



Faculdade de
Arquitetura e Urbanismo



APRENDENDO COM A NATUREZA

CONSTRUINDO E DESVENDANDO ANALOGIAS ENTRE SISTEMAS ESTRUTURAIS NATURAIS E ARTIFICIAIS

PROF. DR. ALEXANDRE AUGUSTO MARTINS

[2021]

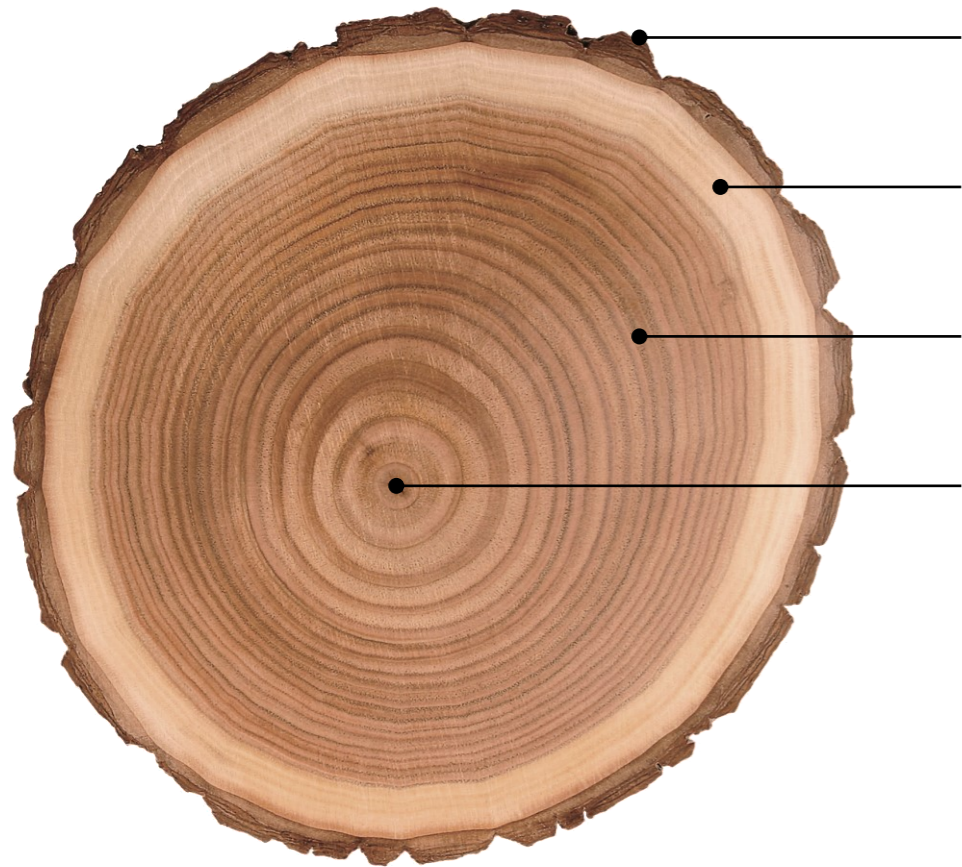
COMO CITAR ESTE MATERIAL

MARTINS, ALEXANDRE AUGUSTO. **APRENDENDO COM A NATUREZA: CONSTRUINDO E DESVENDANDO ANALOGIAS ENTRE SISTEMAS ESTRUTURAIIS NATURAIS E ARTIFICIAIS**. PALESTRA. SÃO PAULO: FACULDADE DE ARQUITETURA E URBANISMO DA UNIVERSIDADE PRESBITERIANA MACKENZIE; OUTUBRO DE 2021.

CONTEÚDO PREPARADO E APRESENTADO COMO CONTRIBUIÇÃO INDIVIDUAL PARA A XVIII SEMANA VIVER METRÓPOLE “ESPERANÇAR PARA REDESENHAR”, ORGANIZADA PELA FAUMACKENZIE ENTRE 19 E 22 DE OUTUBRO DE 2021.

NATURALMENTE ARTIFICIAIS / ARTIFICIALMENTE NATURAIS





CASCA

ALBURNO

CERNE

MEDULA

[MCFOASSOCIATION, 2021]



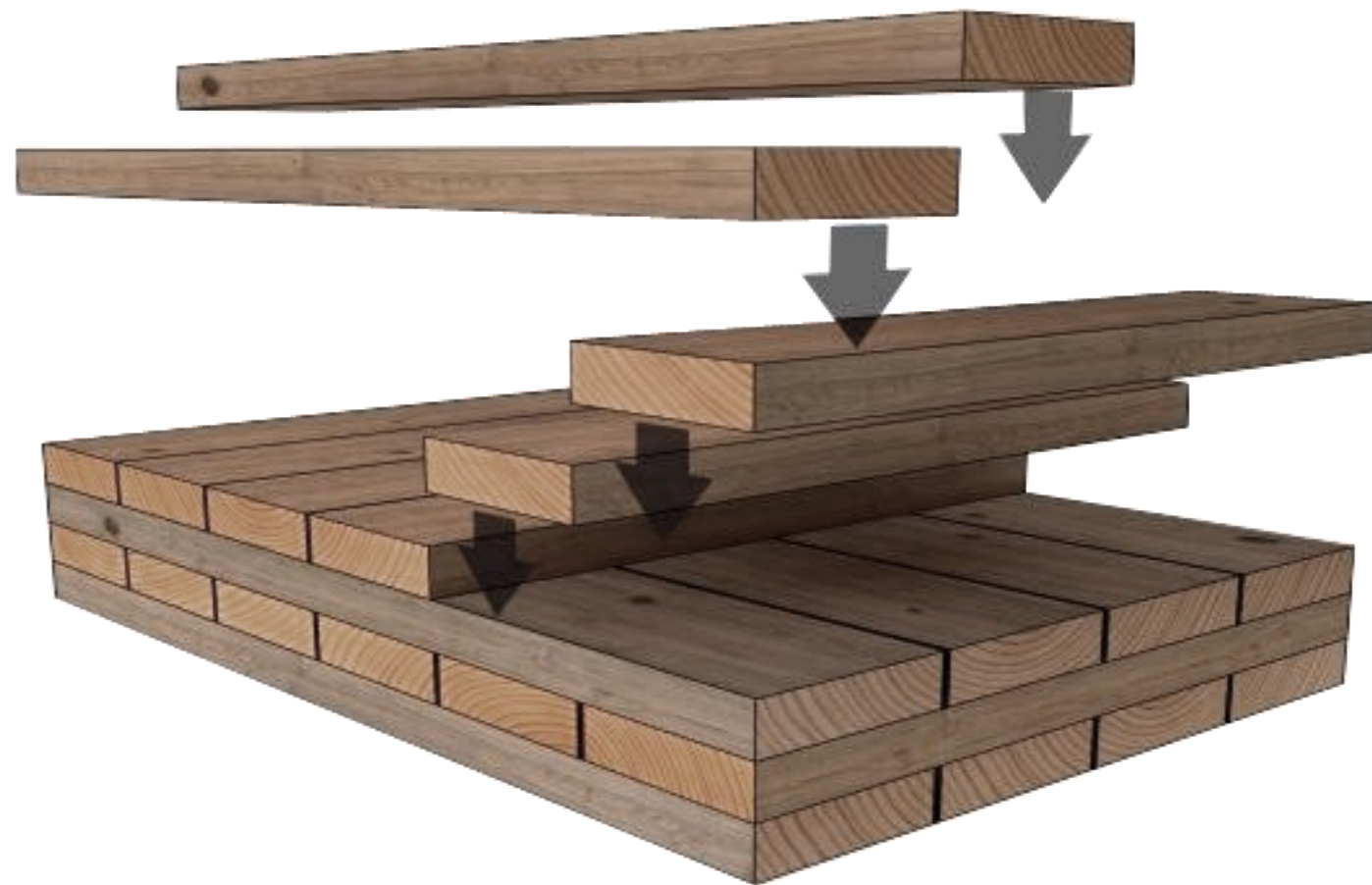
[ARTWOOD, 2021]

MADEIRA LAMINADA COLADA (MLC)
[VIGAS + PÓRTICOS]



[TECHNISCHE UNIVERSITÄT MÜNCHEN – TUM, 2021]

MADEIRA LAMINADA COLADA CRUZADA (CLT)
[PLACAS + PAINÉIS]

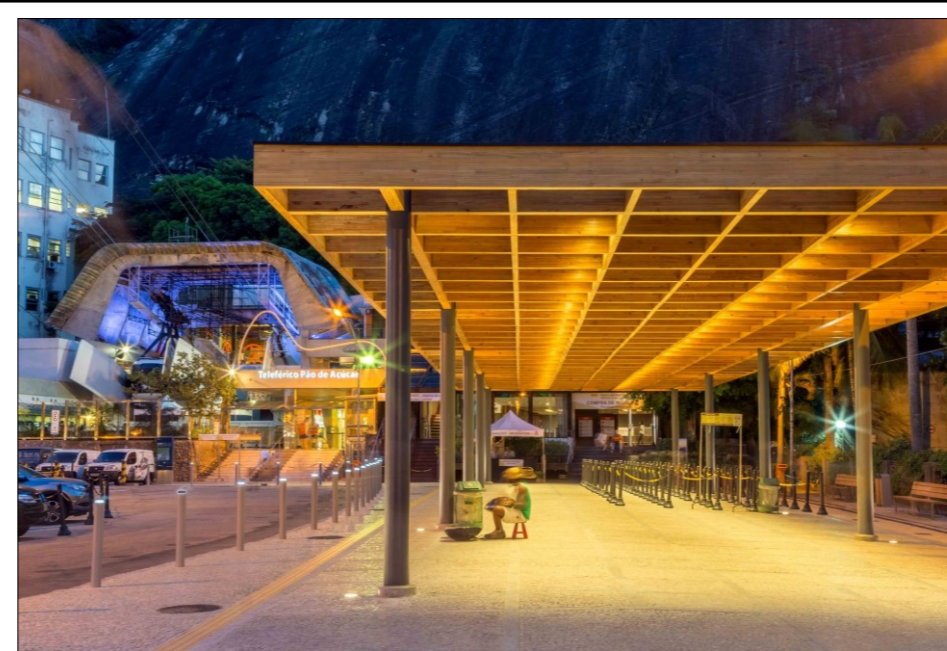
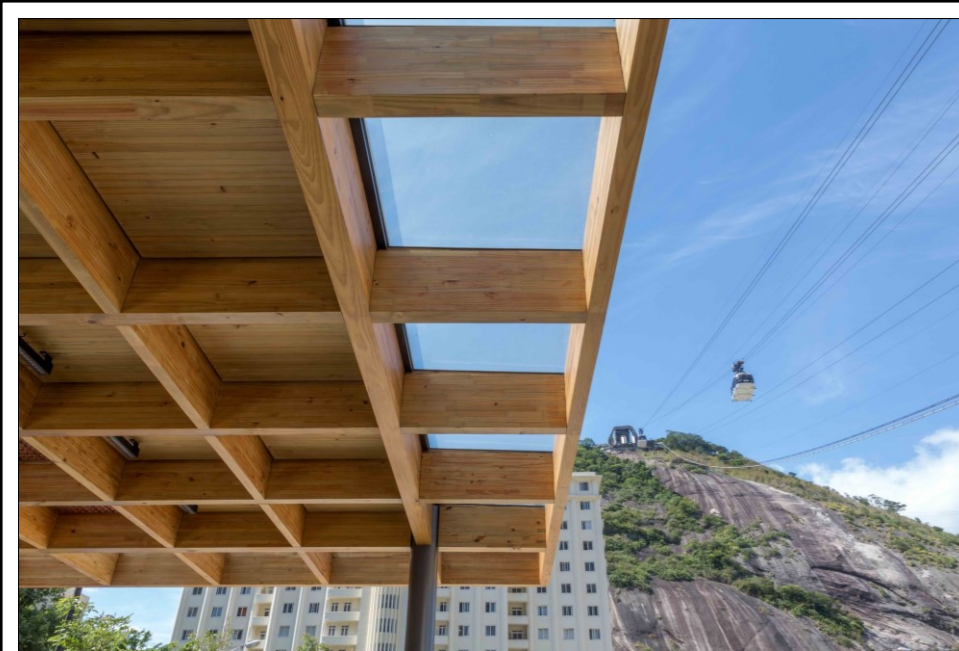


[DIETRICH BUCK *at al.*, 2016]

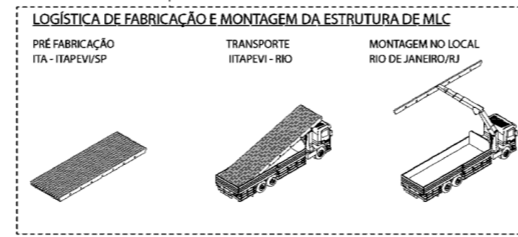
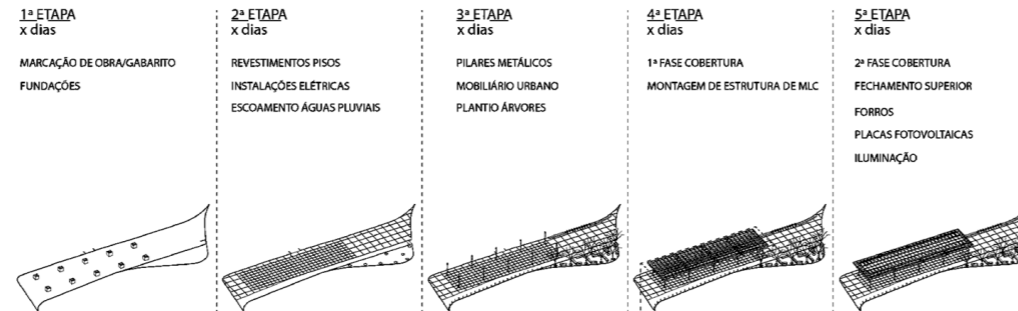
**COBERTURA
SHOPPING FORTALEZA**

[MLC]
La Guarda Low Architects
Fortaleza - Ceará - 2013



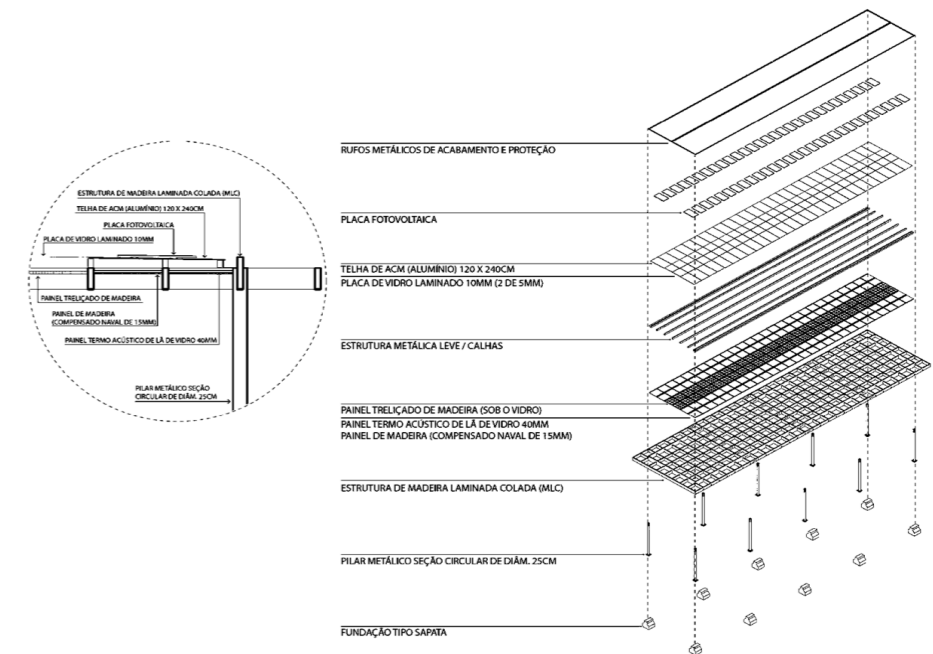


Implantação do Projeto | Fases de construção



a+ arquitetura

Sistema construtivo



a+ arquitetura

ACESSO AO BONDINHO DO PÃO DE AÇÚCAR [MLC]

a + arquitetura
Rio de Janeiro - Brasil - 2016

[ARCHDAILY, 2021]

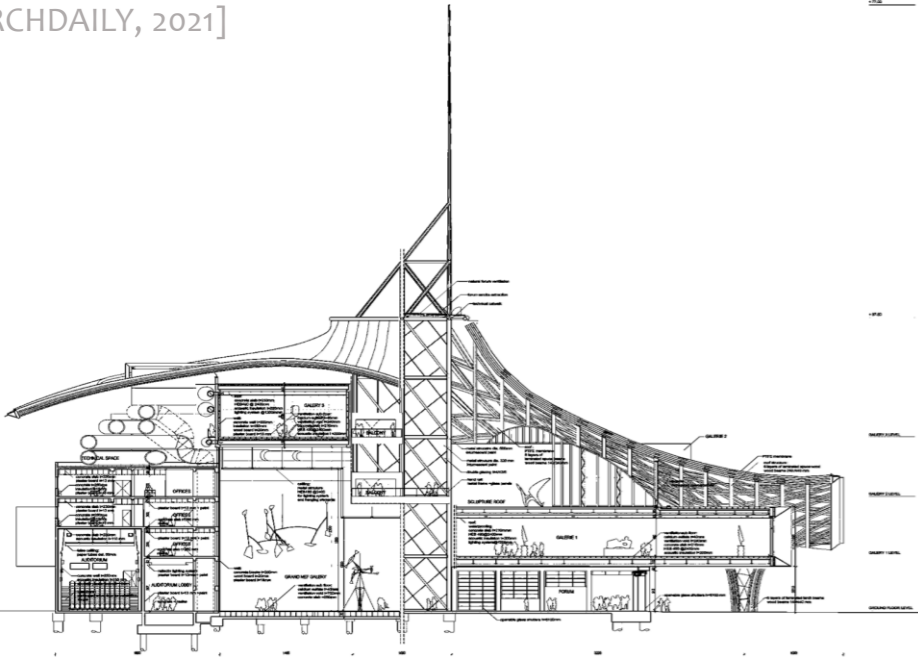
CENTRO POMPIDOU METZ

[MLC]

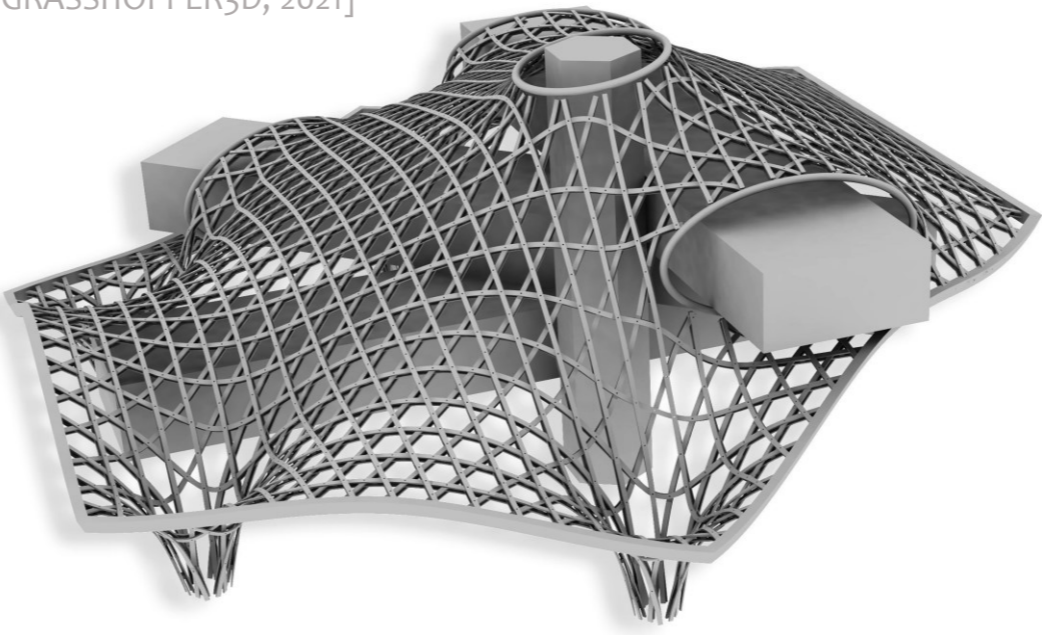
Shigeru Ban Architects
Metz - França - 2013



[ARCHDAILY, 2021]



[GRASSHOPPER3D, 2021]



[DETAIL INSPIRATION, 2021]

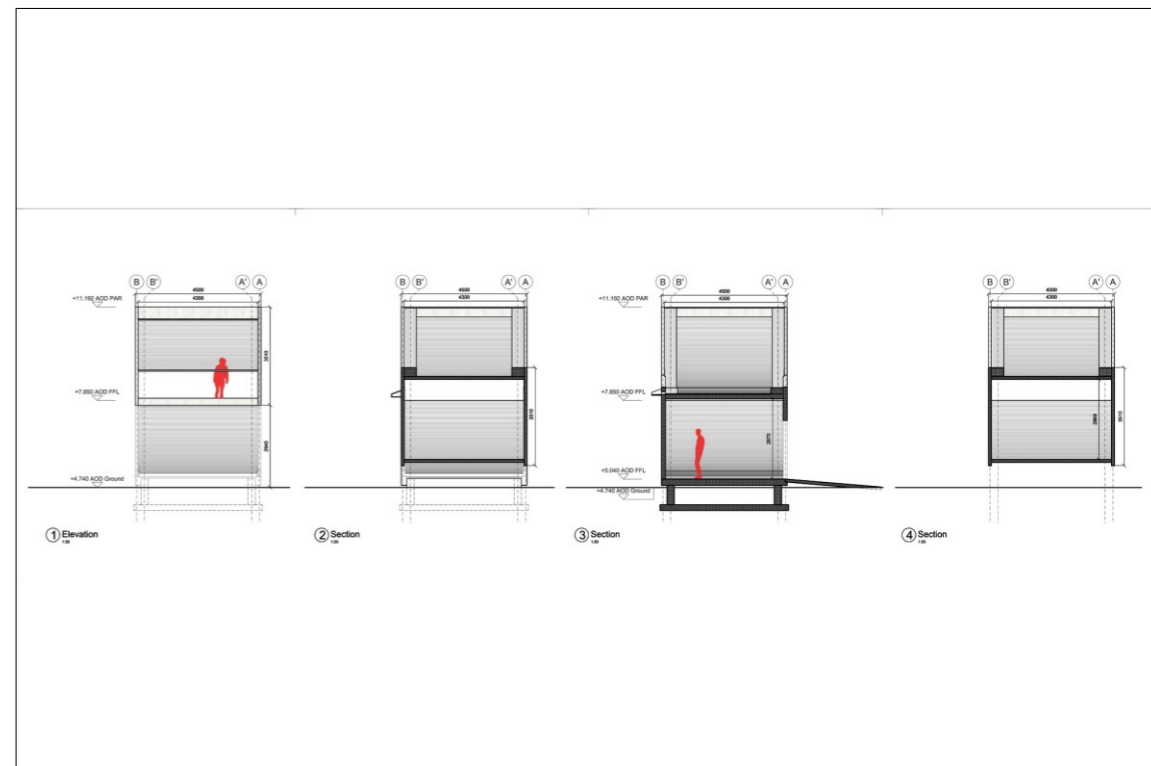




O SORRISO

[CLT]

