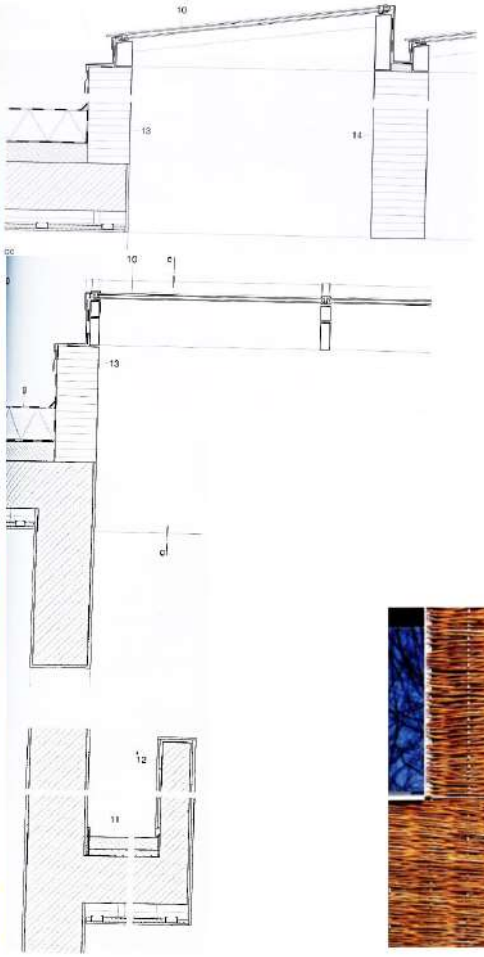
Rehabilitation and extension of a modular school in Schulzendorf, Germany.