Alisson Brooks Architects
Londres - Inghilterra - 2016



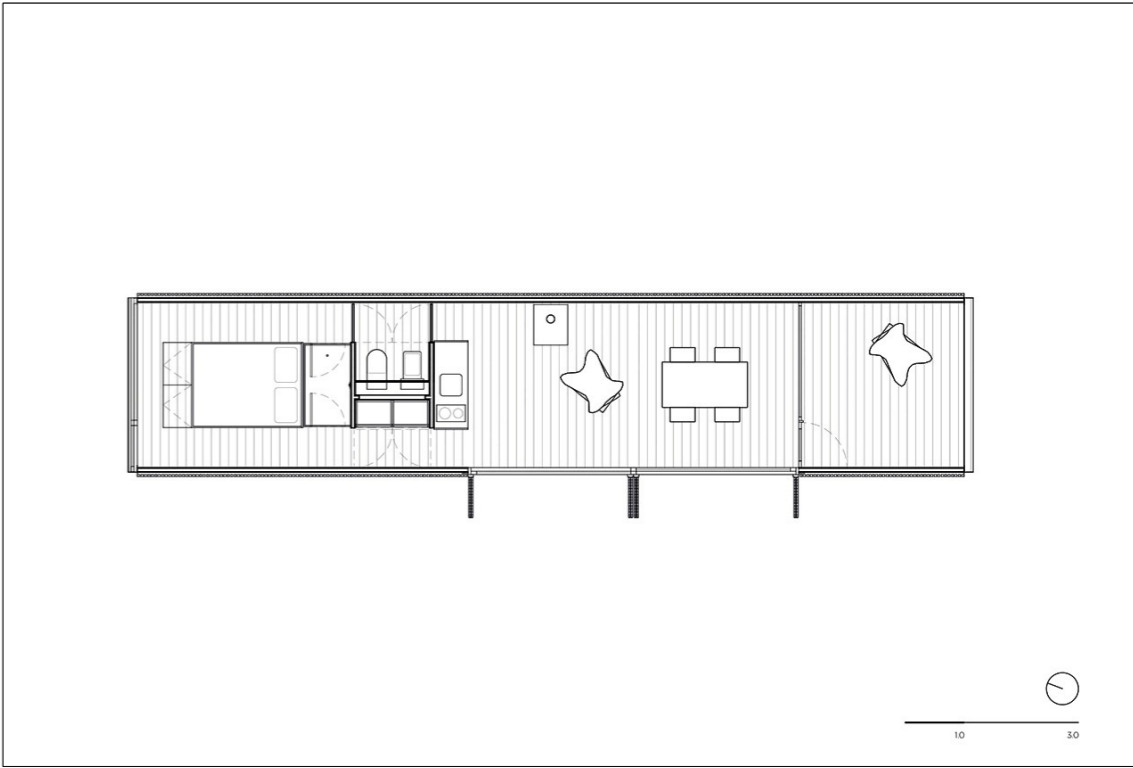
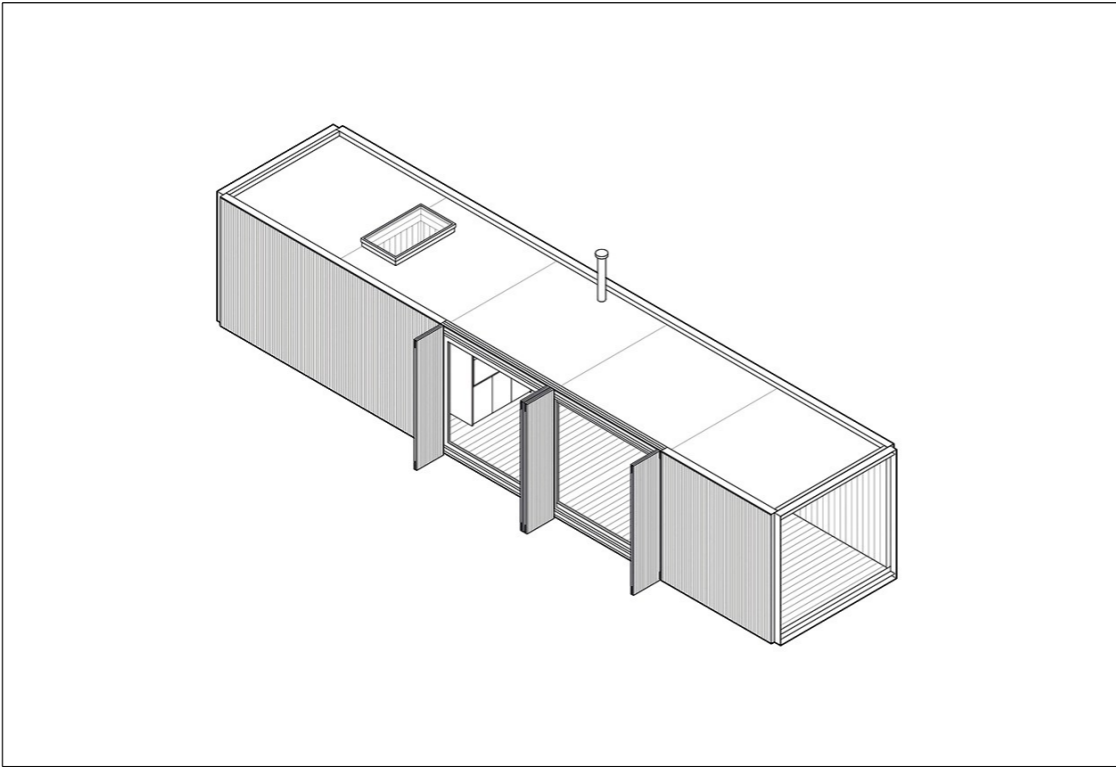


MINIMOD CATUÇABA

[CLT]

MAPA

São Paulo - Brasil - 2015



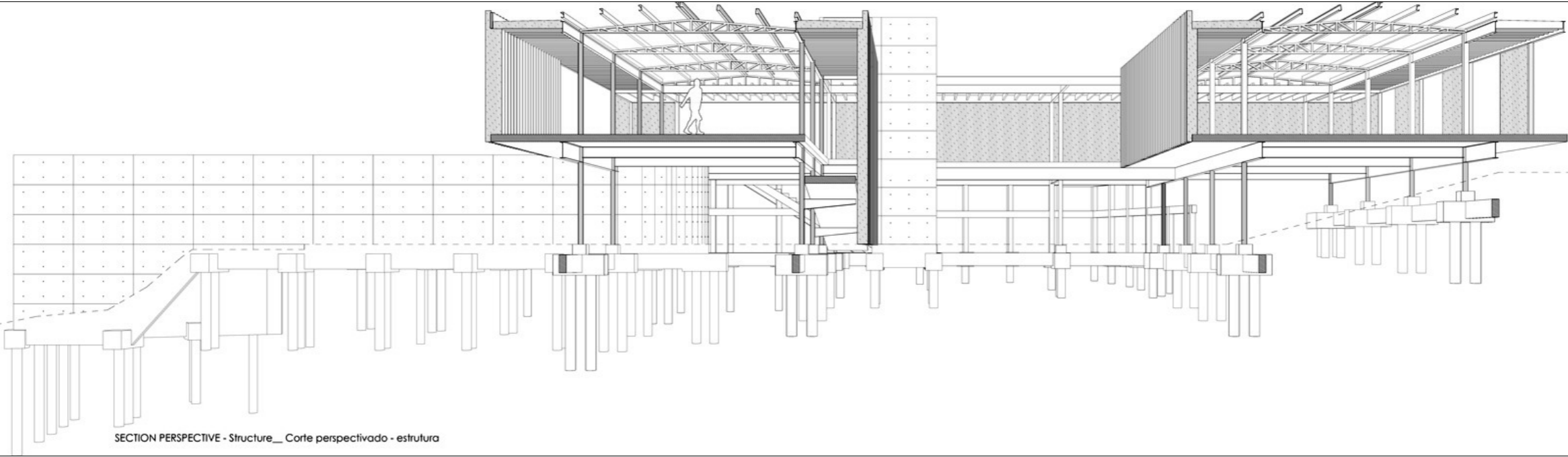
CASA MARIA & JOSÉ

[CLT]

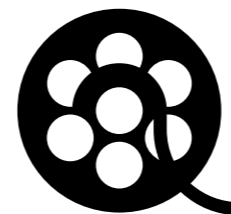
Sérgio Sampaio Arquitetura

Itu - Brasil - 2016

[ARCHDAILY, 2021]



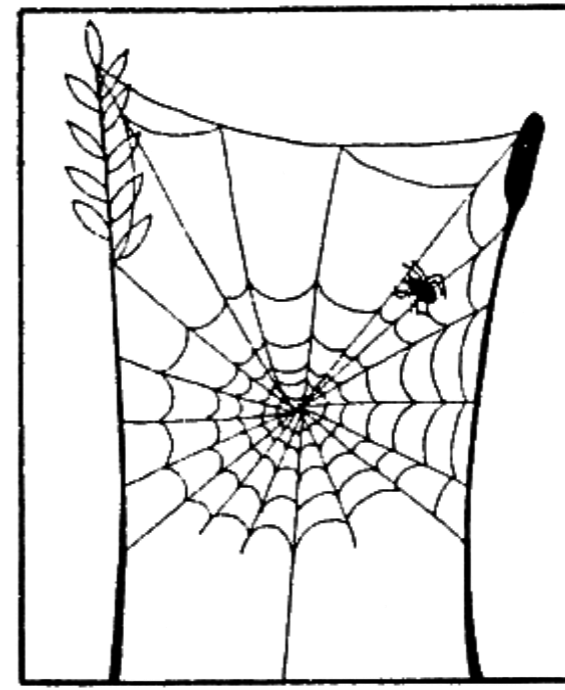
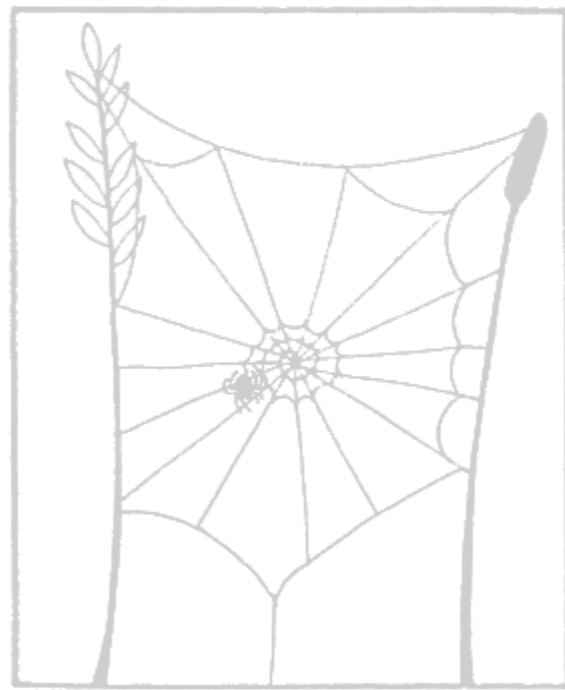
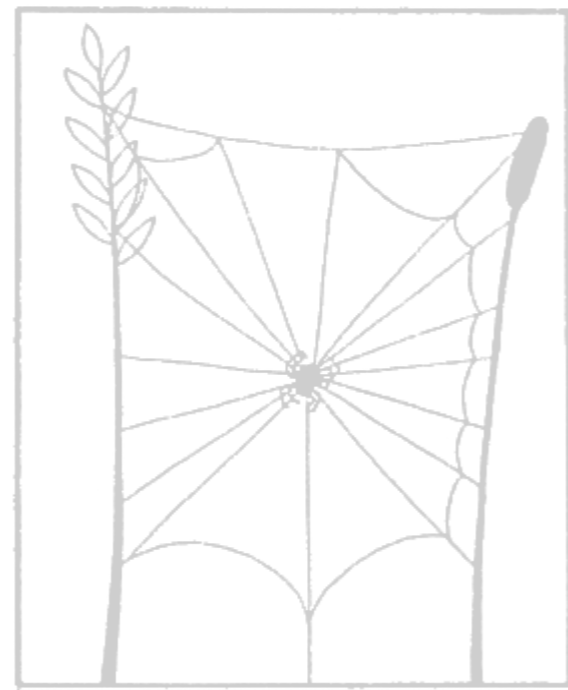
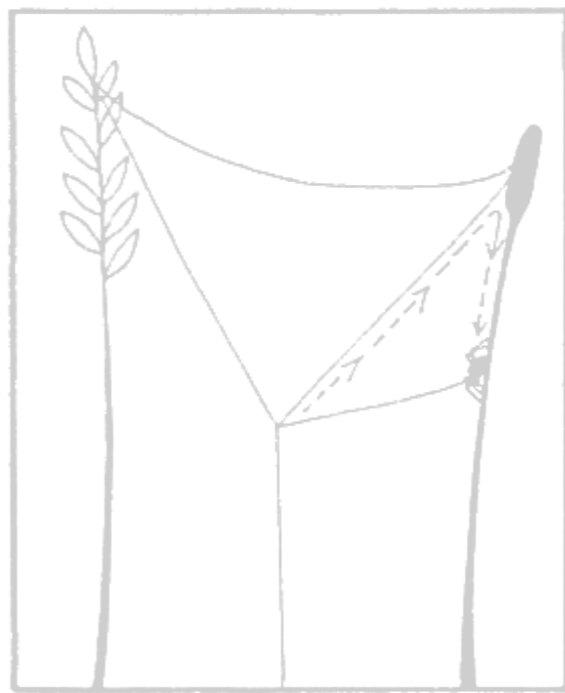
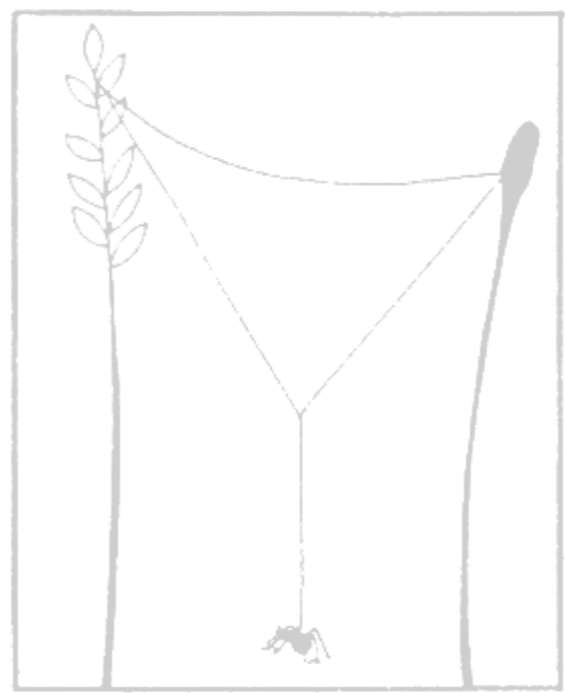
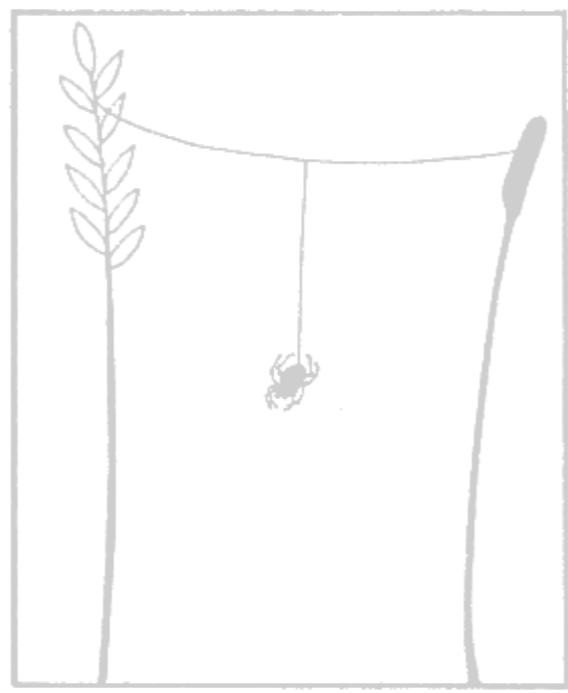
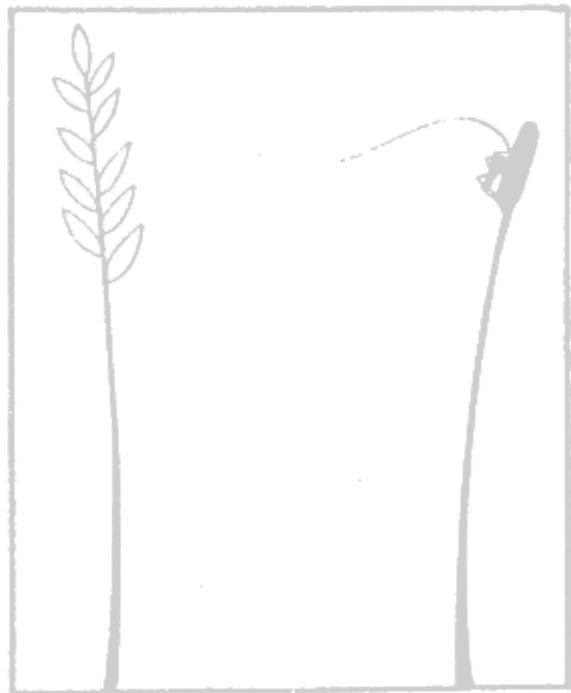
SECTION PERSPECTIVE - Structure__ Corte perspectivado - estrutura



CASA MARIA & JOSÉ

[“CASA MARIA & JOSÉ – SERGIO SAMPAIO ARQUITETURA + PLANEJAMENTO | GALERIA DA ARQUITETURA”, EM: <https://www.youtube.com/watch?v=ejaXgqQ2bPo>]





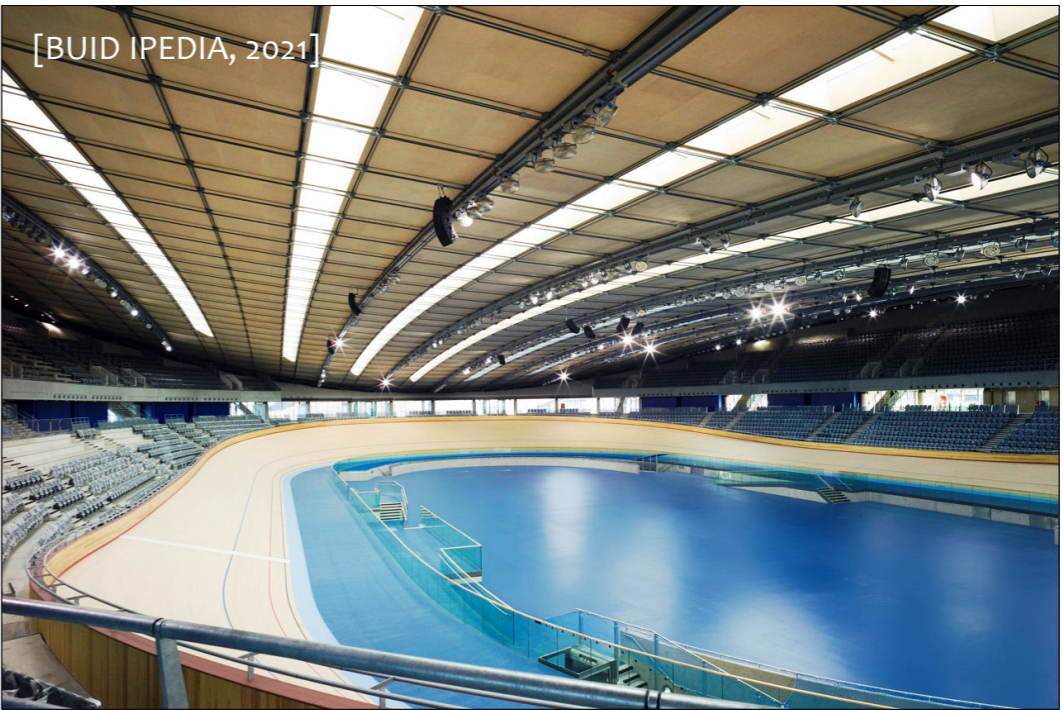
[SPIDERZRULE, 2021]

VELÓDROMO OLÍMPICO

Hopkins Architects
Londres - Inglaterra - 2012



[POSITIVE MAGAZINE, 2021]



[BUID IPEDIA, 2021]



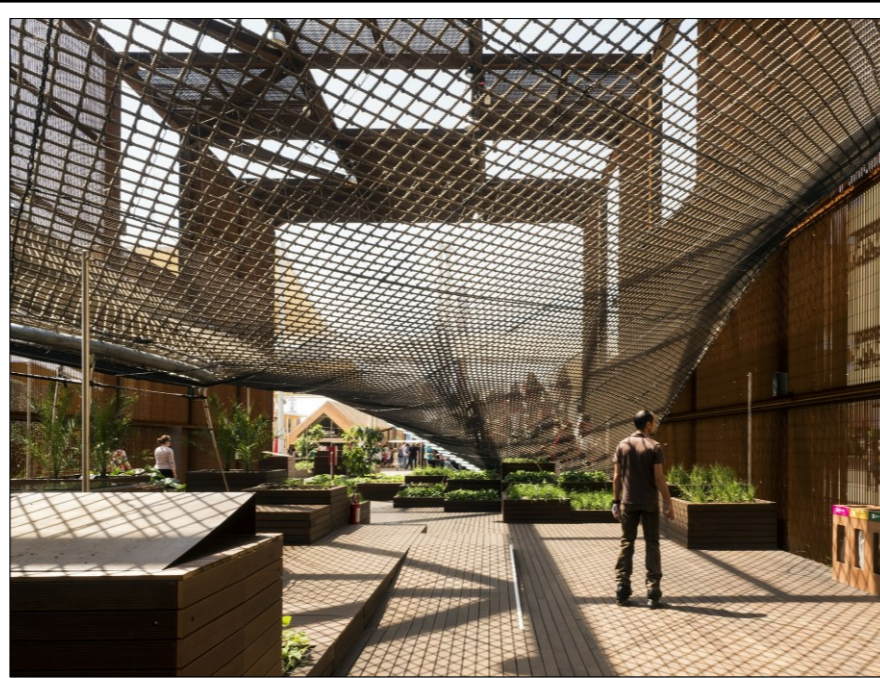
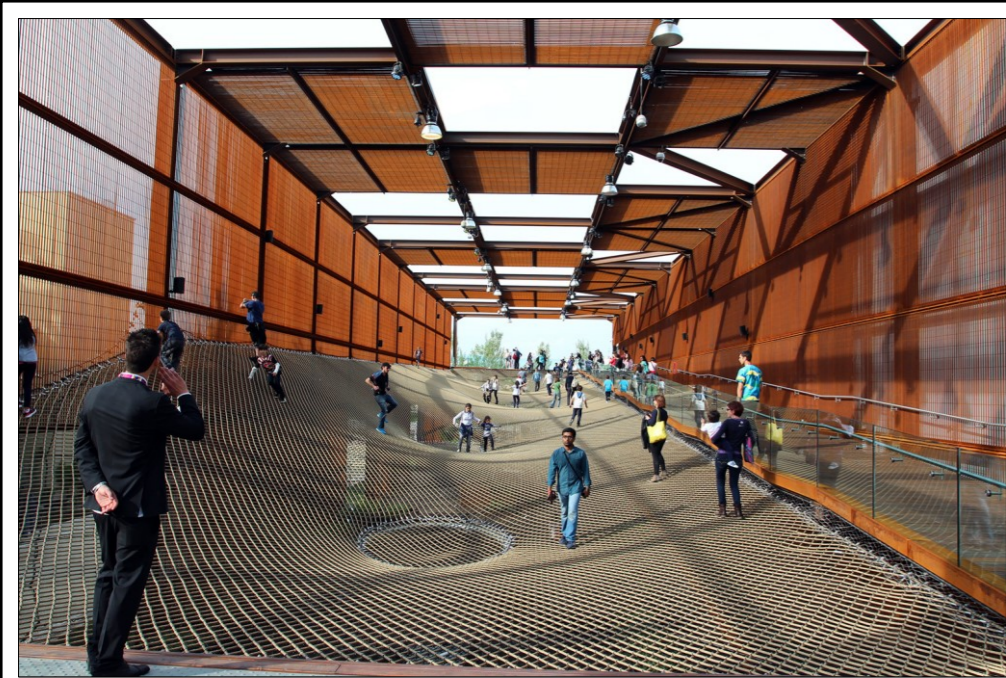
[E-ARCHITECT, 2021]



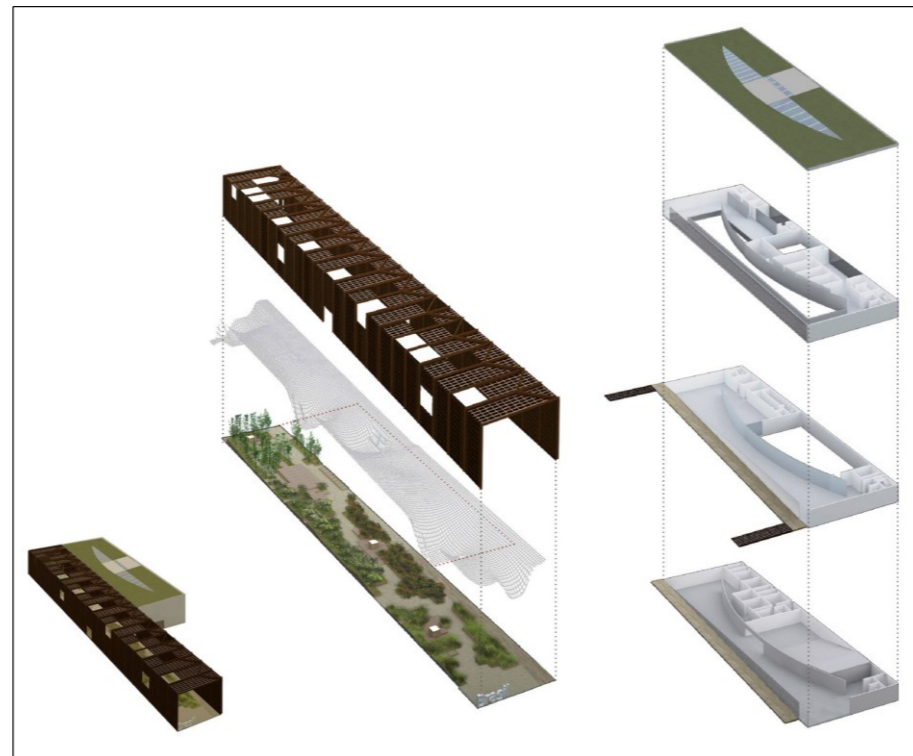
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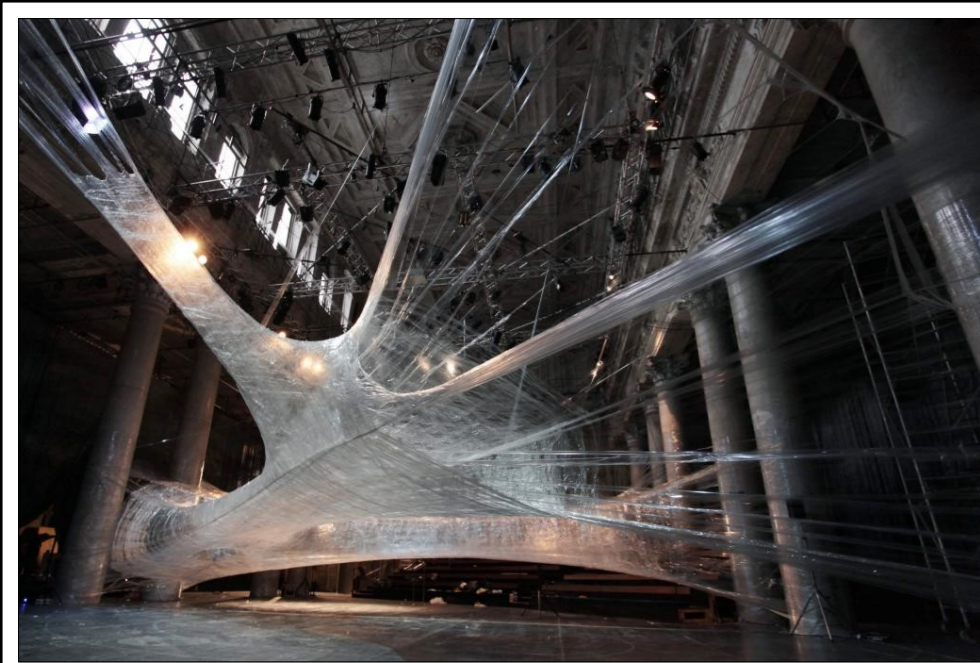


[E-ARCHITECT, 2021]

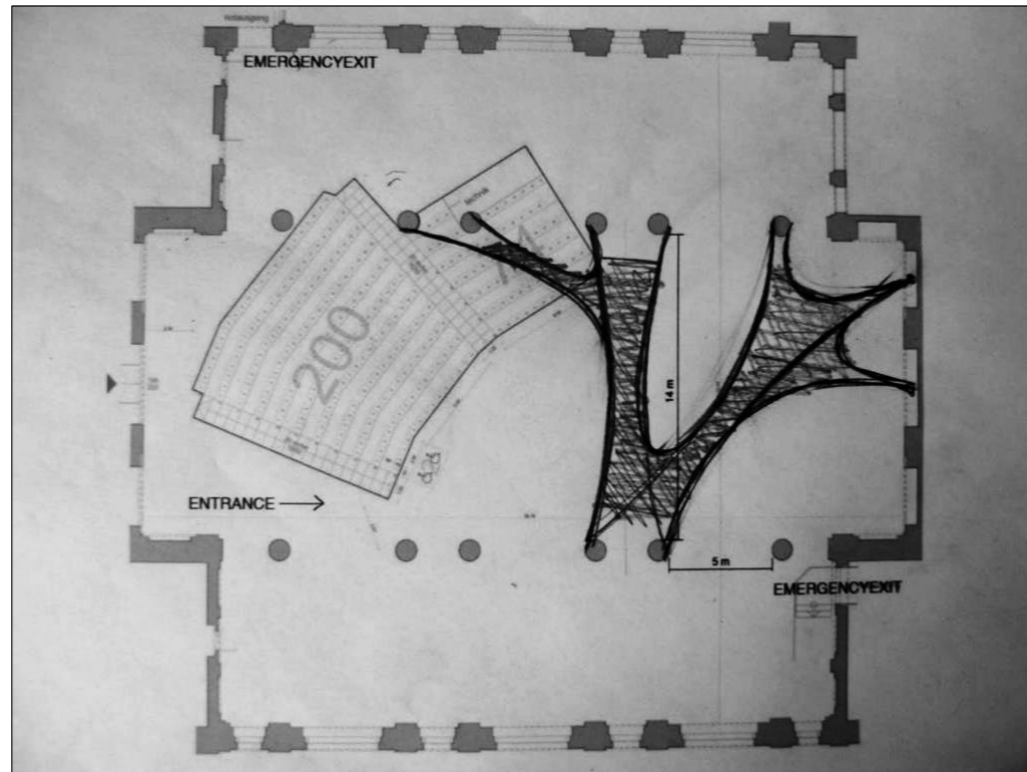


**PAVILHÃO DO BRASIL
NA EXPO MILÃO 2015**
Studio Arthur Casas + Atelier Marko Brajovic
Milão - Itália - 2015





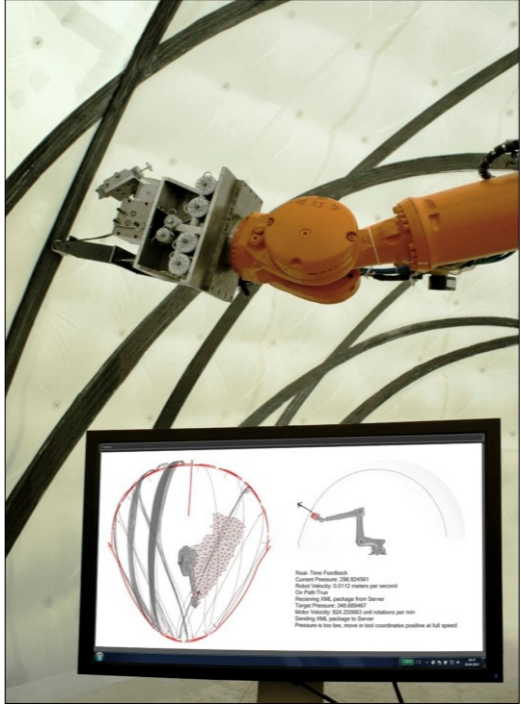
TAPE
For Use / Numen
Viena - Itália - 2010

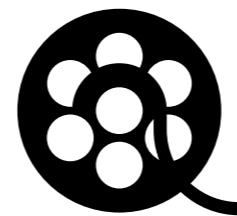


PAVILHÃO DE PESQUISA

ICD/ITKE Universidade de Stuttgart
Heilbronn - Alemanha - 2015

[ARCHDAILY, 2021]

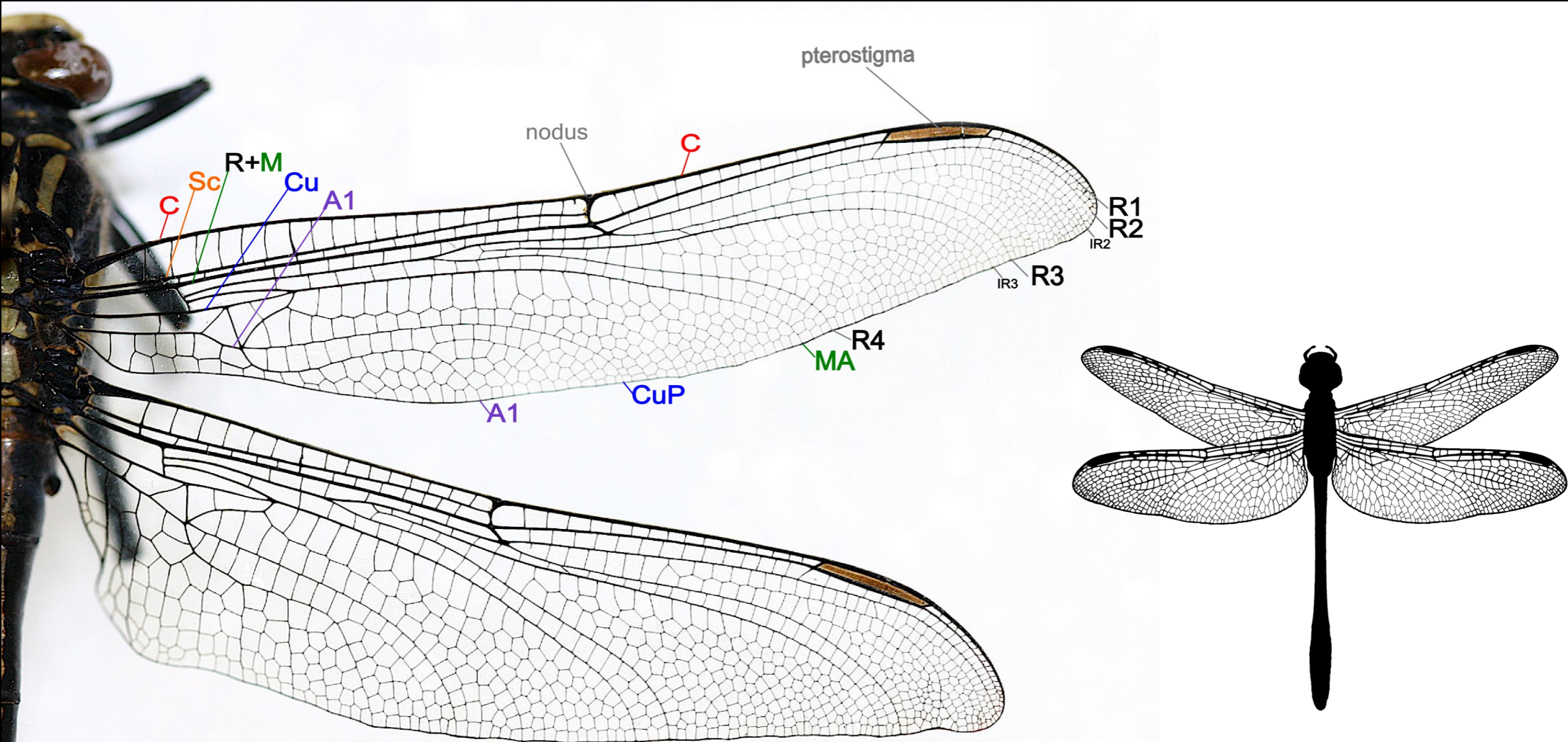


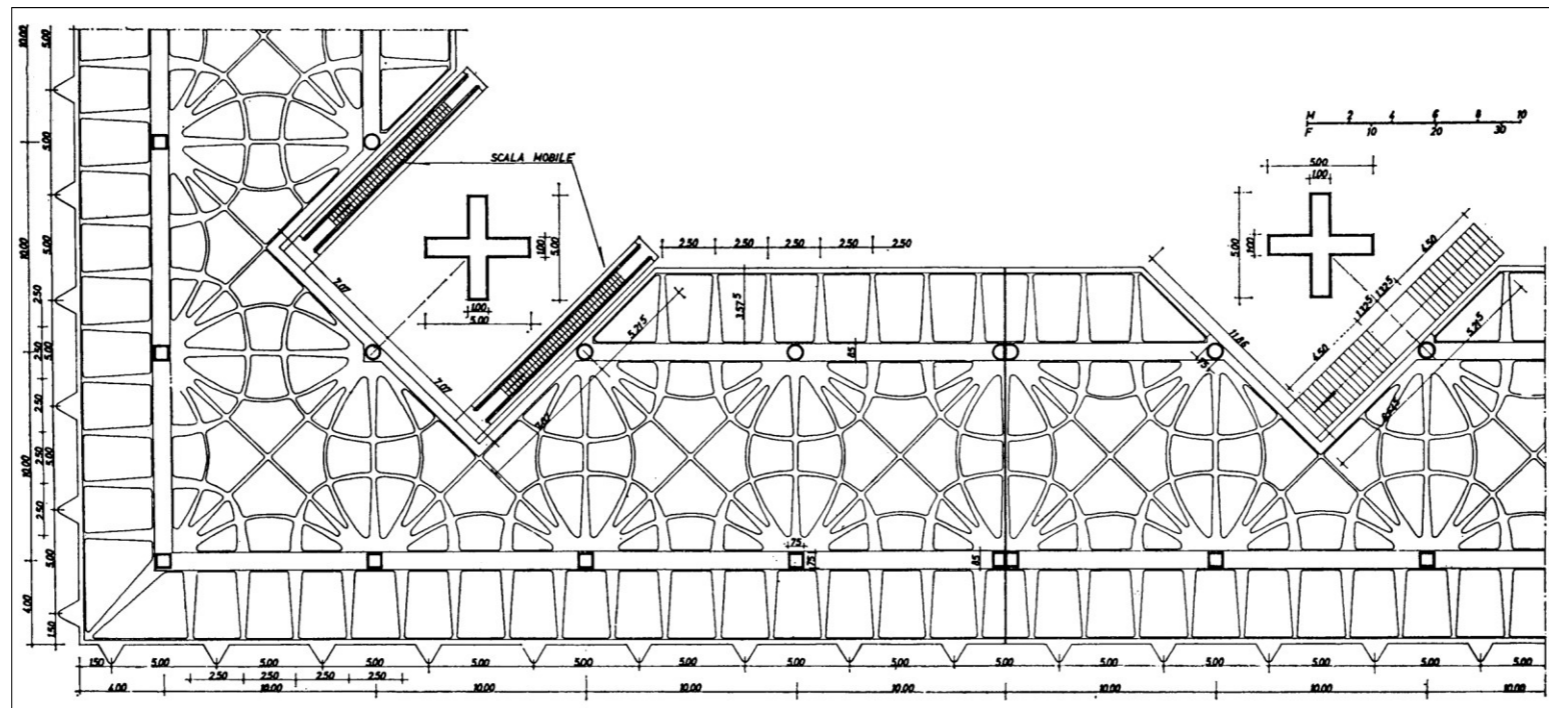


PAVILHÃO DE PESQUISA – 2015

[“ICD ITKE RESEARCH PAVILION 14-15”, EM: <https://www.youtube.com/watch?v=1XORT2f2Res>]

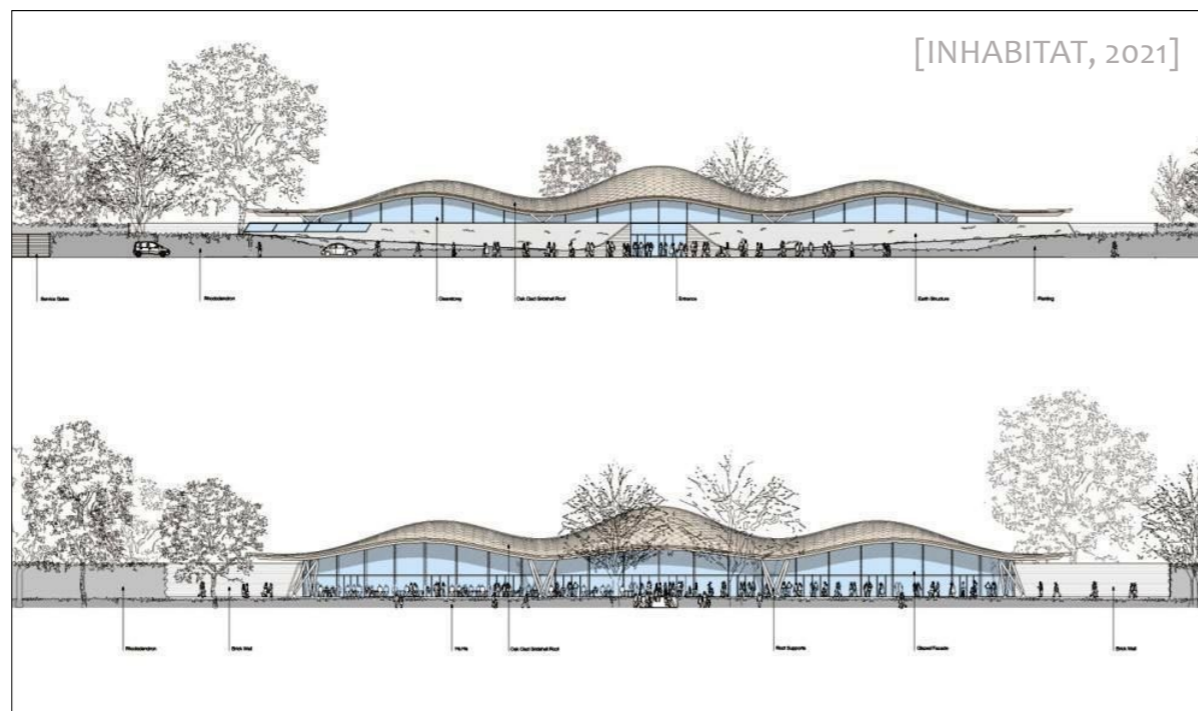




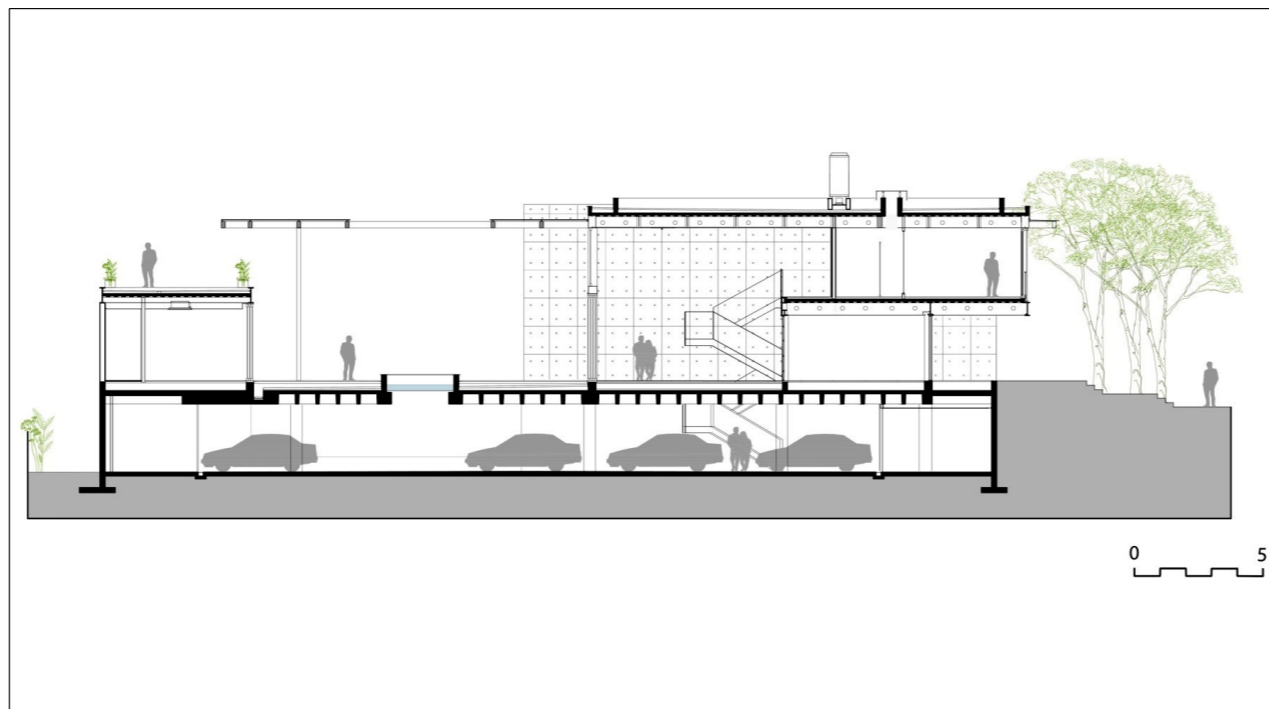


PALAZZO DEL LAVORO

Pier Luigi Nervi & Antonio Nervi
Turin - Itália - 1961



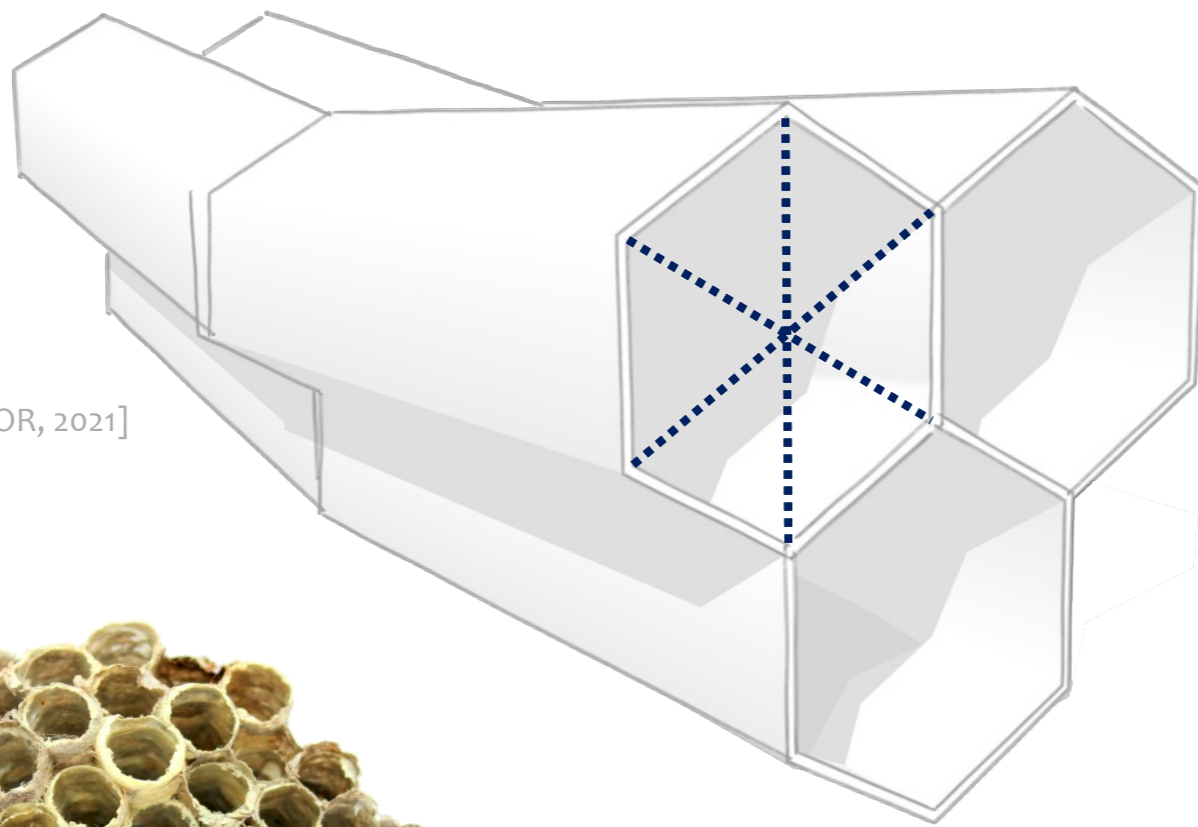
SAVILL BUILDING
Glenn Howells Architects
Surrey - Reino Unido - 2006



CASA JARDIM DO SOL

Hype Studio
Porto Alegre - Brasil - 2017





[DO AUTOR, 2021]



[NEYEDENIR, 2021]



[PERFECT BEE, 2021]

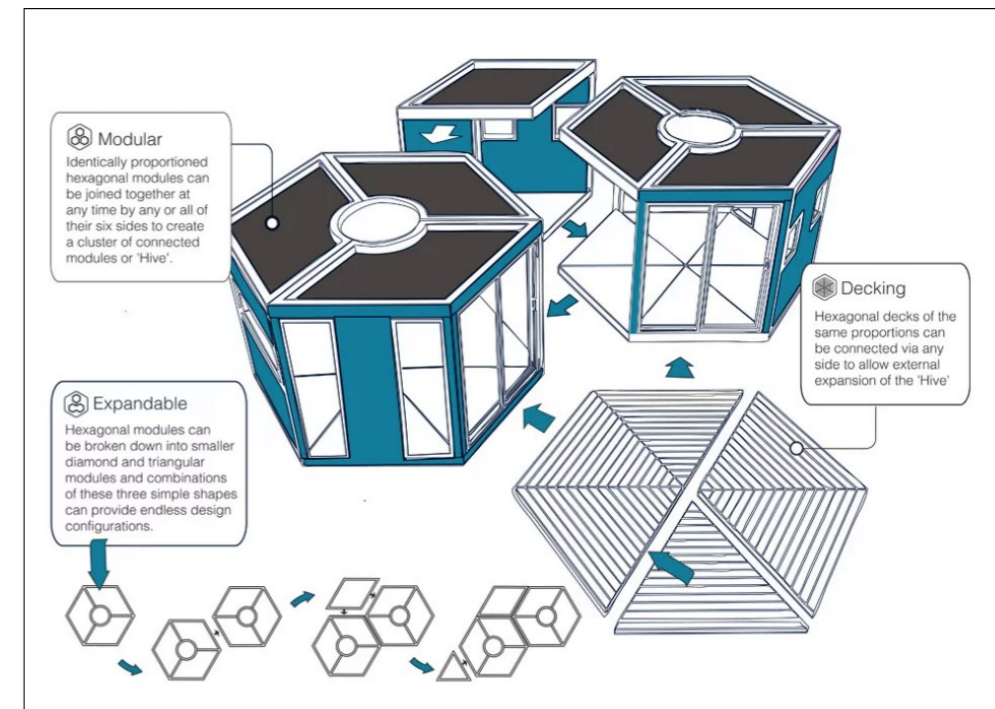
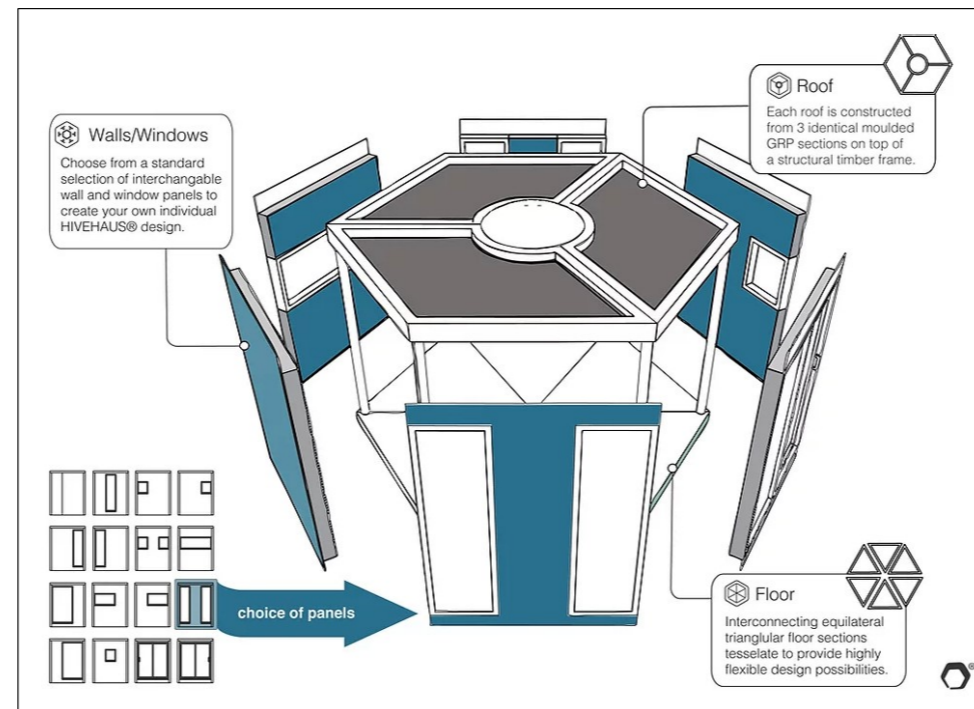


[SÍTIO DONA LÔ, 2021]