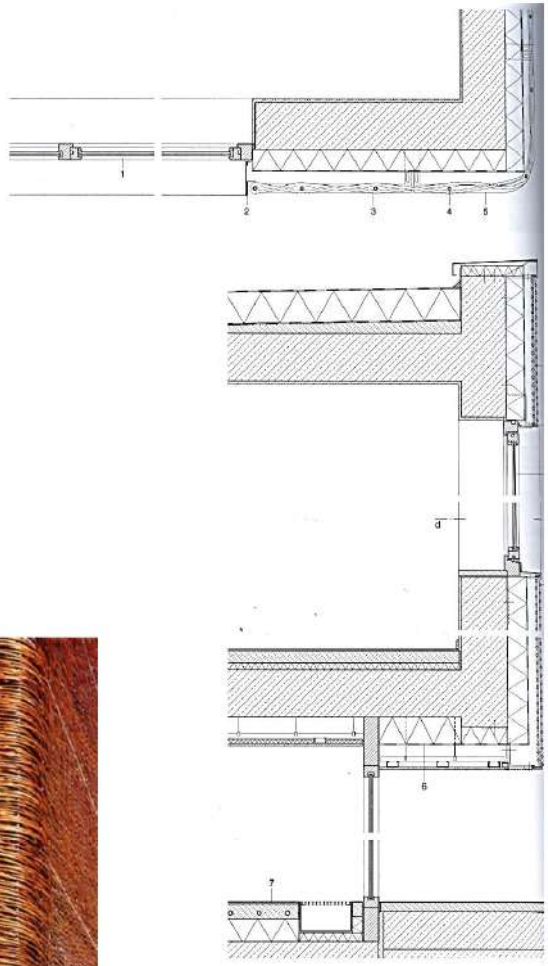
Anderroth Architekten, Berlin





ENCLOSURE - LIGHTWEIGHT ROOFS AND FAÇADES

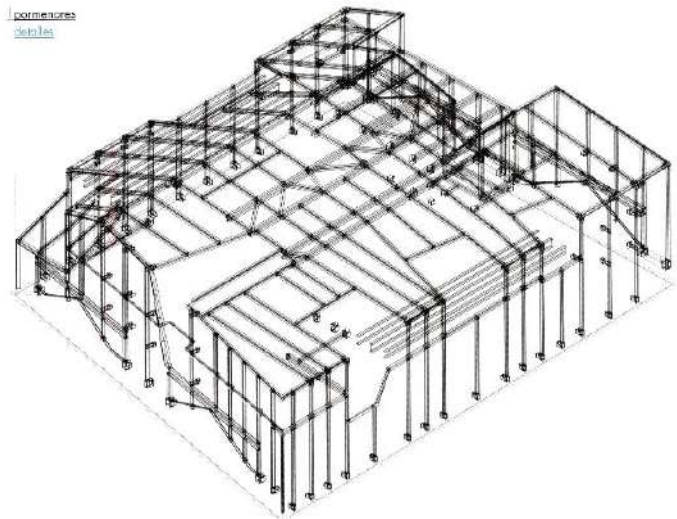




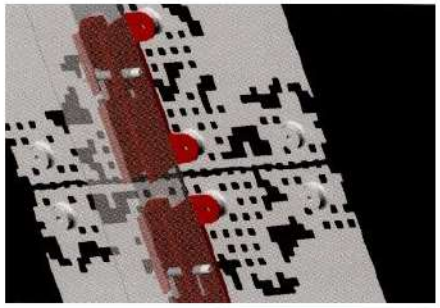
Façades

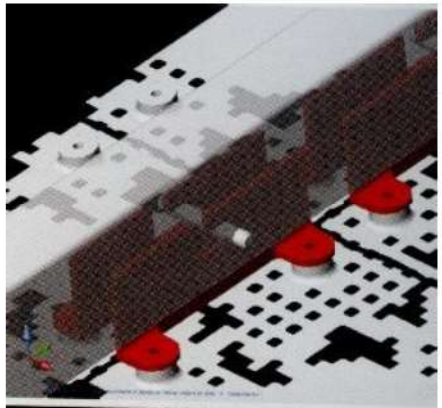
Caixa Forum Madrid. Conversion of an electricity tranforming central to exhibition centre. Madrid, Spain. 2002

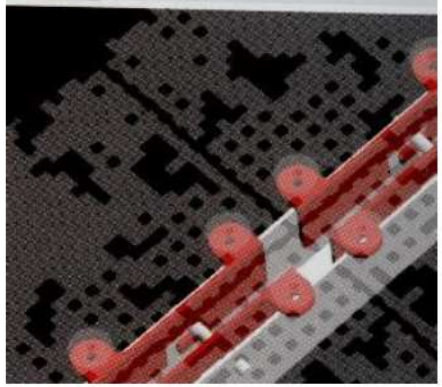
Herzog & deMeuron

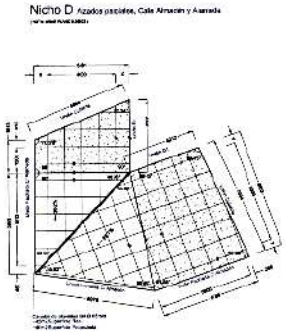


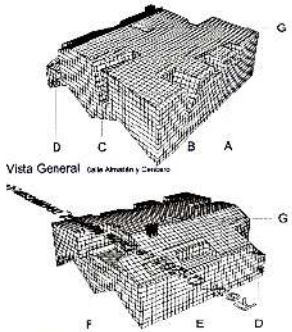
ENCLOSURE - LIGHTWEIGHT ROOFS AND FAÇADES

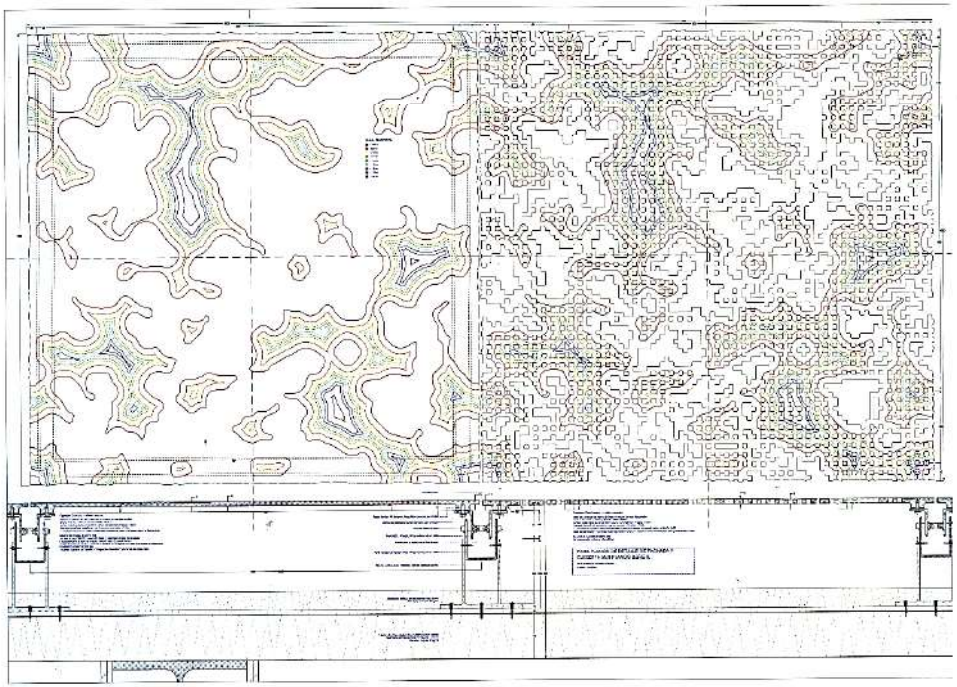












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