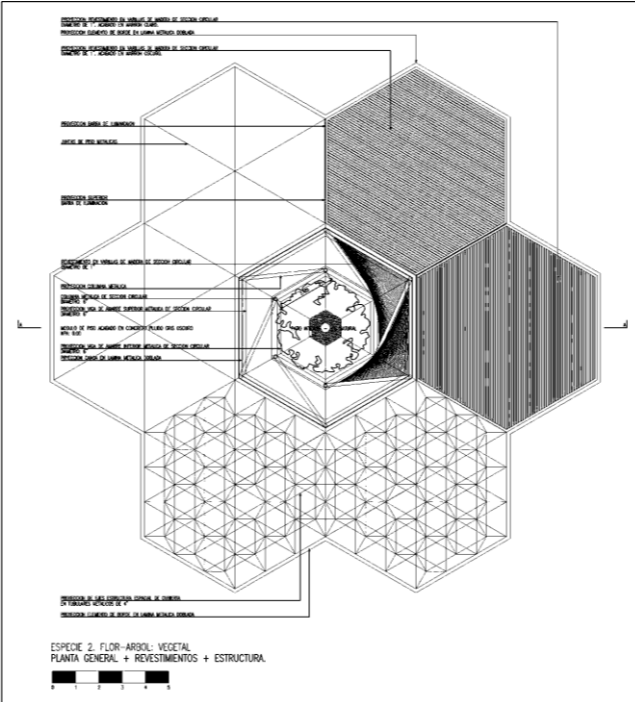
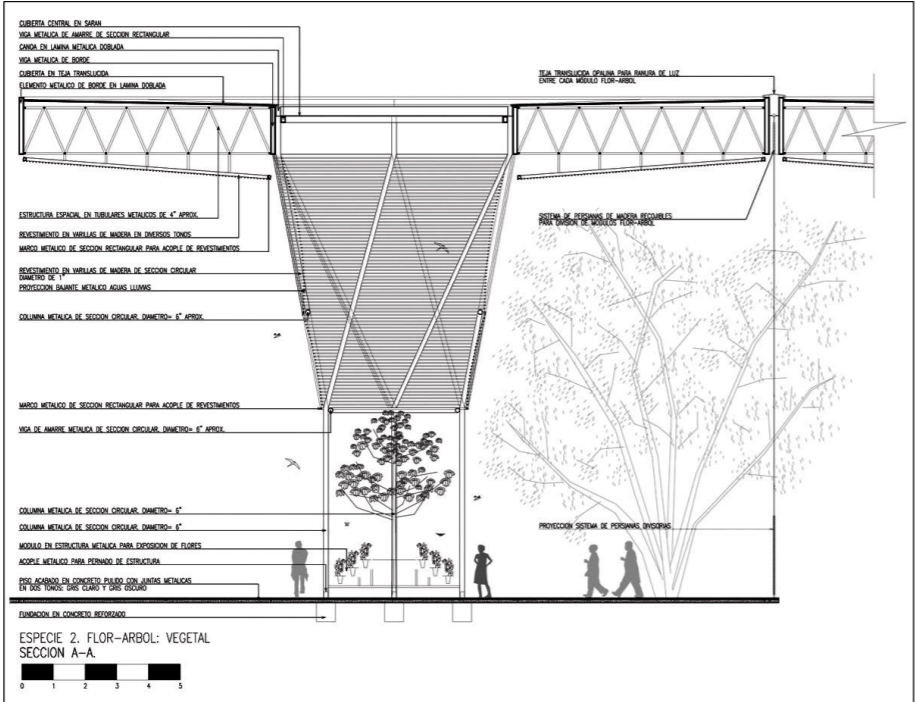
HIVEHAUS

Barry Jackson
Wigan - Reino Unido - 2014



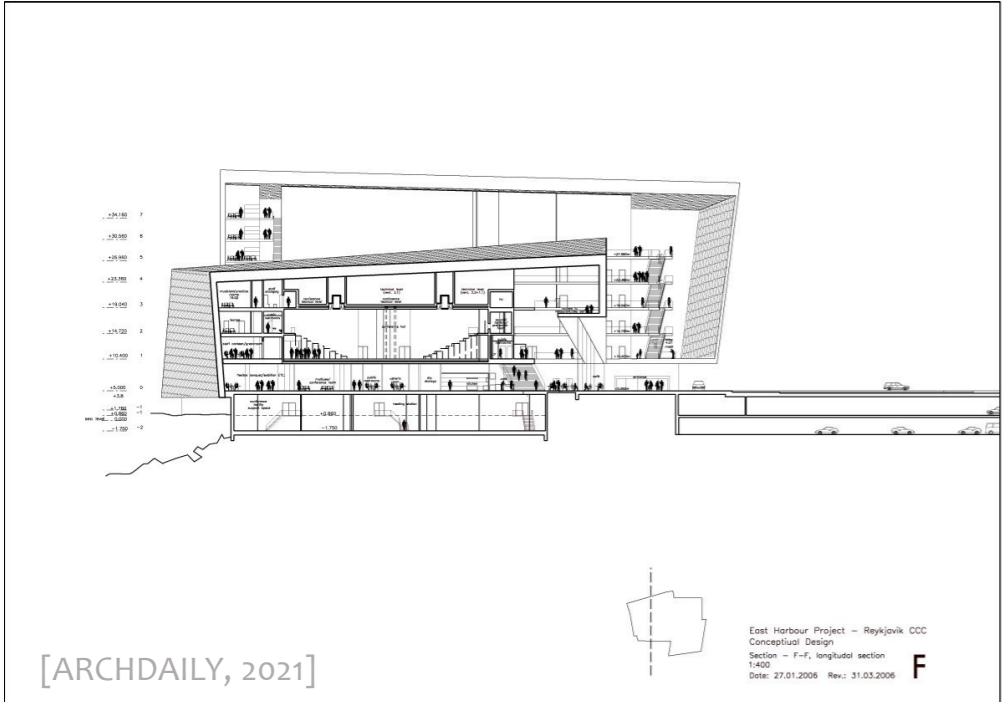
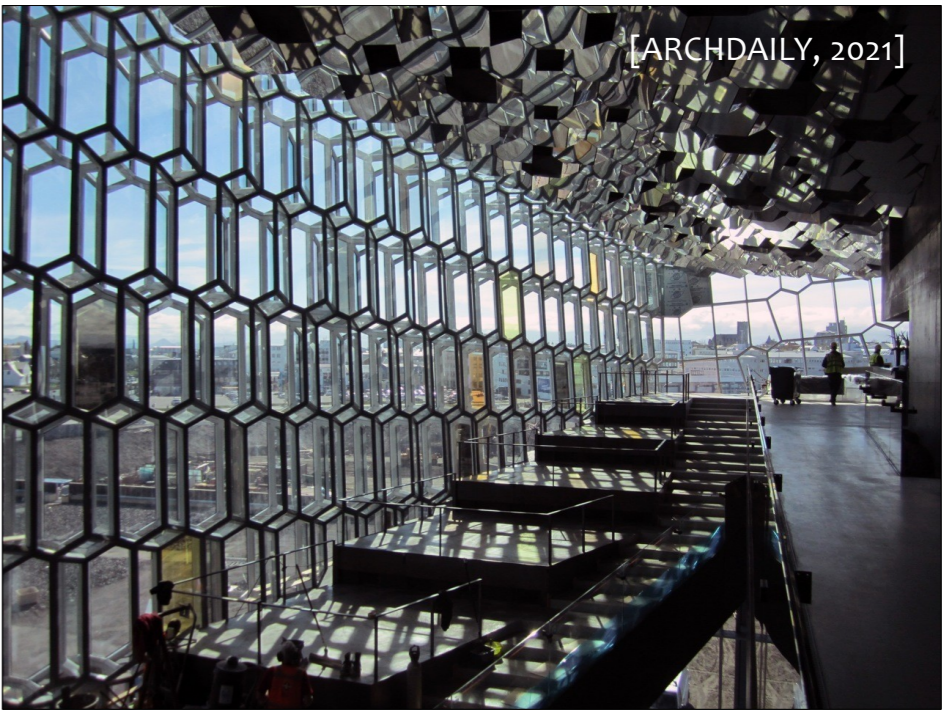
ORQUIDEORAMA

Plan B Arquitectos + JPCR Arquitectos
 Medellín - Colombia - 2006



HARPA CONCERT HALL AND CONFERENCE CENTRE

Henning Larsen Architects +
Olafur Eliasson
Reykjavík - Islândia - 2011



**MARQUISE MODULAR
NA CASA COR 2015**

FGMF Arquitetos
São Paulo - Brasil - 2015



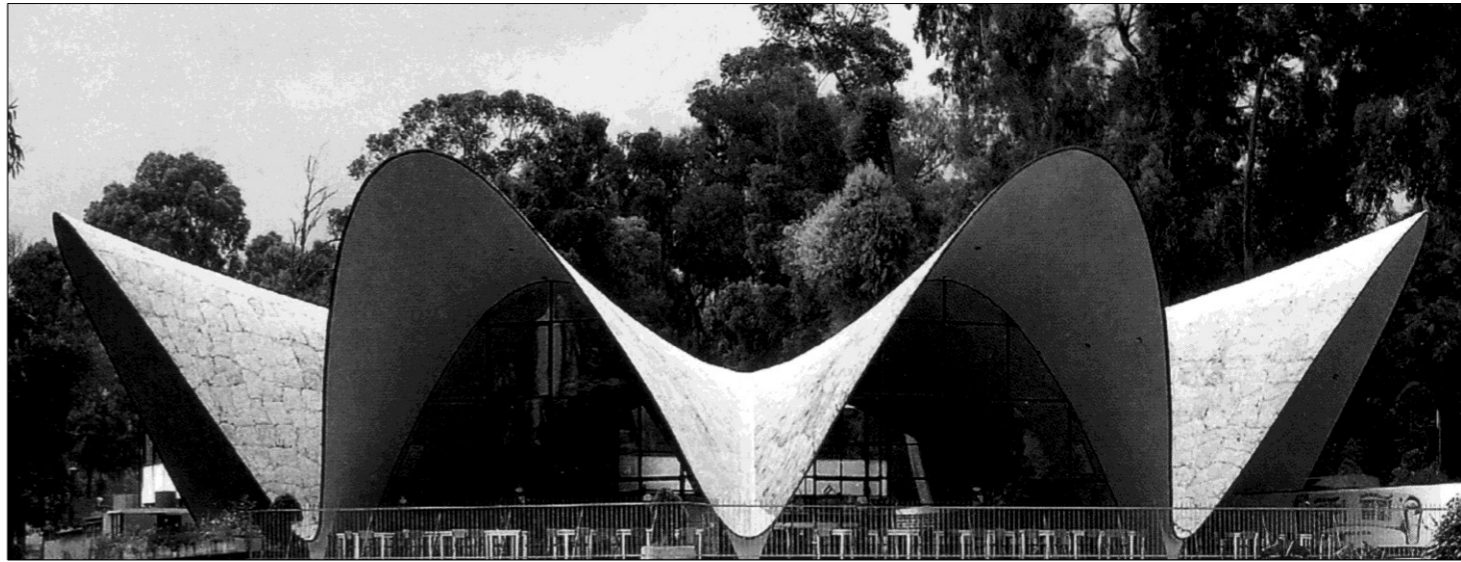
[ARCHDAILY, 2021]



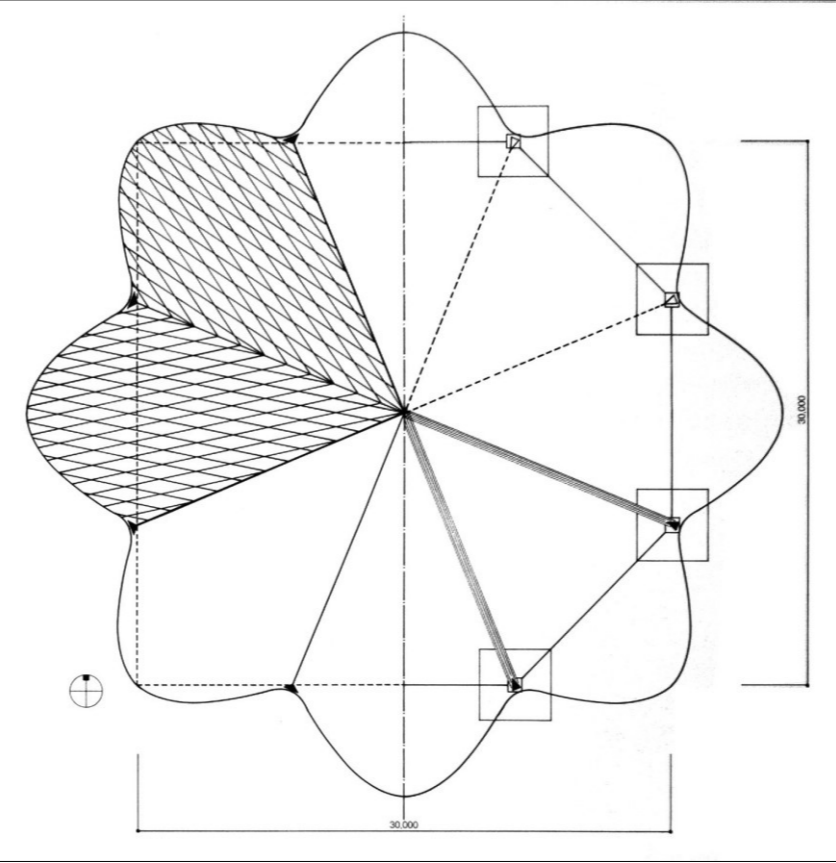
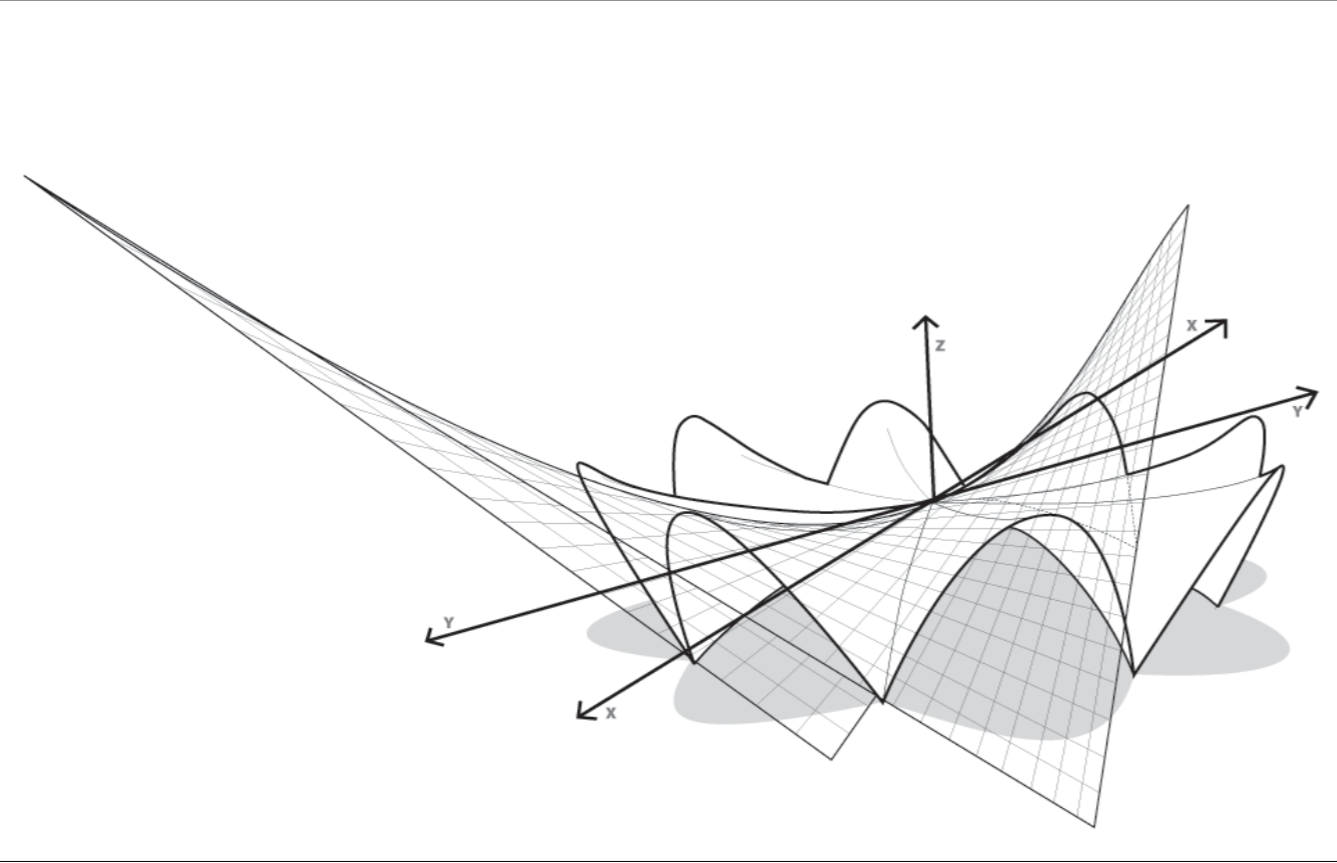


**RESTAURANTE
LOS MANANTIALES**

Félix Candela
Cidade de México - México - 1958



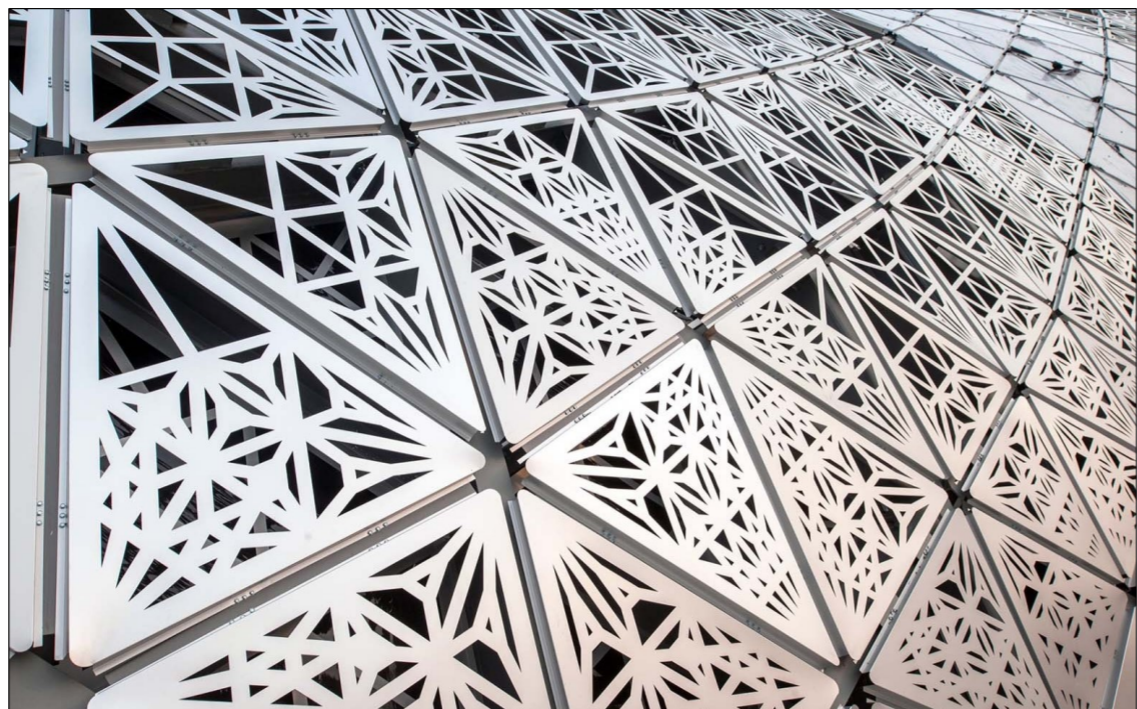
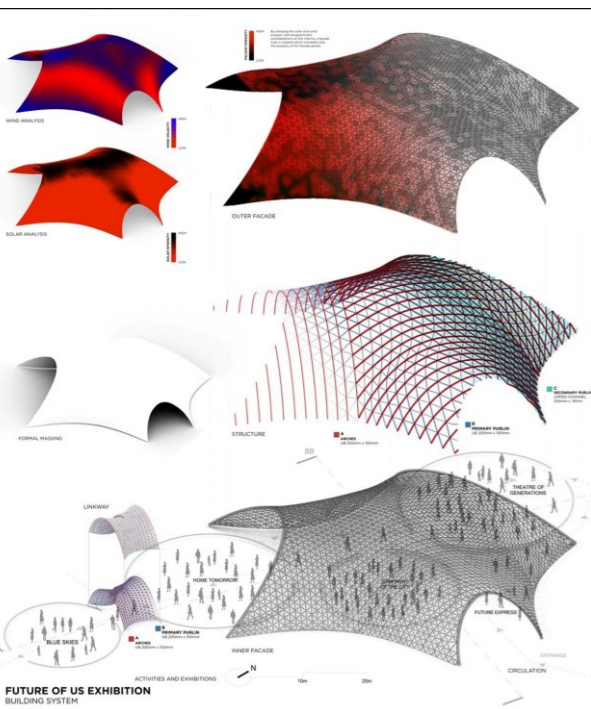
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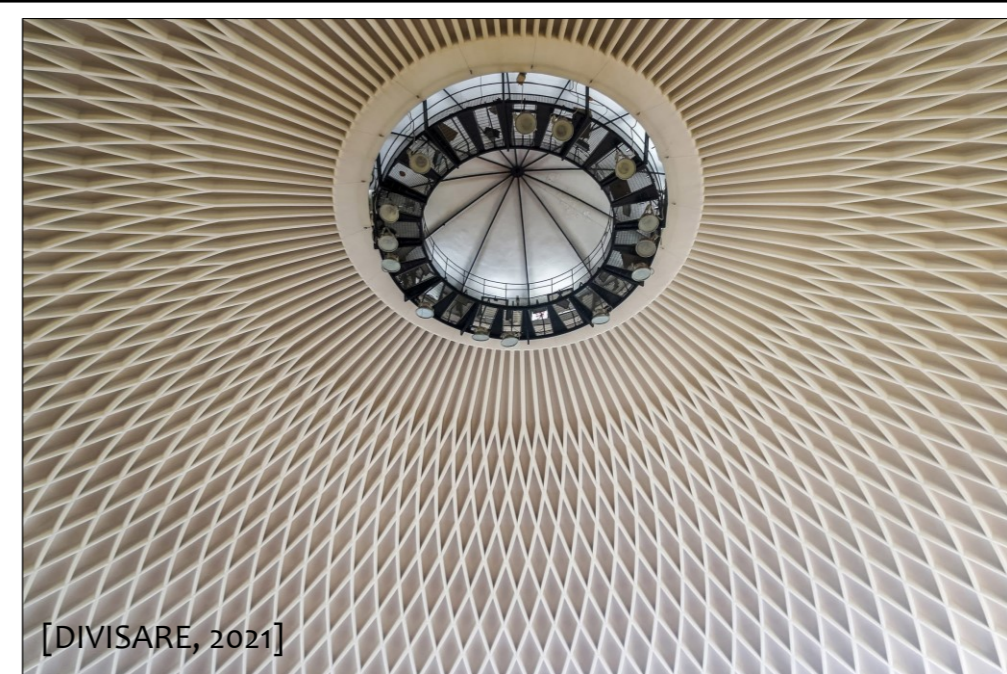


ENVELOPE ESTRUTURAL DE "O NOSSO FUTURO"

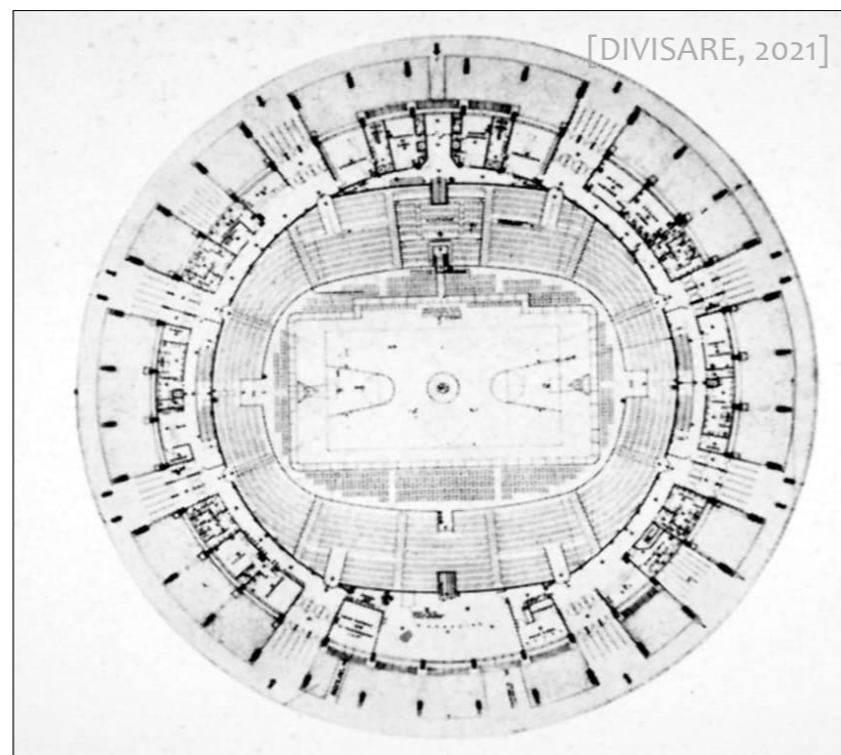
SUTD Advanced Architecture Laboratory
Singapura - 2015

[ARCHDAILY, 2021]



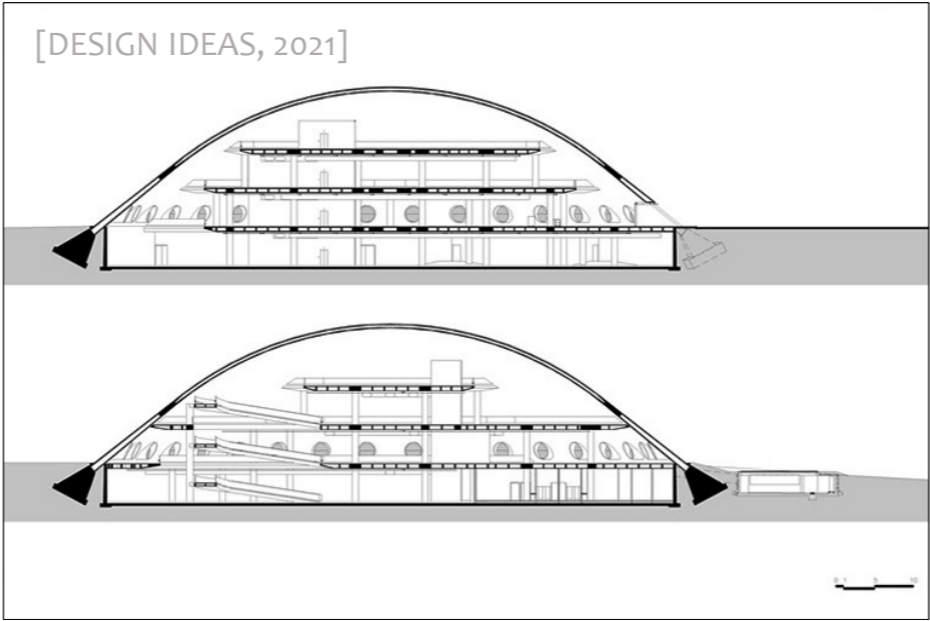
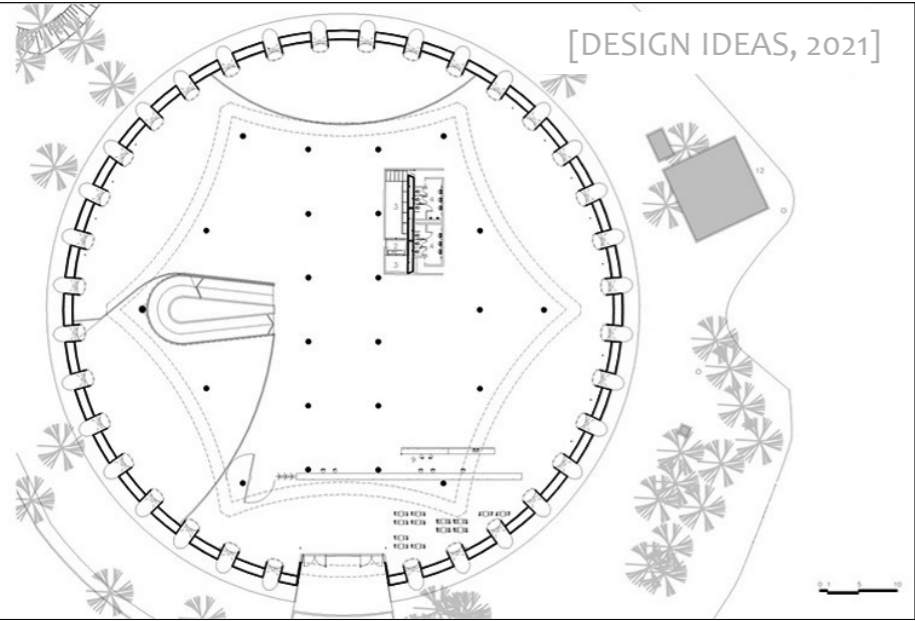
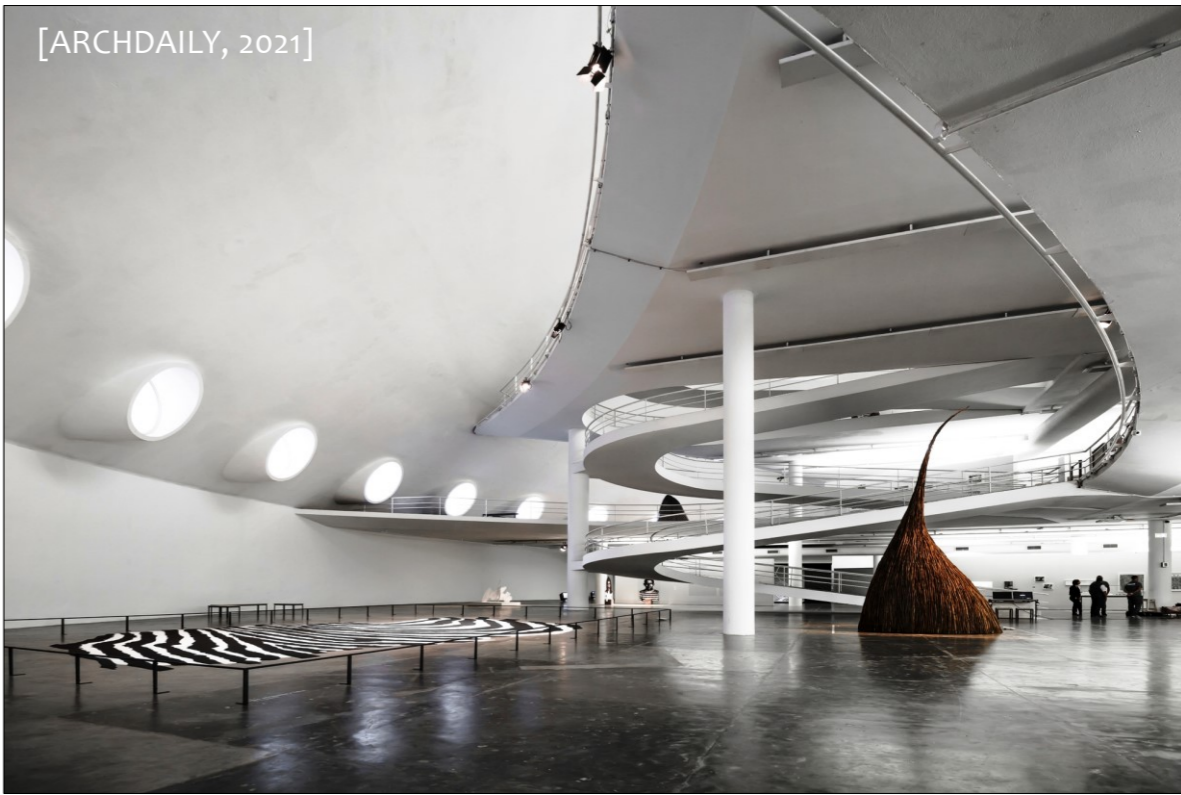


PALÁCIO DO ESPORTE
Pier Luigi Nervi e Marcello Piacentini
Roma - Itália - 1956



**PALÁCIO
DAS ARTES
(OCA)**

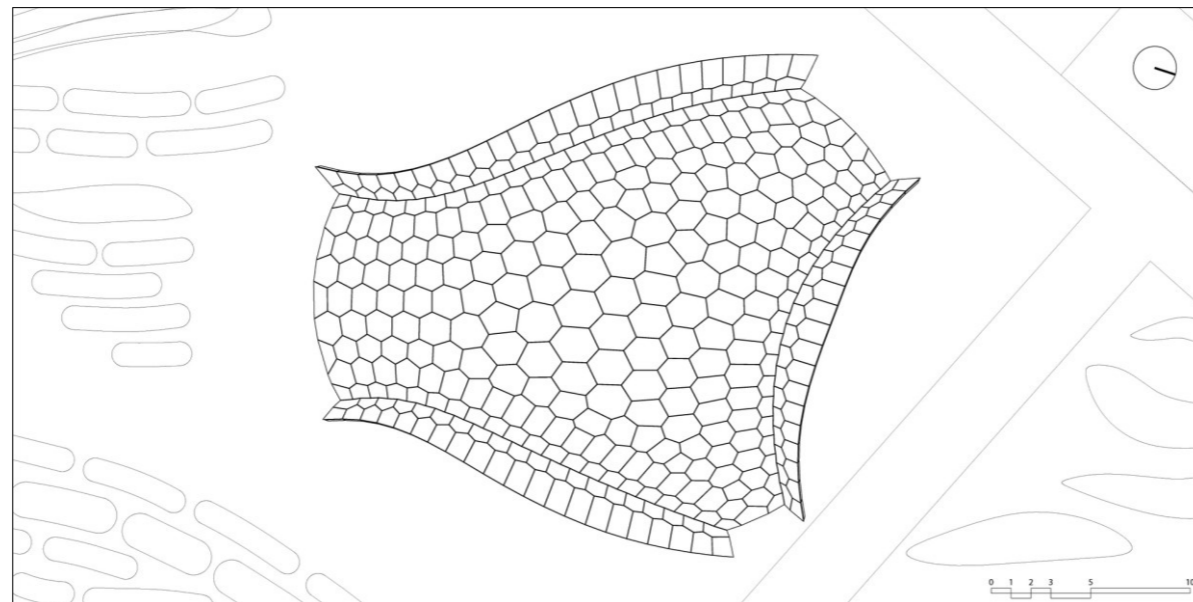
Oscar Niemeyer
São Paulo - Brasil - 1951

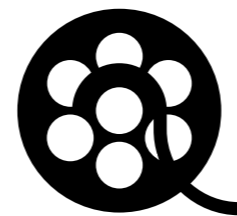




PAVILHÃO BUGA

ICD/ITKE Universidade de Stuttgart
Heilbronn - Alemanha - 2019





PAVILHÃO BUGA

[“BUGA WOOD PAVILION, BUNDESGARTENSCHAU HEILBRONN 2019”, EM: <https://www.youtube.com/watch?v=zZoE5Xbns00>]





CHAPÉU
(PILEO)

HIMÊNIO

ANEL

ESTIPE
(PÉ)

VERRUGA

VOLVA

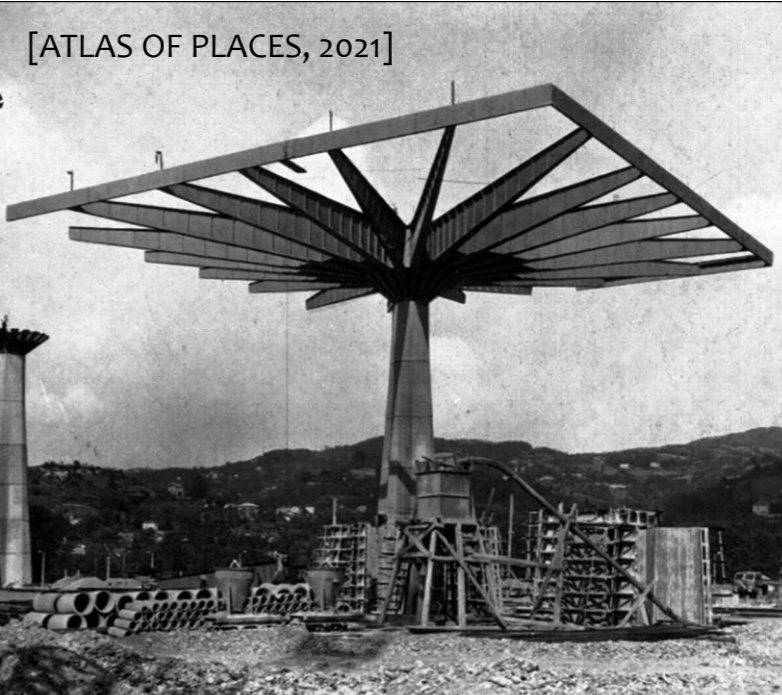
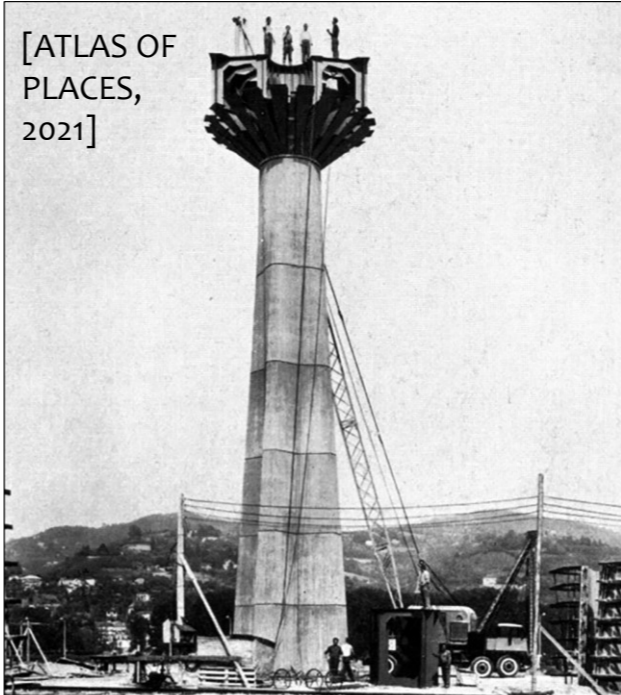
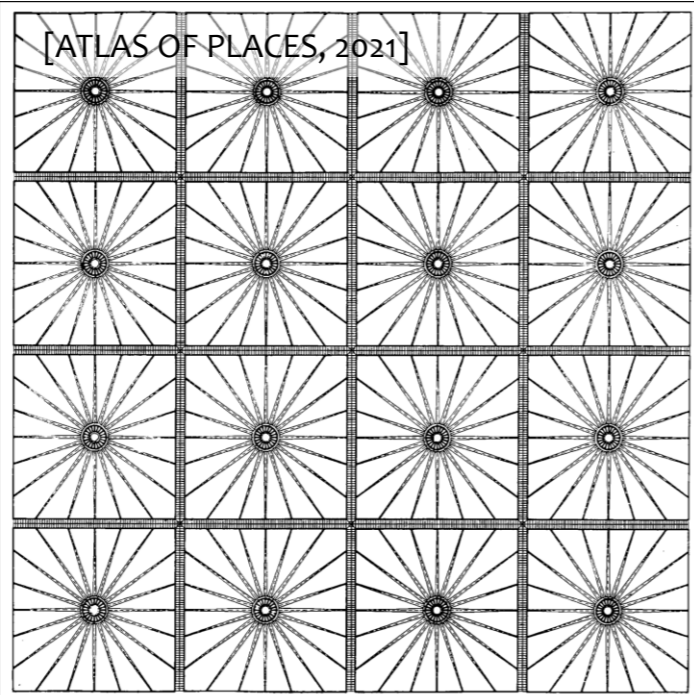
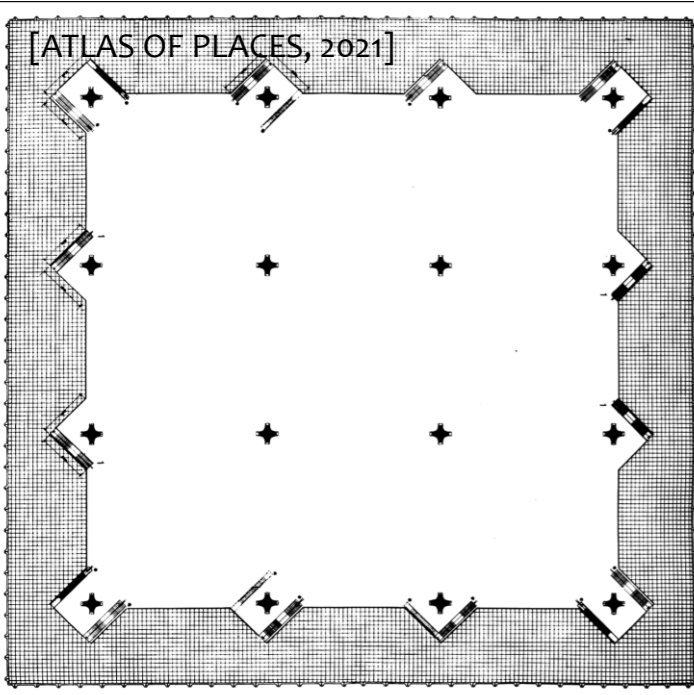
CARNE

MICÉLIO



PALAZZO DEL LAVORO

Pier Luigi Nervi & Antonio Nervi
Turim - Itália - 1961



**PAVILHÃO NA
EXPO HANNOVER 2000**

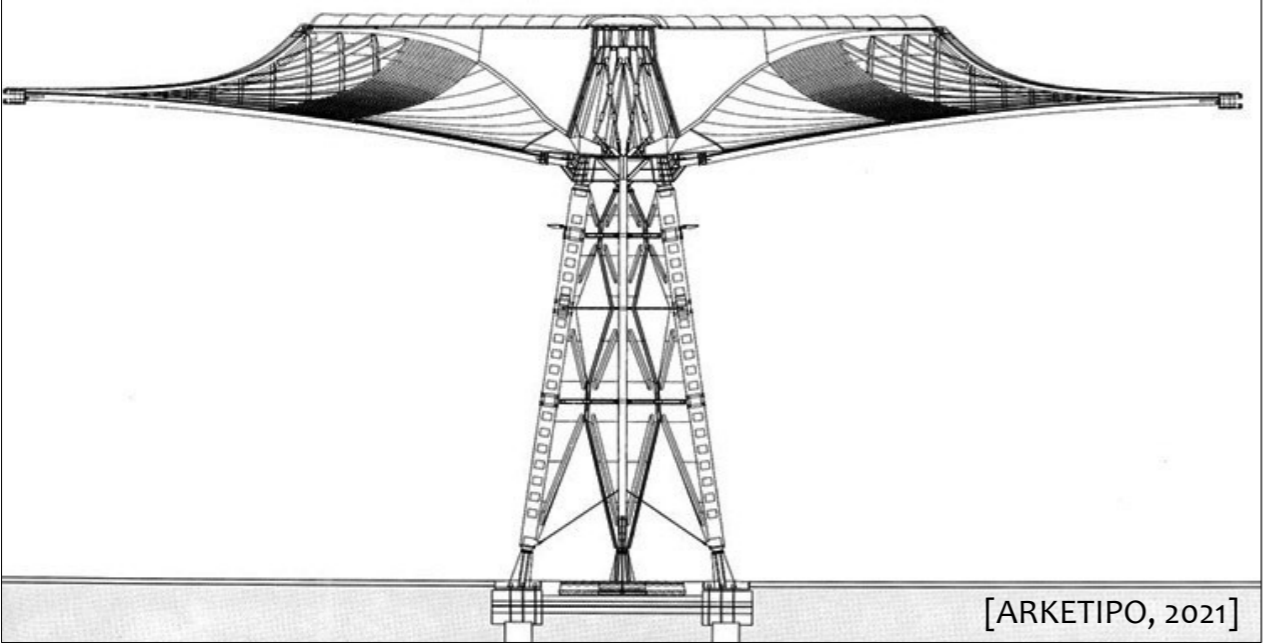
Herzog + Partner BDA
Hannover - Alemanha - 2000



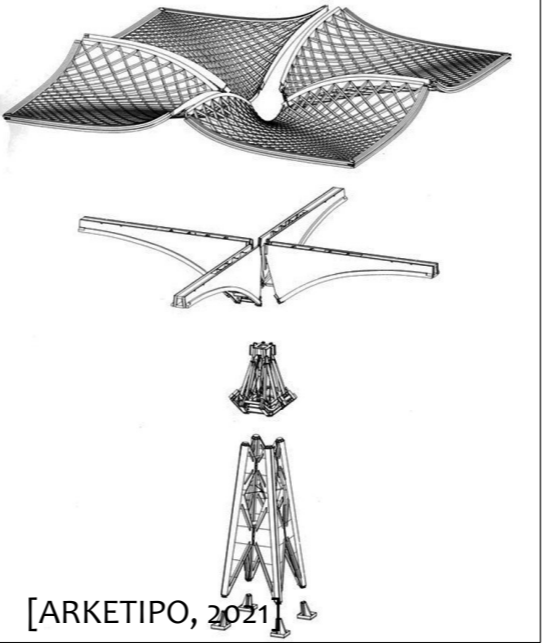
[EXHIBITION WORLD, 2021]



[EXHIBITION WORLD, 2021]



[ARKETIPO, 2021]



[ARKETIPO, 2021]



[XLEARNING, 2021]

[DO AUTOR, 2021]



[DO AUTOR, 2021]

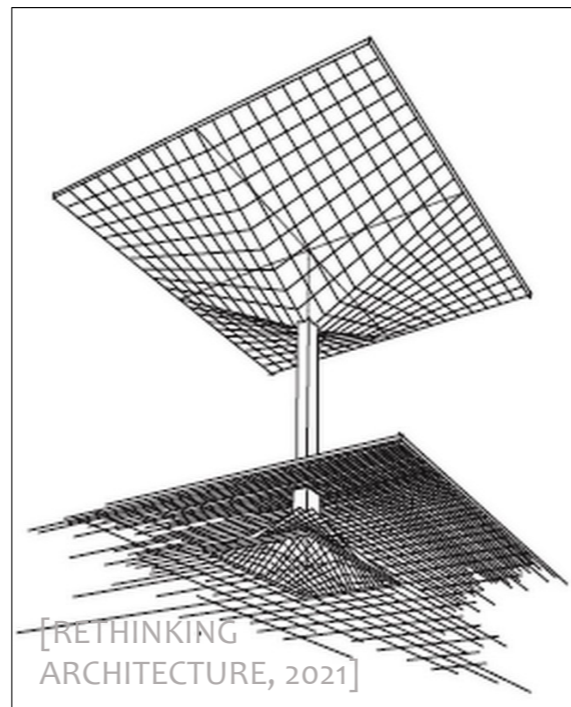


[DO AUTOR, 2021]

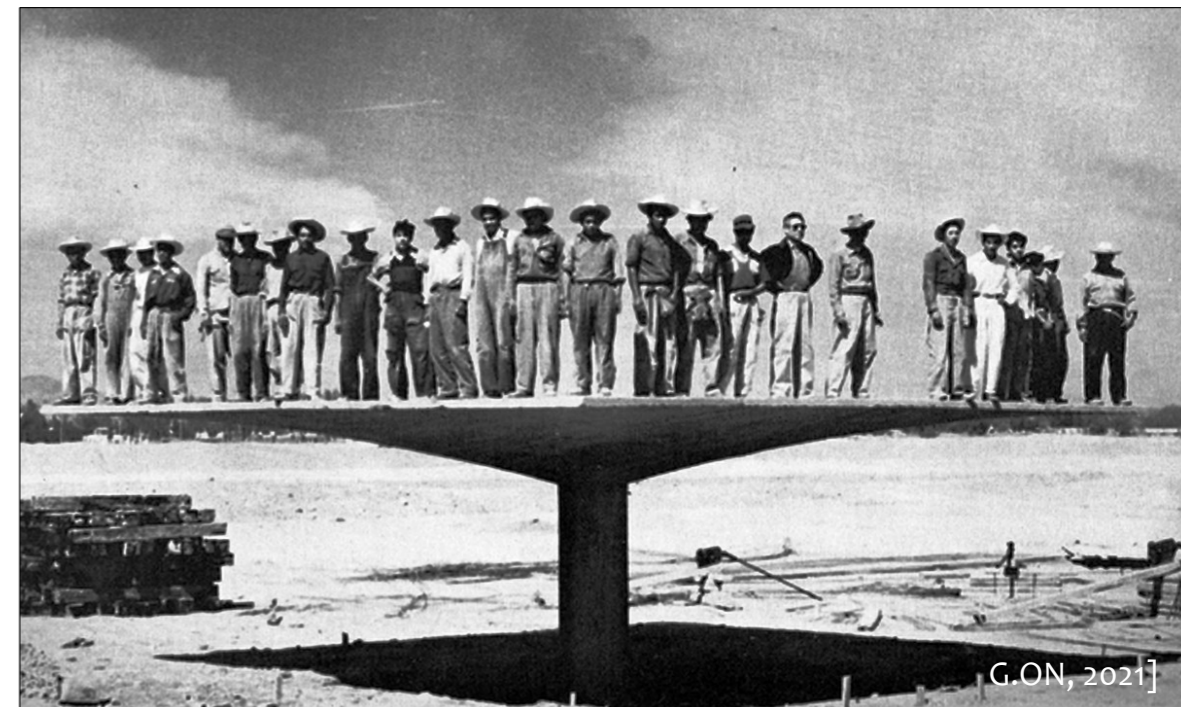


TERMINAL DE ÔNIBUS VILA MARIANA

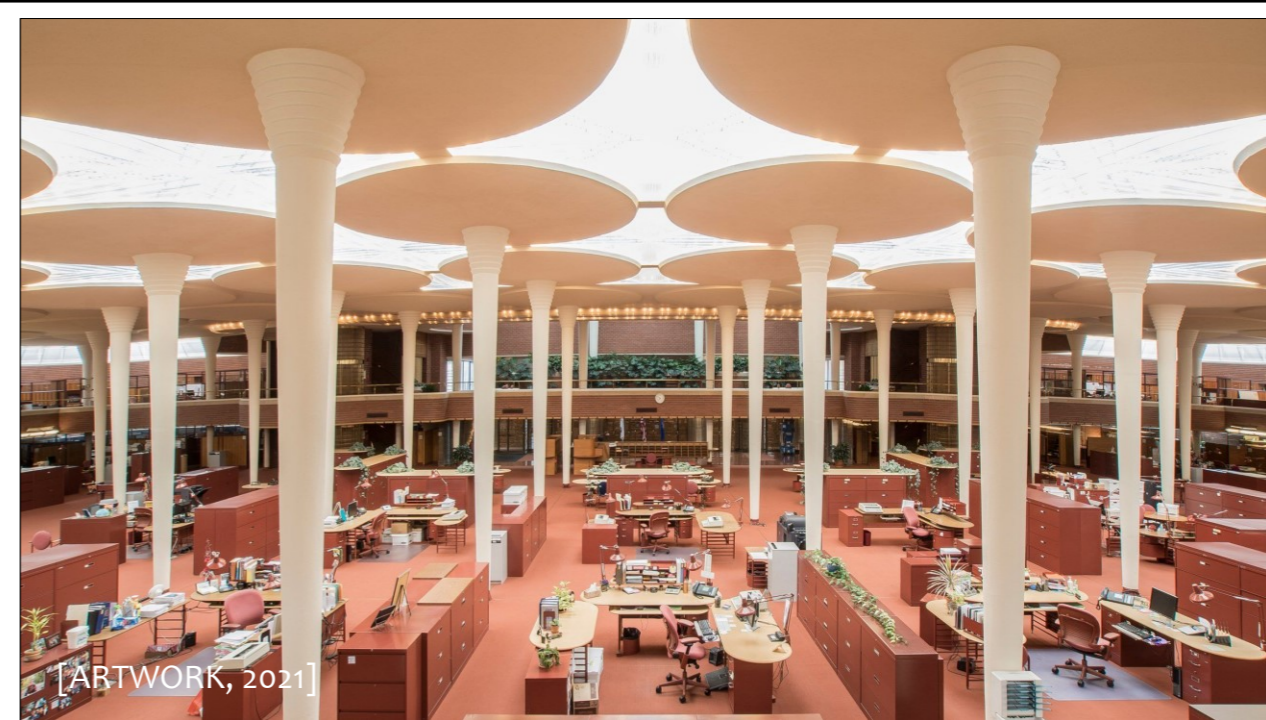
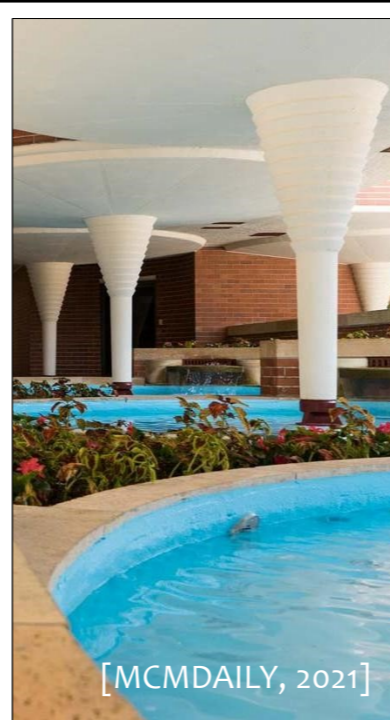
Vasco de Mello e Luiz Gonzaga de Oliveira Camargo
São Paulo - Brasil - 1974



[RETHINKING
ARCHITECTURE, 2021]

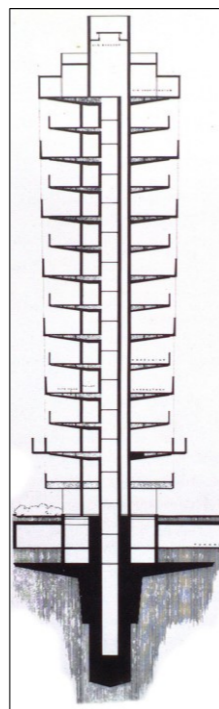


G.ON, 2021]



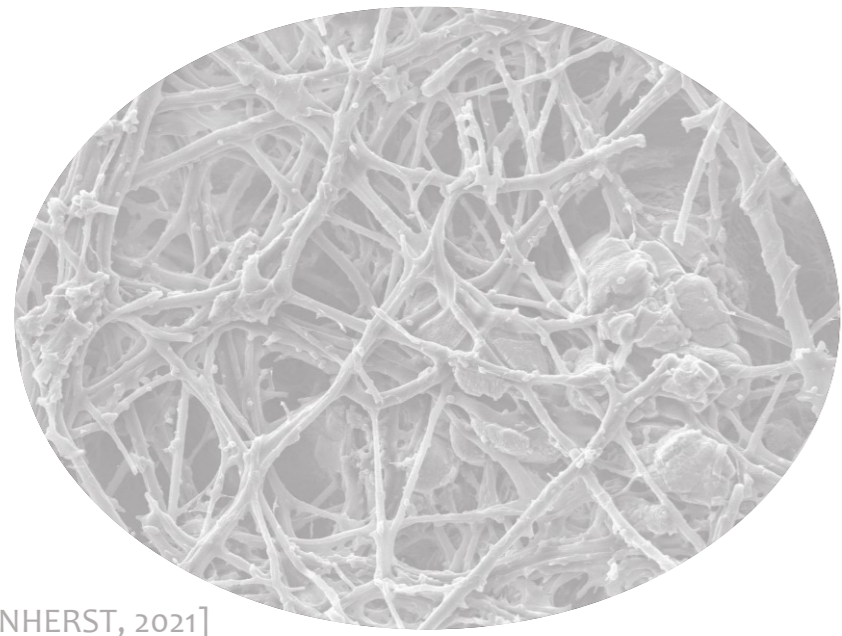
EDIFÍCIO ADMINISTRATIVO S.C. JOHNSON AND SON

Frank Lloyd Wright
Wisconsin - EUA - 1939
(Torre de investigação (P&D), inaugurada em 1950)

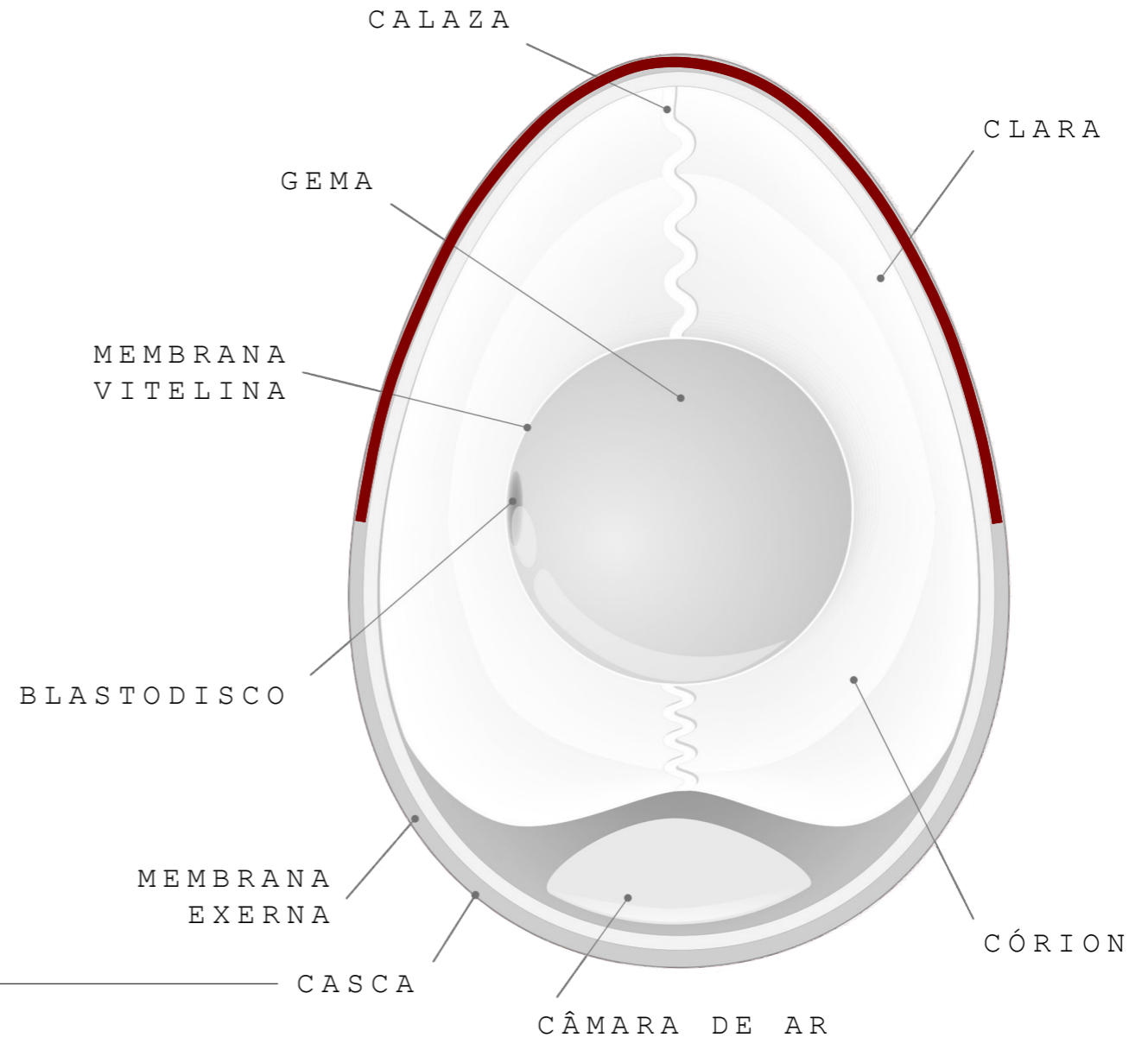




[MODVAN, 2021]



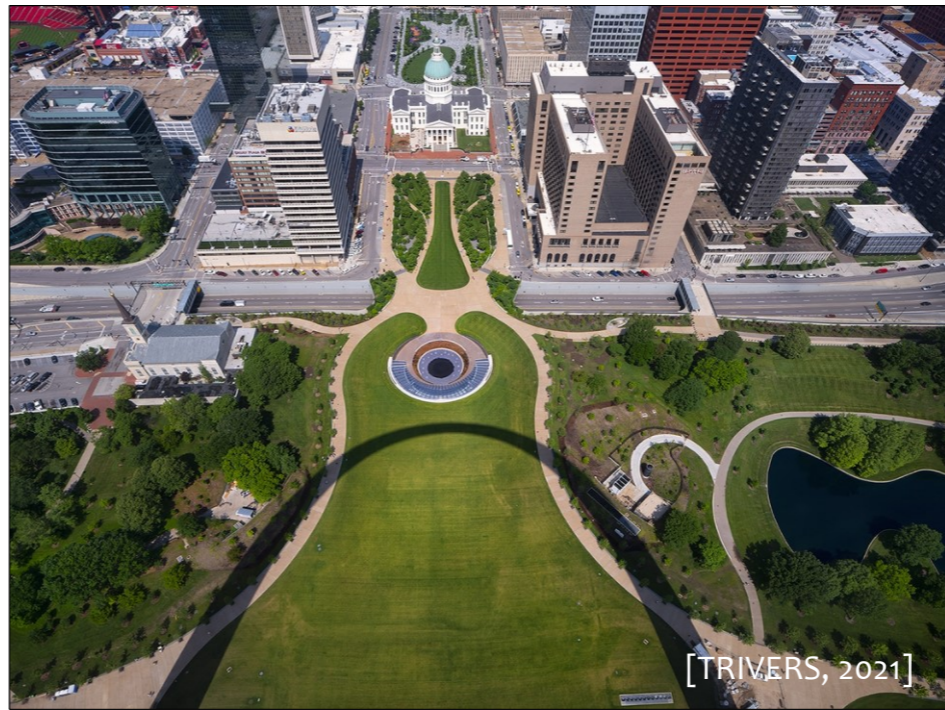
[UMASS UNHERST, 2021]



[BUILDING BODY, 2021]



[CHICAGO TRIBUNE, 2021]



[TRIVERS, 2021]



[FLICKR, 2021]

GATEWAY ARCH
Eero Saarinen
Missouri - EUA - 1965



[PHOTO NS HOUSE, 2021]



[PHOTO NS HOUSE, 2021]

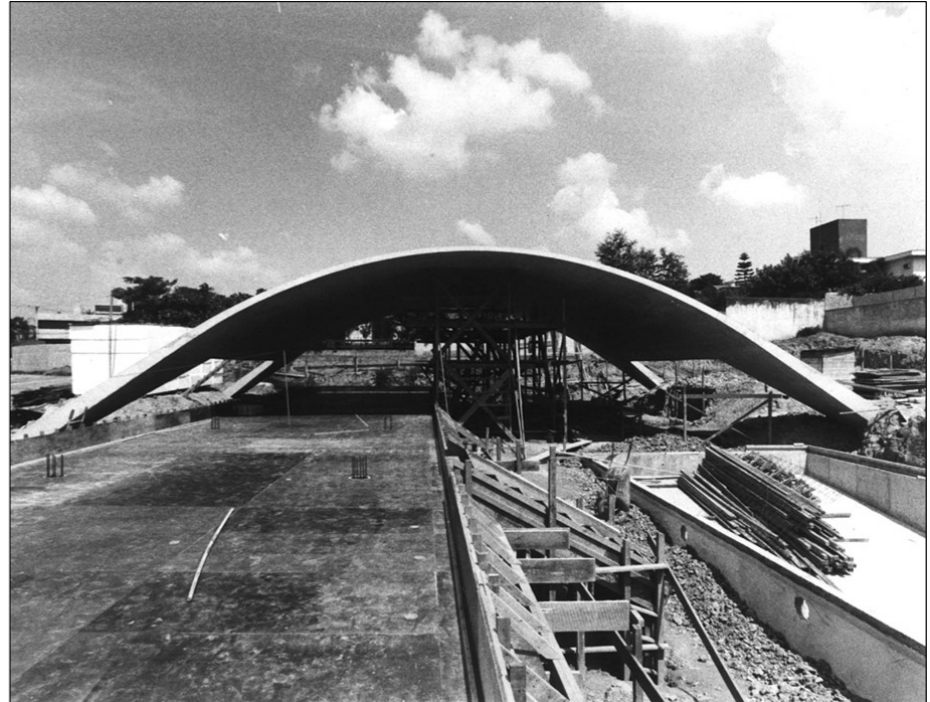
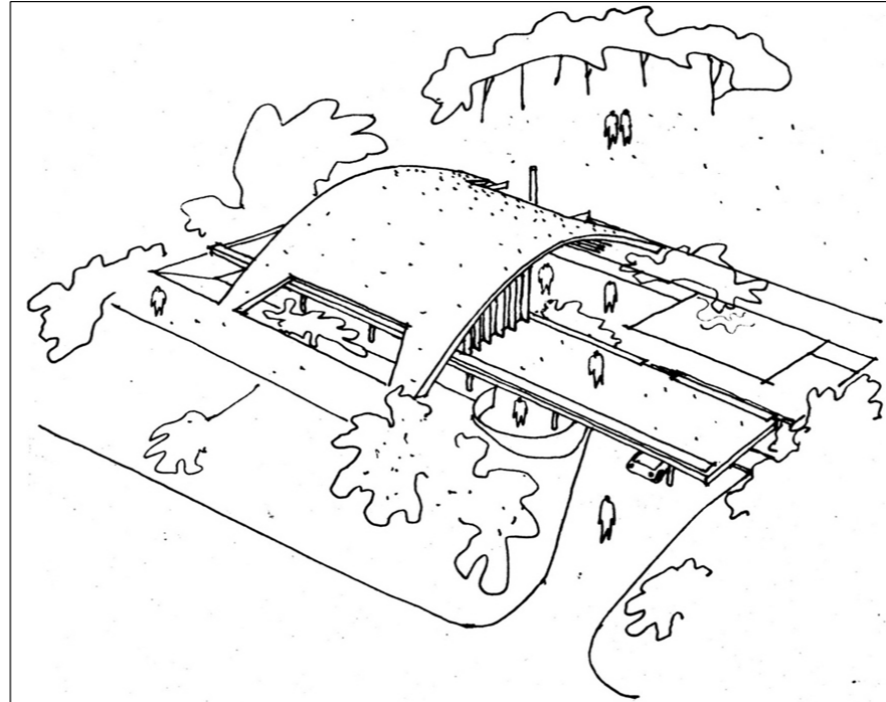
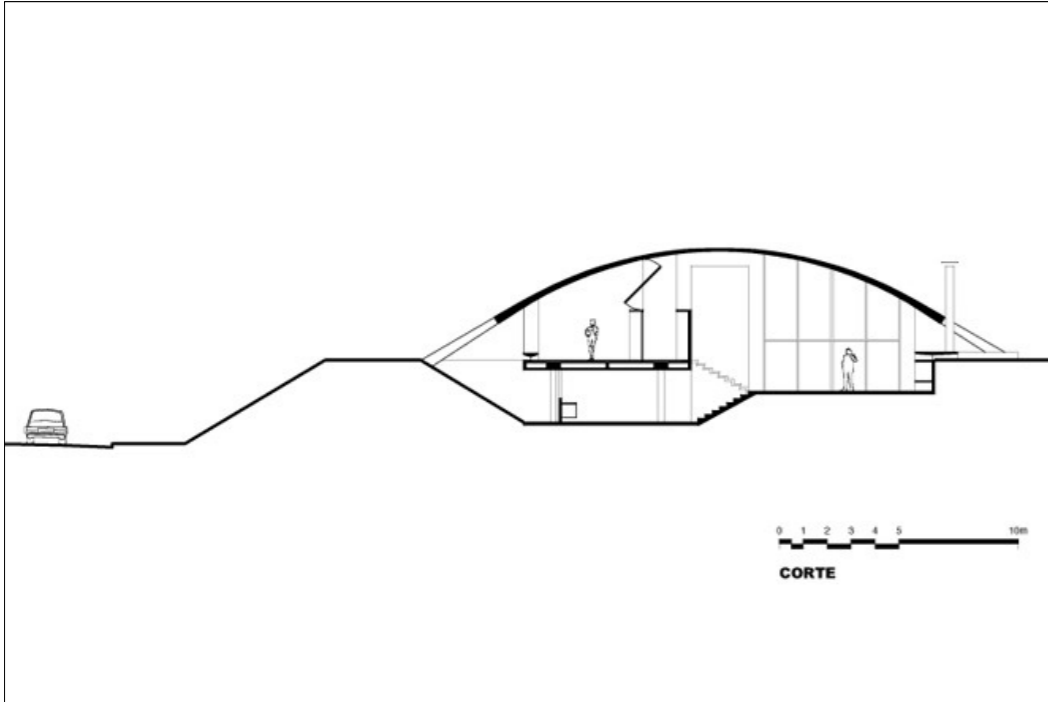


[PHOTO NS HOUSE, 2021]

RESIDÊNCIA MILAN

Marcos Acayaba
São Paulo - Brasil - 1972

[ARCHDAILY, 2021]



[VEJA SP, 2021]

[VEJA SP, 2021]

[ARQUIVO ARQ, 2021]



**MERCADO DE
PIRITUBA**
Abelardo de Souza
São Paulo - Brasil - 1969



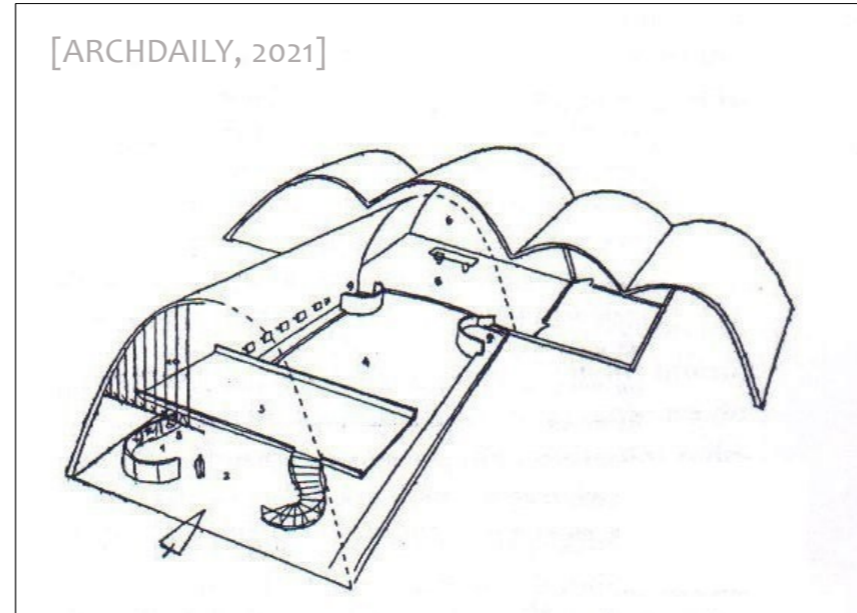
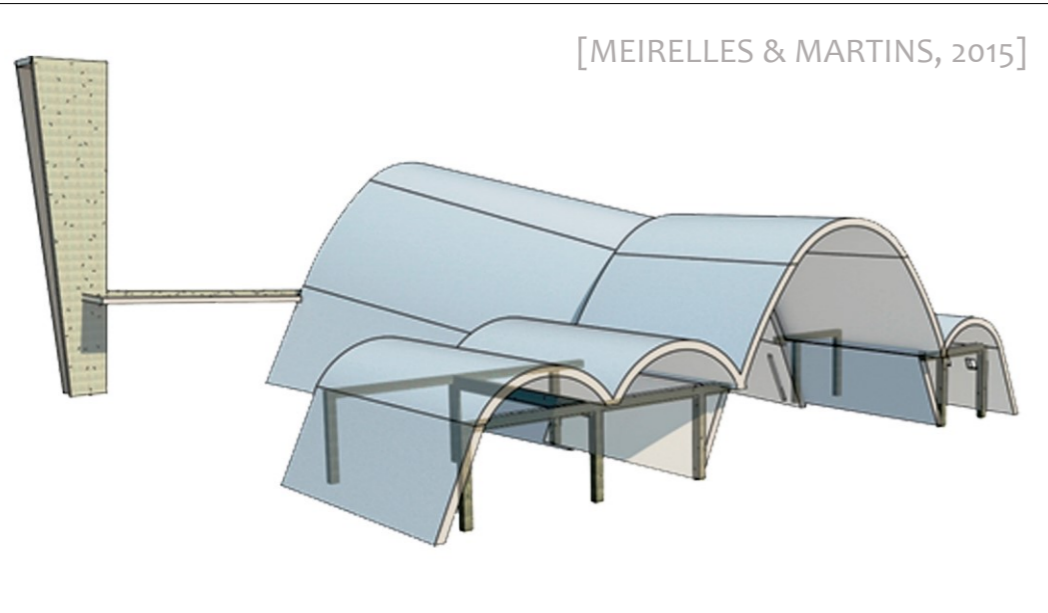
[MEDRANO & MEIRELLES, 2013]



[ARQUIVO ARQ, 2021]

**IGREJA DE
SÃO FRANCISCO DE ASSIS**

Oscar Niemeyer
Belo Horizonte - Brasil - 1943



[BODEGAS PROTOS, 2021]



[ARCHDAILY, 2021]

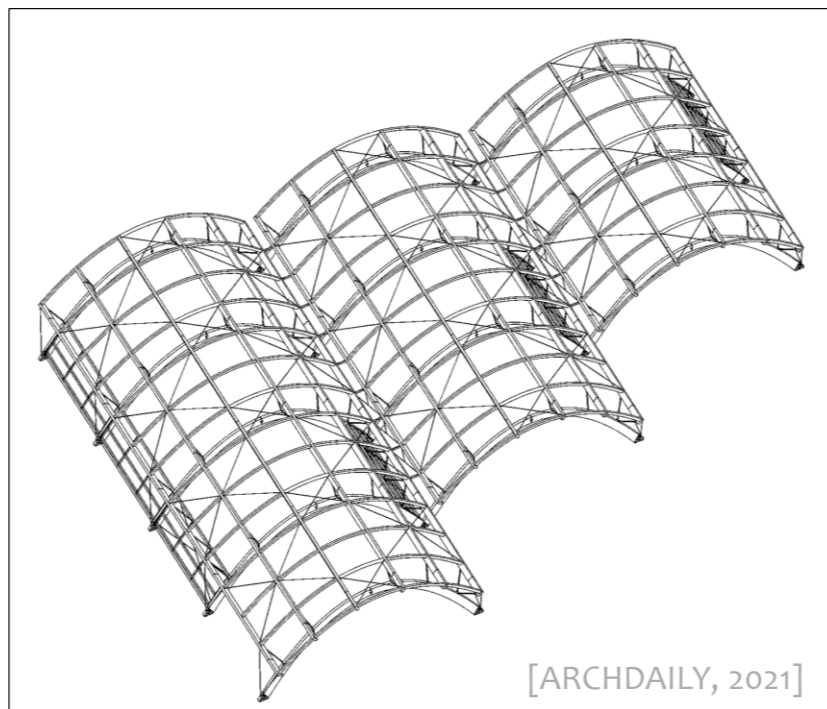


[EVADIUM, 2021]



BODEGAS PROTOS

Richard Rogers + Alonso y Balaguer
Peñafiel - Espanha - 2008



[ARCHDAILY, 2021]

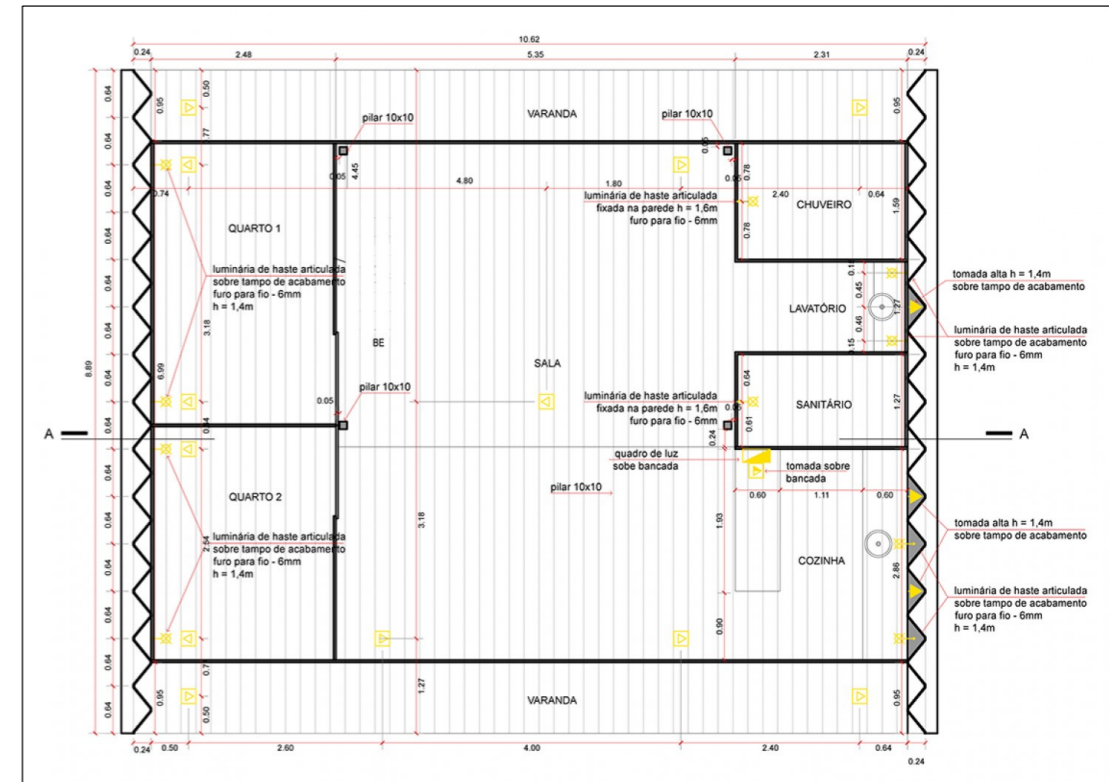
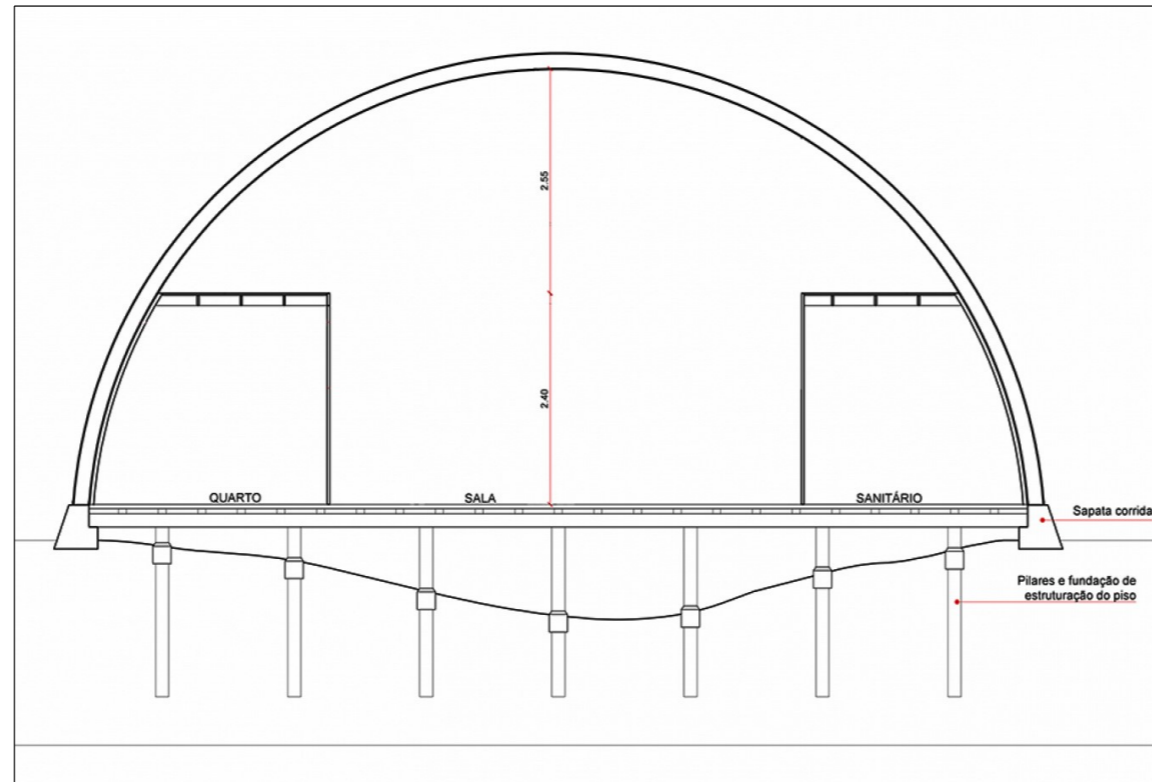


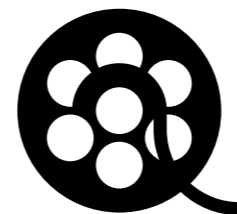
[KERAMO PLAST, 2021]



CASA ARCA

Atelier Marko Brajovic
Paraty - Rio de Janeiro - 2015



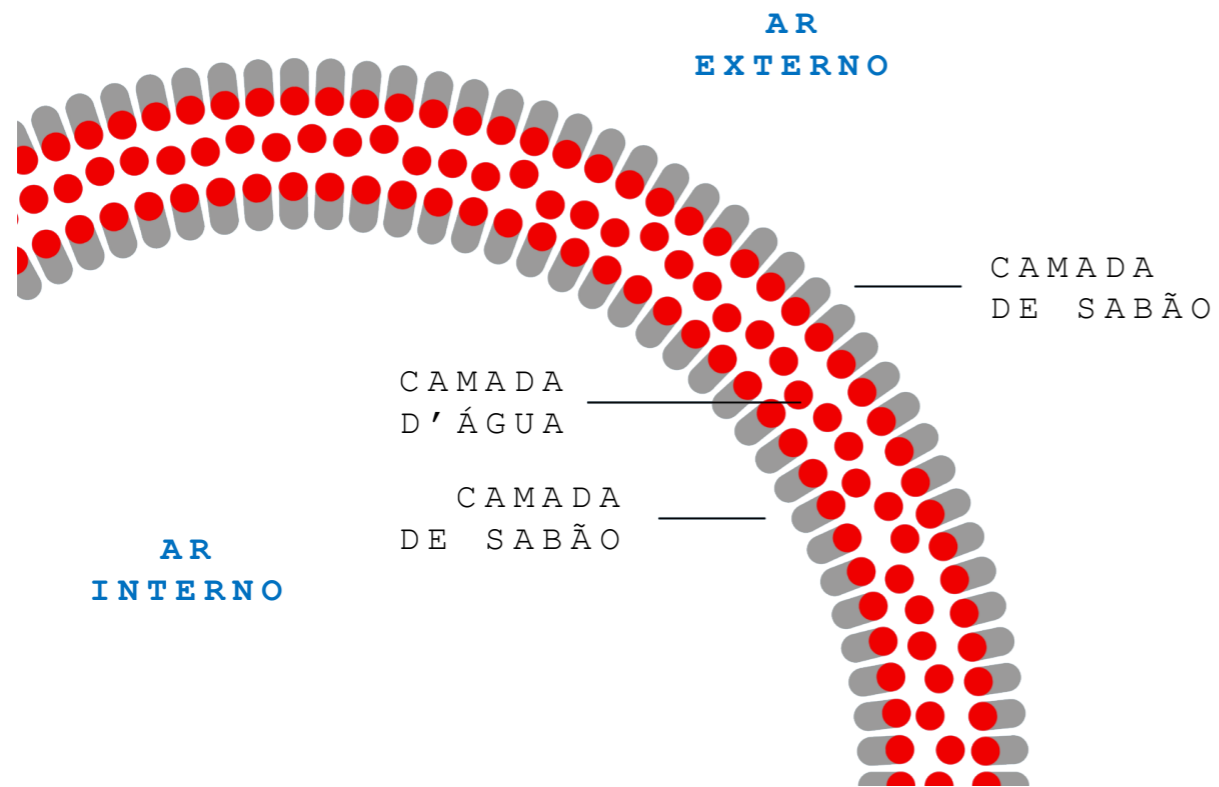


CASA ARCA

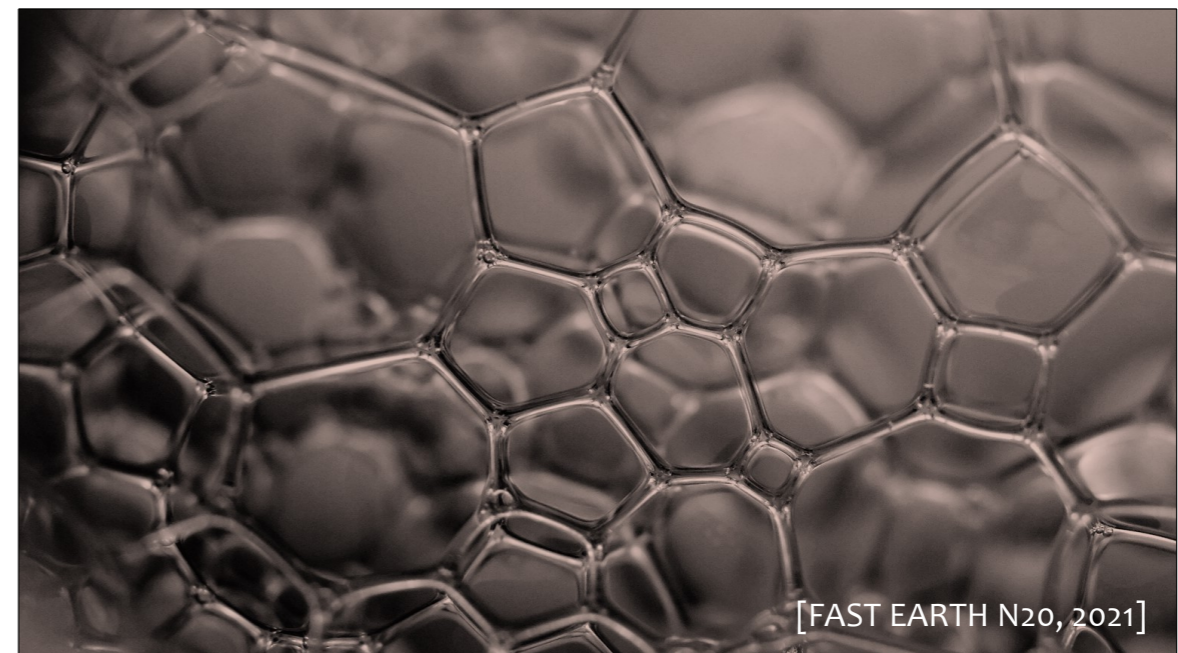
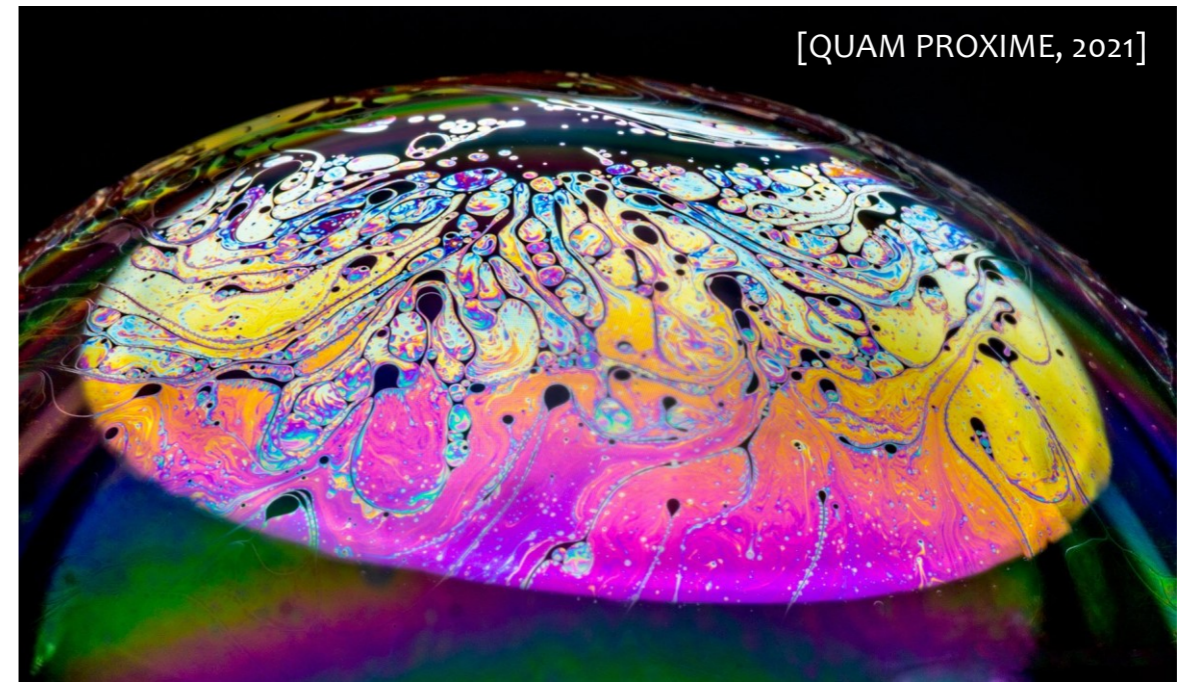
[“ARCA - ATELIER MARKO BRAJOVIC | GALERIA DA ARQUITETURA”, EM: <https://www.youtube.com/watch?v=d3hbeHRPhMA>]

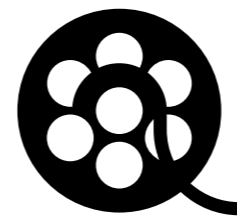






[MEDIUM, 2021]





FREI OTTO – EXPERIMENTAÇÕES

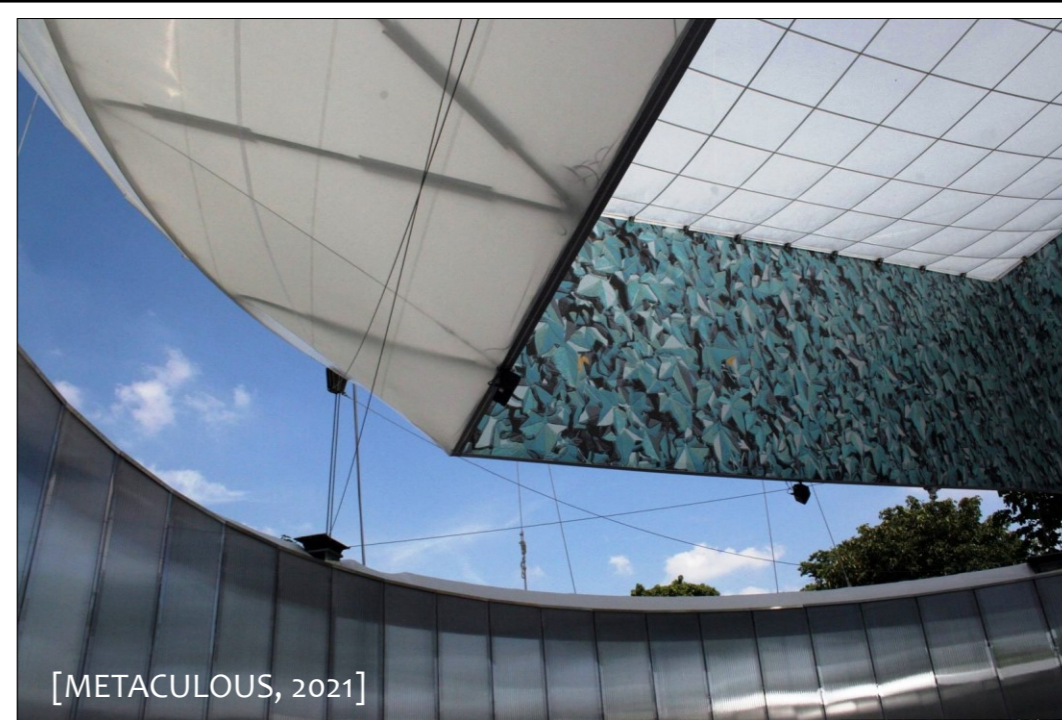
[“FREI OTTO - MODELING WITH SOAP FILMS”, EM: <https://www.youtube.com/watch?v=-IW7o25NmeA>]



[FLICKR, 2021]



[METACULOUS, 2021]

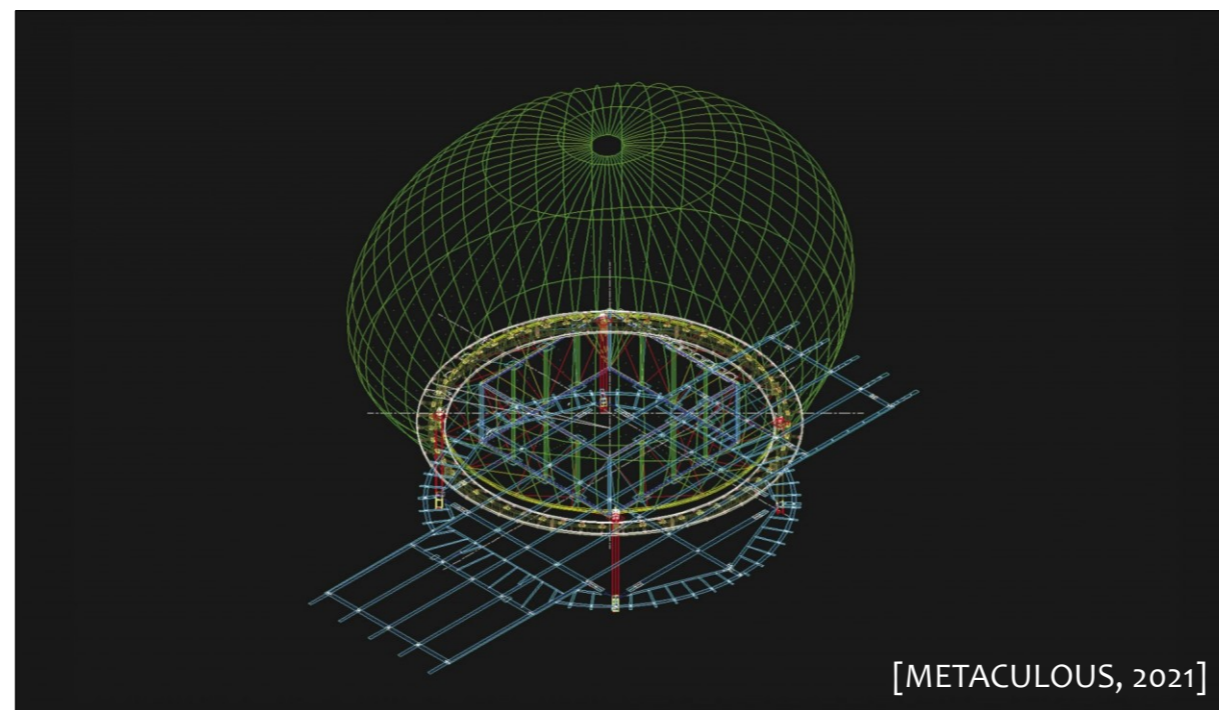


[METACULOUS, 2021]

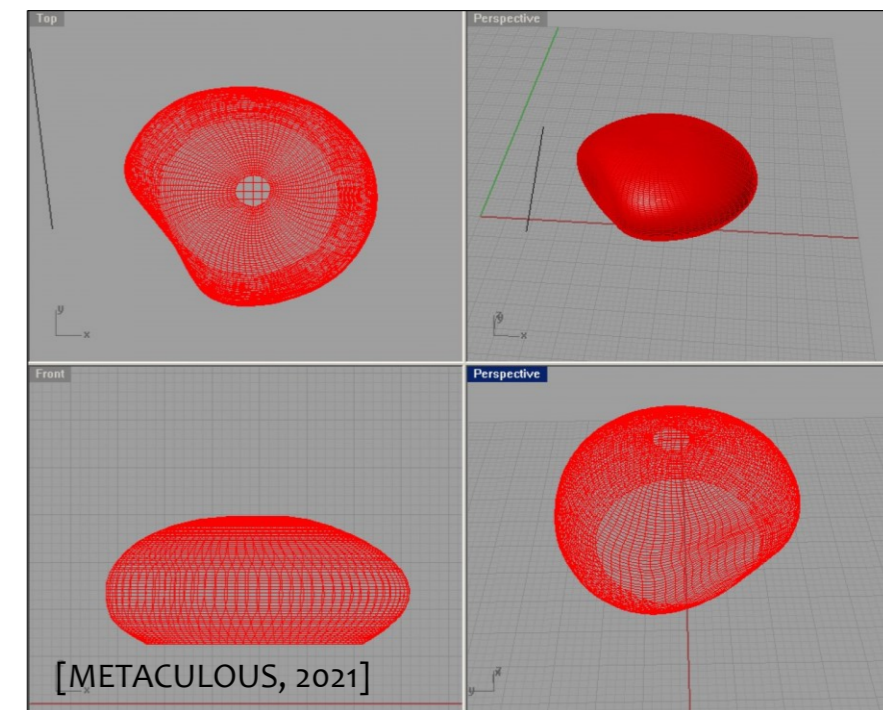
PAVILHÃO SERPENTINE

OMA

Londres - Inglaterra - 2006



[METACULOUS, 2021]

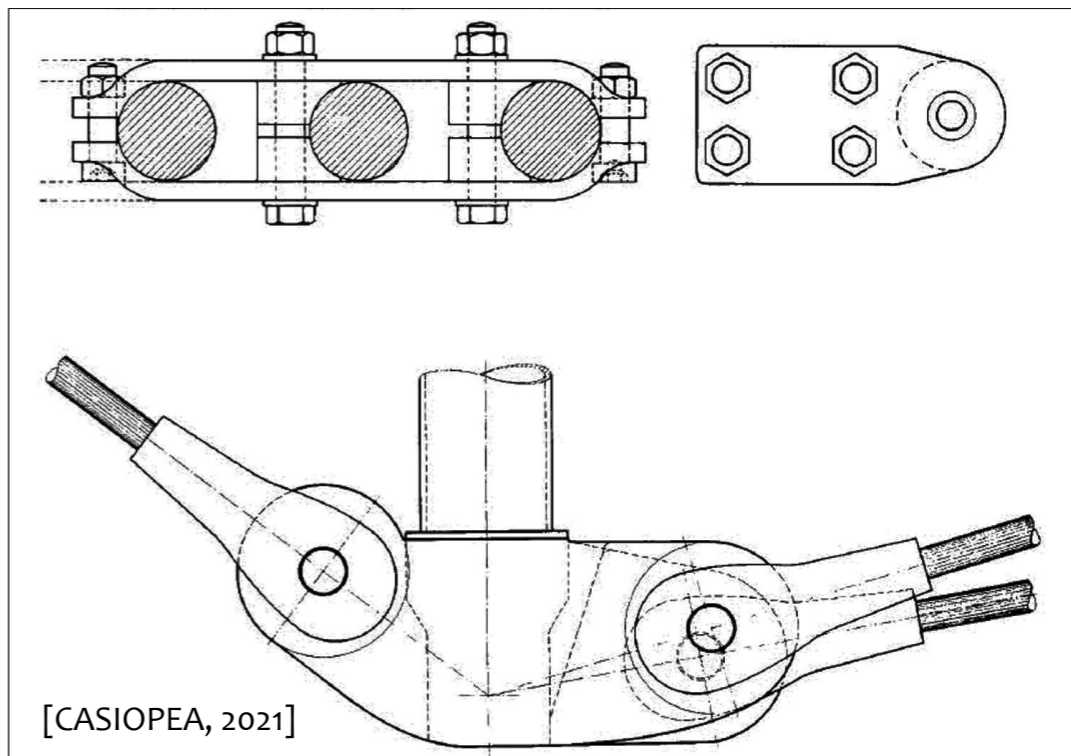


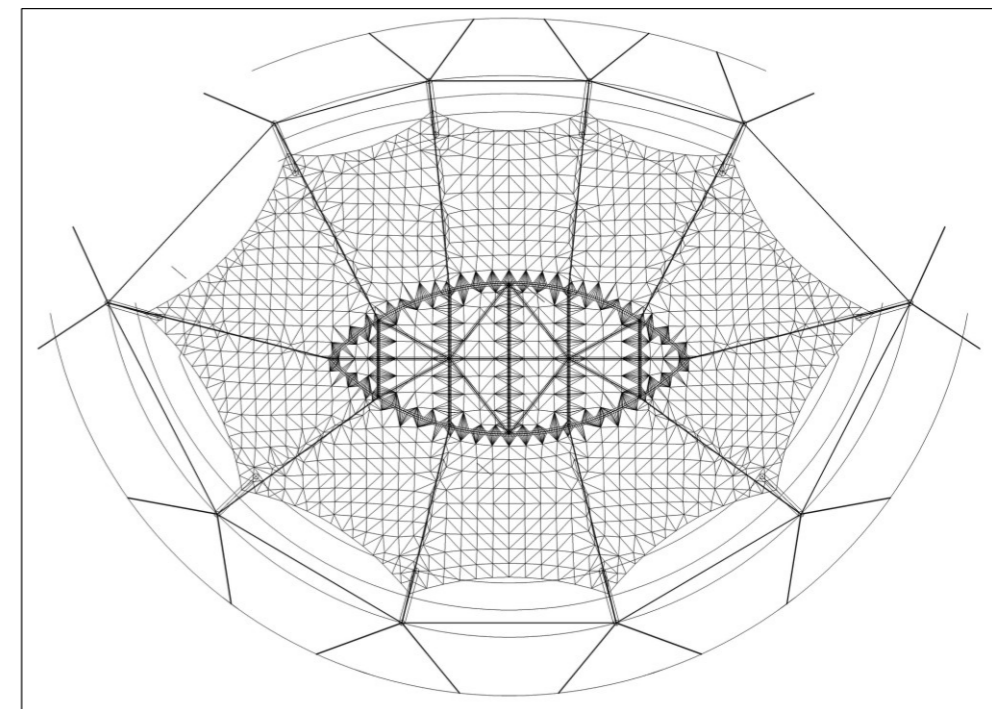
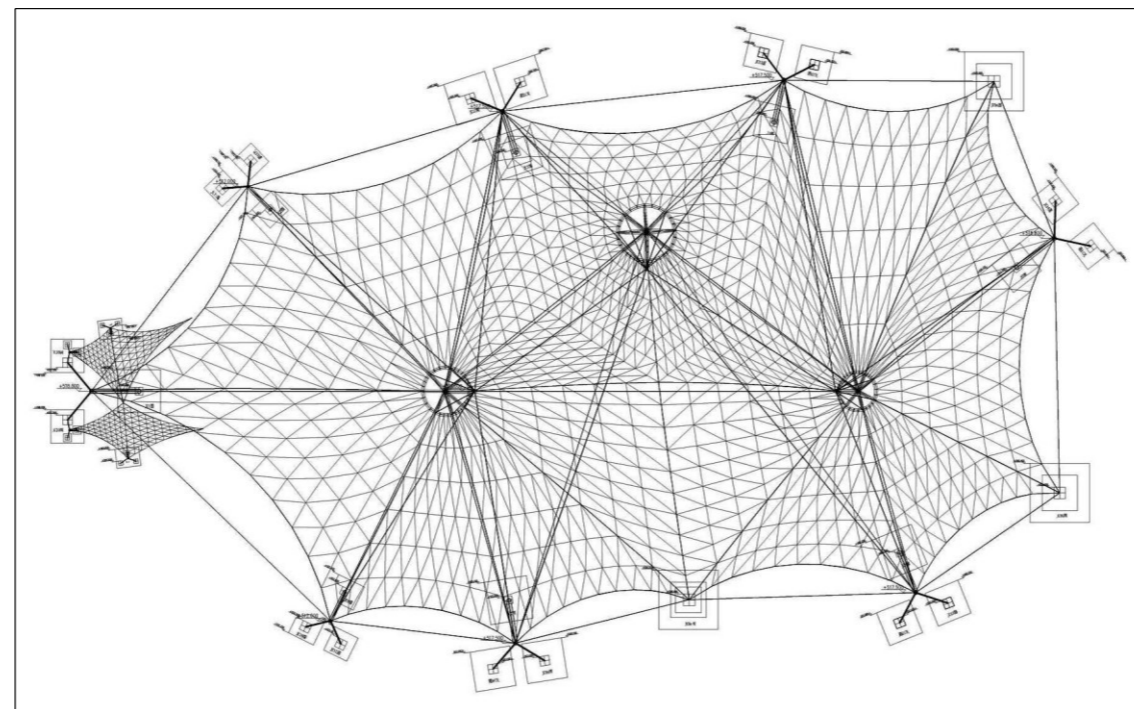
[METACULOUS, 2021]



ESTÁDIO OLÍMPICO DE MUNIQUE

Frei Otto & Gunther Behnisch
Munich - Alemanha - 1972



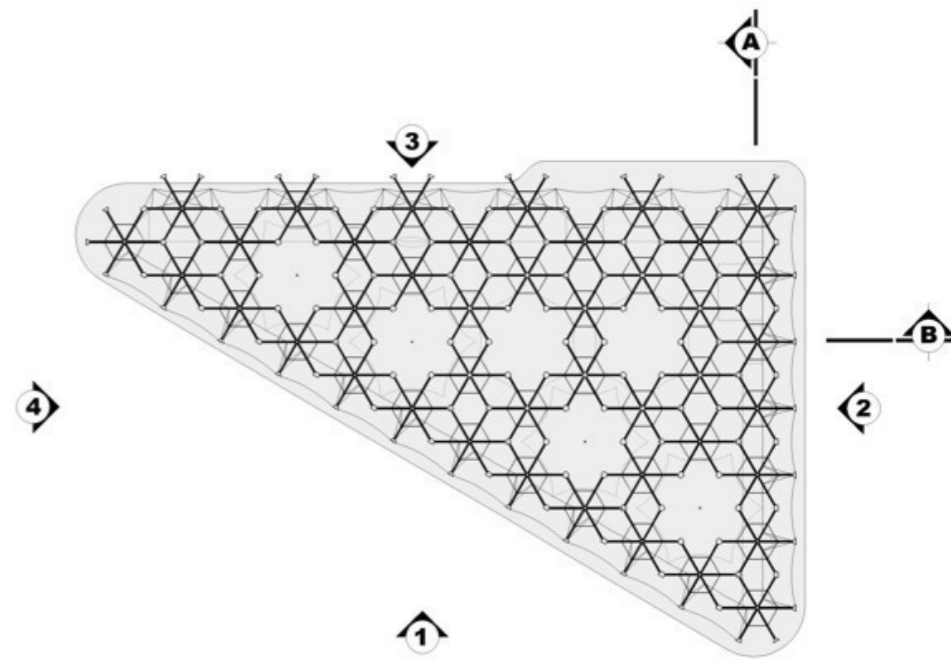
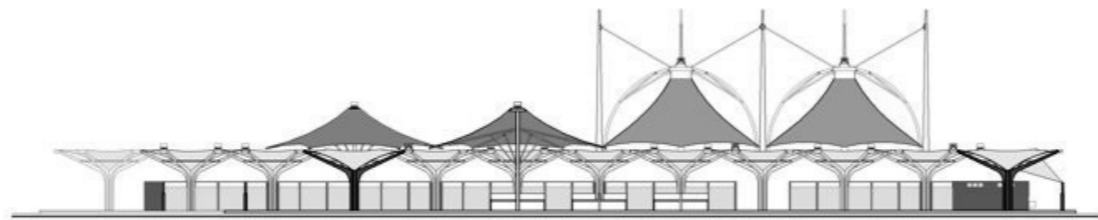


**CENTRO EQUESTRE EM
LUXELAKES ECO-CITY**
Chengdu Wide Horizon Investment Group
Chengdu - China - 2019



FEIRA DA CIDADE

Meia Dois Nove Arquitetura
Ananindeua - Brasil - 2005



PLANTA DE ESTRUTURA

[ARCHDAILY, 2021]

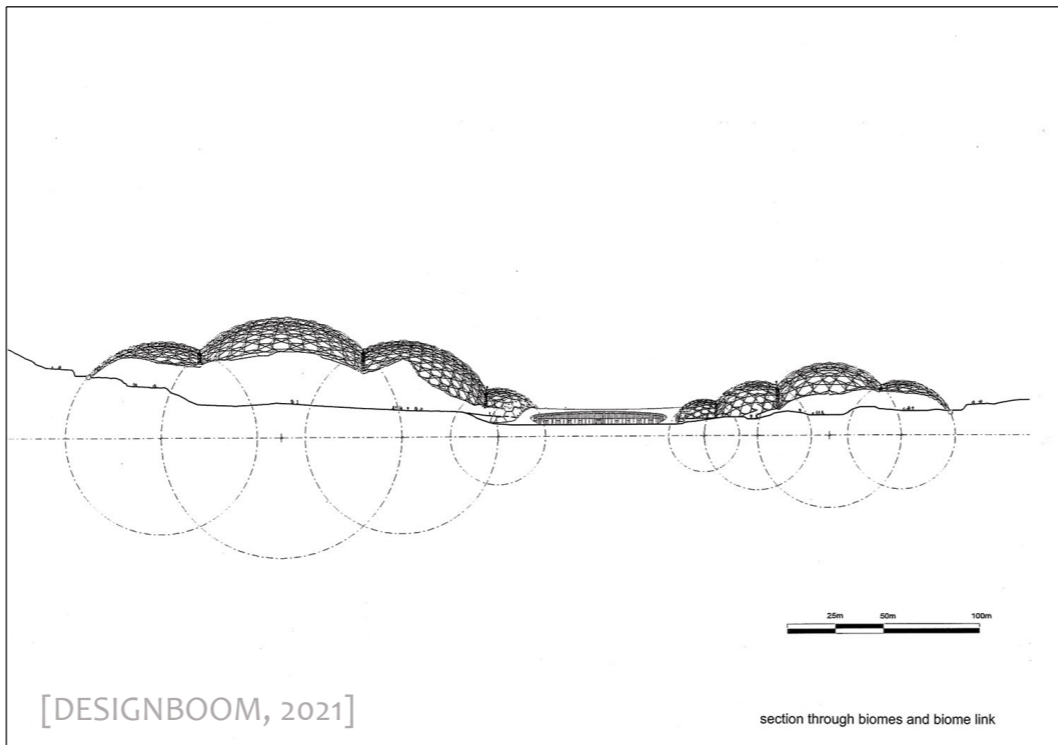
[EXPEDIA, 2021]

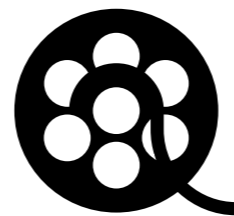
[PINTEREST, 2021]



PROJETO EDEN

Nicholas Grimshaw
Cornualha - Reino Unido - 2001





EX OF IN HOUSE

[“STEVEN HOLL ARCHITECTS: EX OF IN HOUSE”, EM: <https://www.youtube.com/watch?v=OmjrTghS6gw>]





[BRITANNICA, 2021]



[LULULEMON, 2021]



[BRITANNICA, 2021]





[MOVEMENT FITNESS, 2021]



[PURE YOGA, 2021]

[USON MILJÖTEKNIK, 2021]

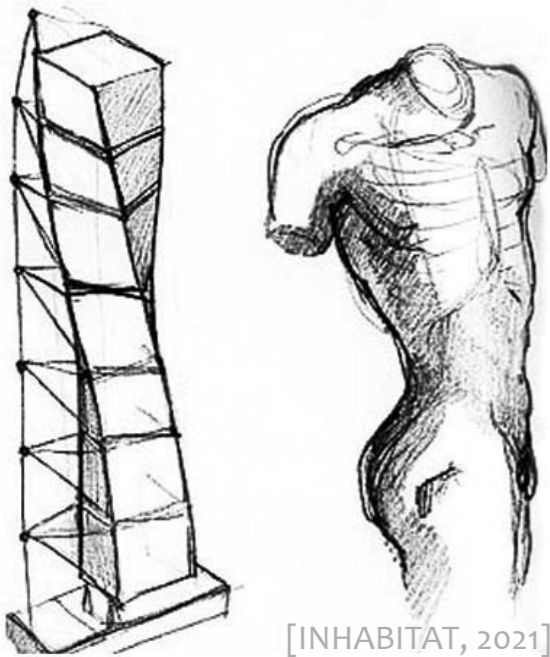


[BYGGERI ARKITEKTUR, 2021]

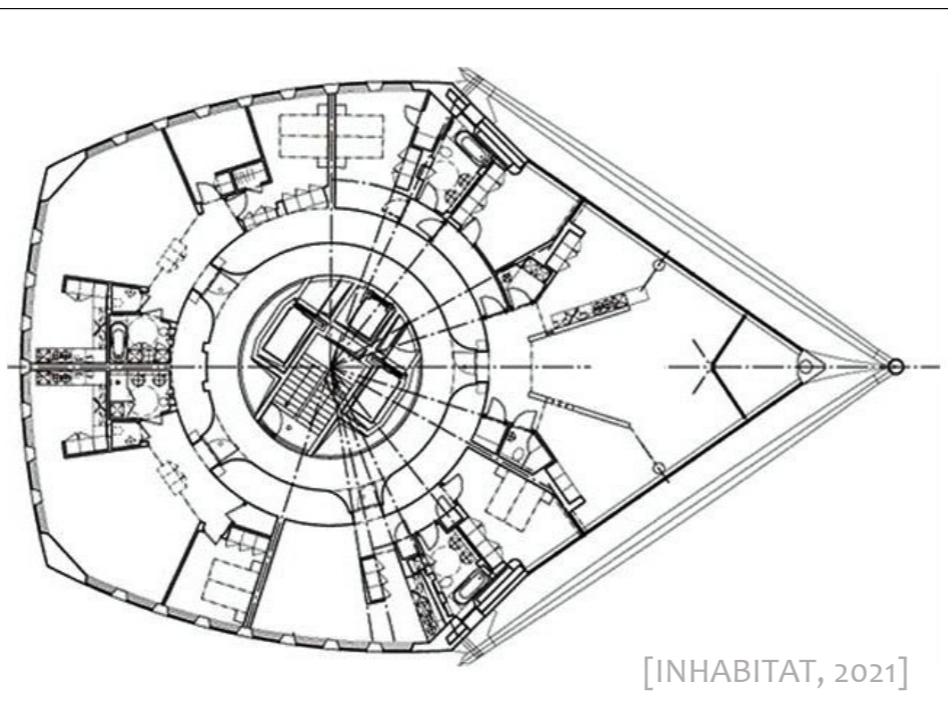


TURNING TORSO

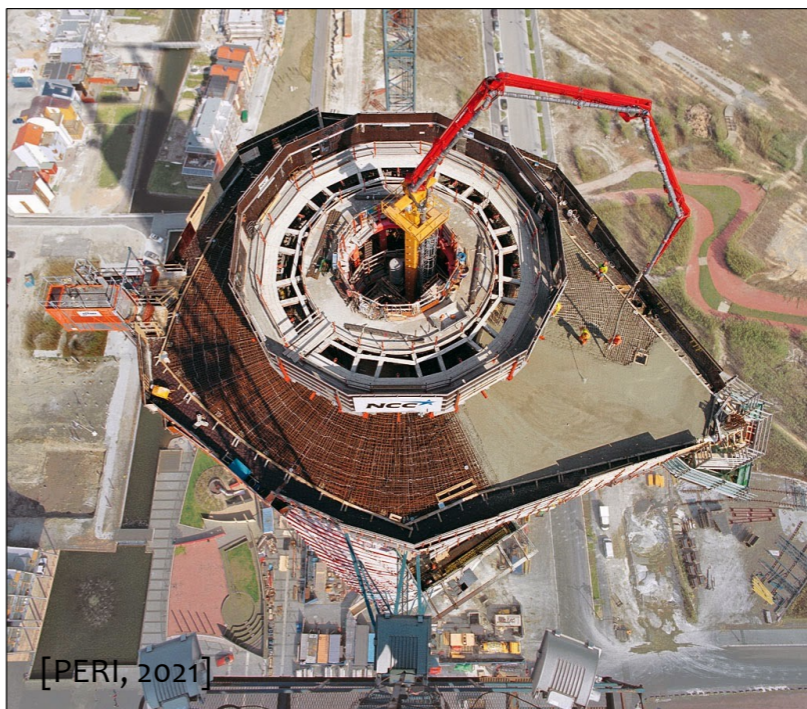
Santiago Calatrava
Malmö - Suécia - 2005



[INHABITAT, 2021]



[INHABITAT, 2021]



[PERI, 2021]



[PERI, 2021]

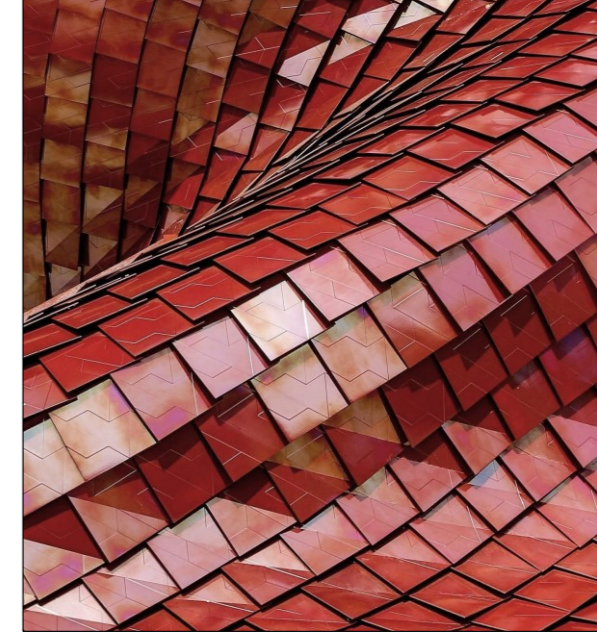
[ARCHDAILY, 2021]



[ARCHDAILY, 2021]

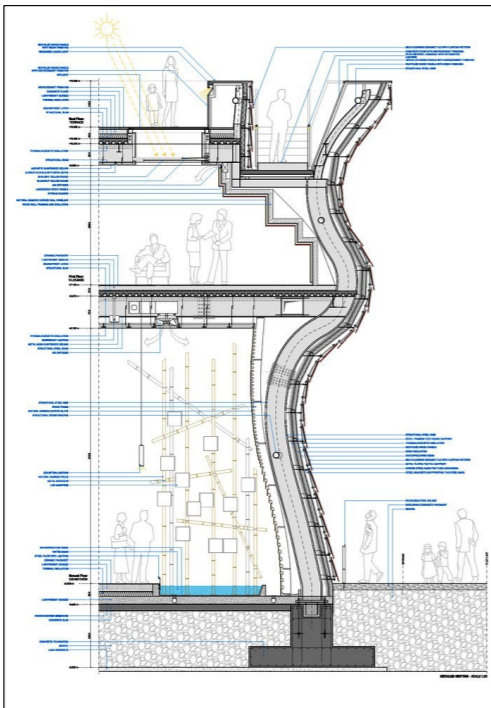


[ARCHDAILY, 2021]

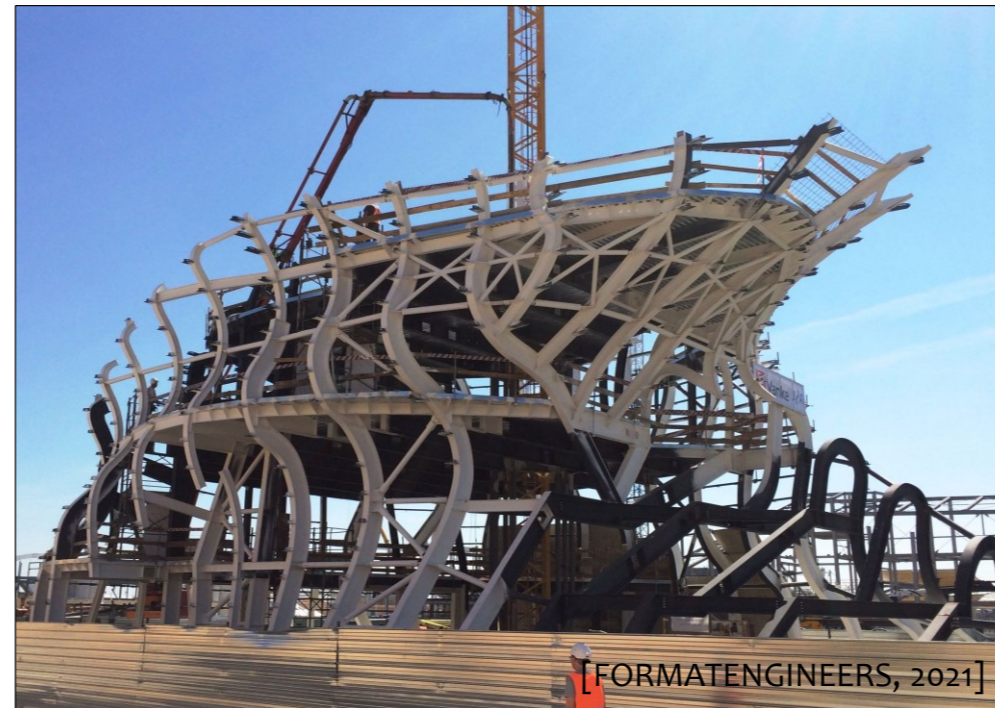


PAVILHÃO VANKE EXPO MILÃO 2015

Studio Libeskind
Milão - Itália - 2015



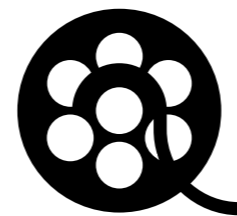
[ARCHDAILY, 2021]



[FORMATENGINEERS, 2021]

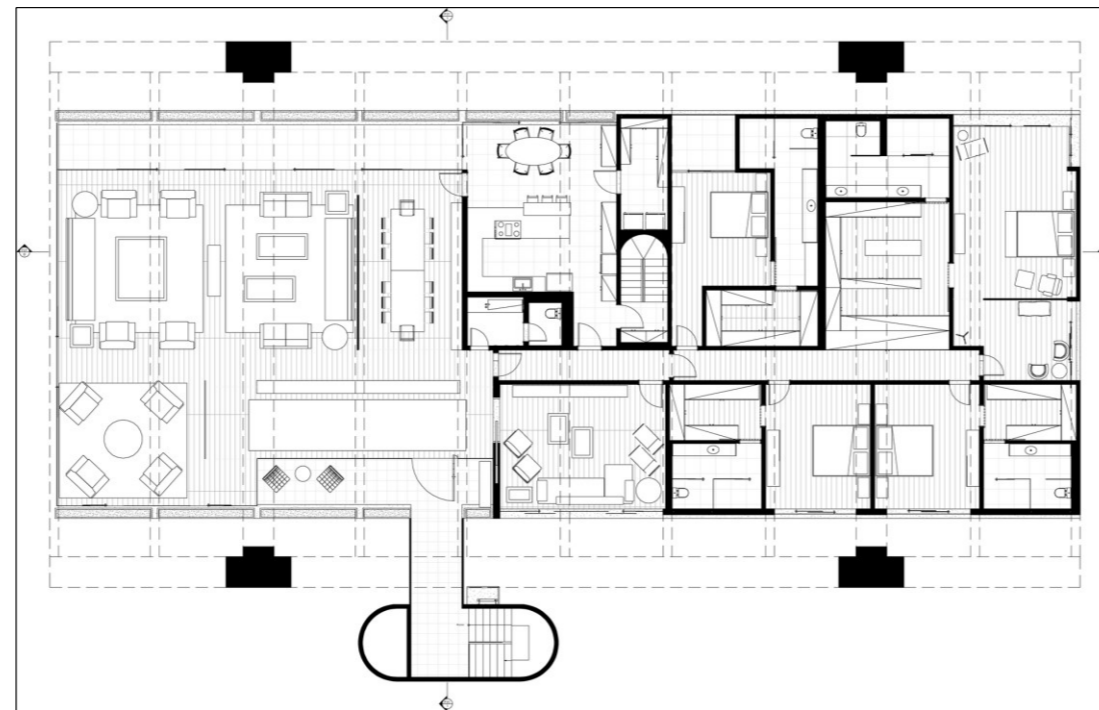


[AFASIAARCHZINE, 2021]



PAVILHÃO VANKE

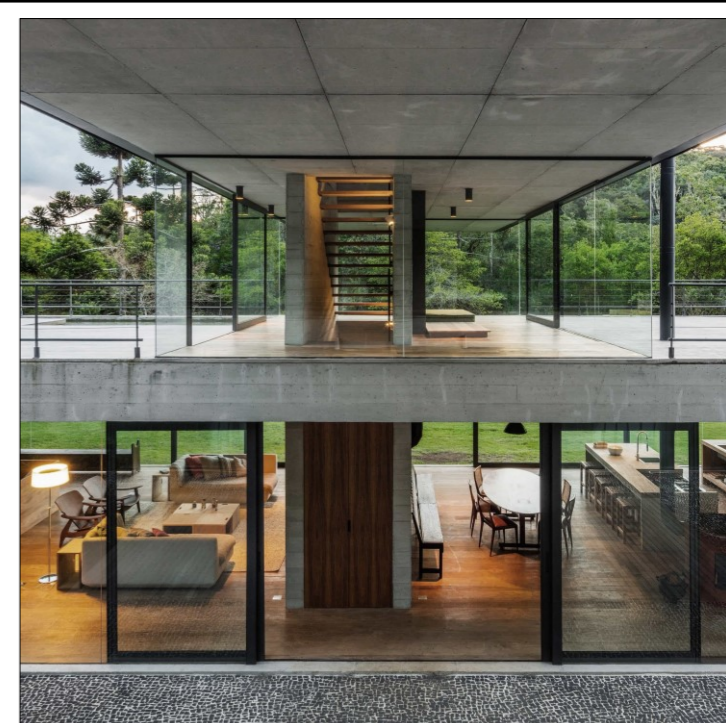
[“CASALGRANDE PADANA FOR VANKE AT EXPO 2015”, EM: https://www.youtube.com/watch?v=68l8Zolp_fg]



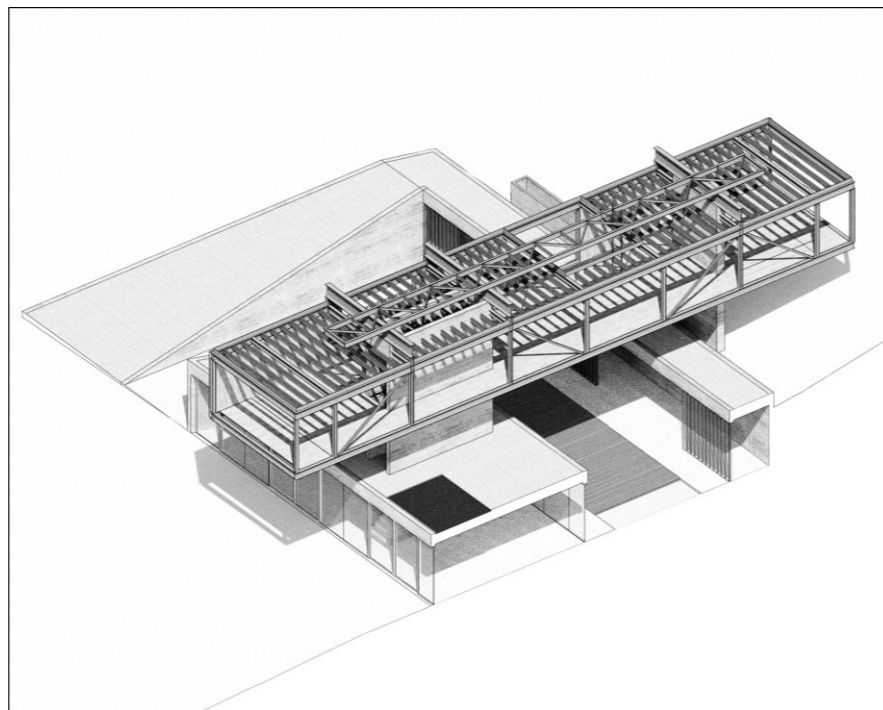
RESIDÊNCIA (CASA JSN)

João Filgueiras Lima + Arquitécника
Brasília - Brasil - 1970s + 2019

[ARCHDAILY, 2021]



CASA NA MANTIQUEIRA
UNA Arquitetos
São Bento do Sapucaí - Brasil - 2016



COMO CITAR ESTE MATERIAL

MARTINS, ALEXANDRE AUGUSTO. **APRENDENDO COM A NATUREZA: CONSTRUINDO E DESVENDANDO ANALOGIAS ENTRE SISTEMAS ESTRUTURAIIS NATURAIS E ARTIFICIAIS**. PALESTRA. SÃO PAULO: FACULDADE DE ARQUITETURA E URBANISMO DA UNIVERSIDADE PRESBITERIANA MACKENZIE; OUTUBRO DE 2021.

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Faculdade de
Arquitetura e Urbanismo



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PROF. DR. ALEXANDRE AUGUSTO MARTINS

[2021]