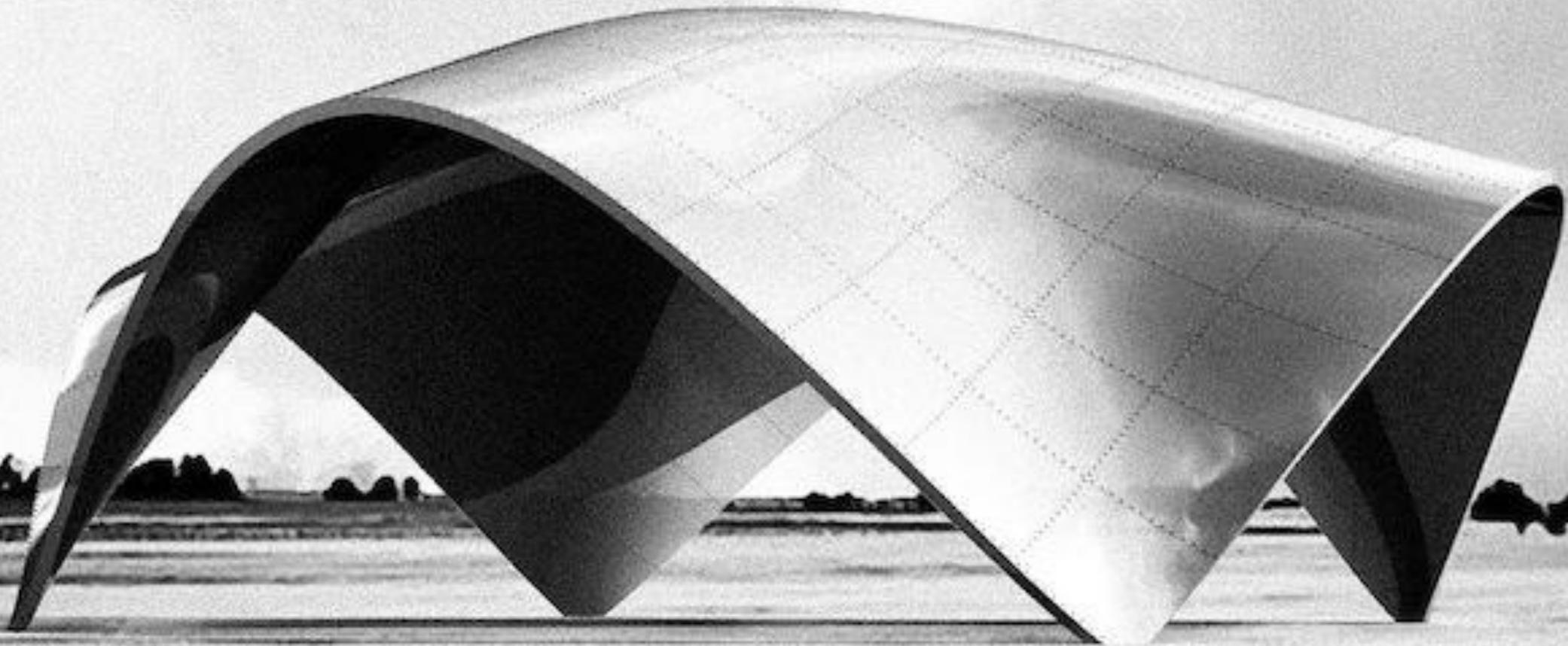


SHELLS

Maria Cebrian Lopez | Martina Checconi | Kajetan Herkt



DEFINITION

DEFINITION
CLASSIFICATION

DEFINITION
CLASSIFICATION
REFERENCES

DEFINITION

what is a shell?

-A shell is a **thin structure** composed of **curved sheets** of material.

-The curvature plays an important role in the structural behavior, realizing a **spatial form**.

-A shell is the most efficient way of using the material and can be very useful in case of storage of fluids and solids (**uniform loads**).

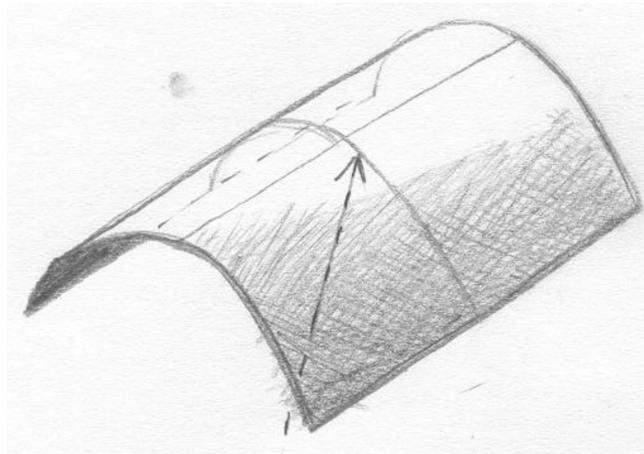
DEFINITION
CLASSIFICATION
REFERENCES

CLASSIFICATION

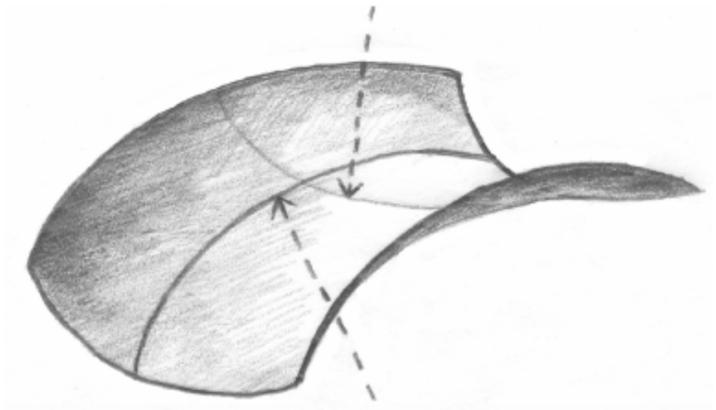
structural typologies



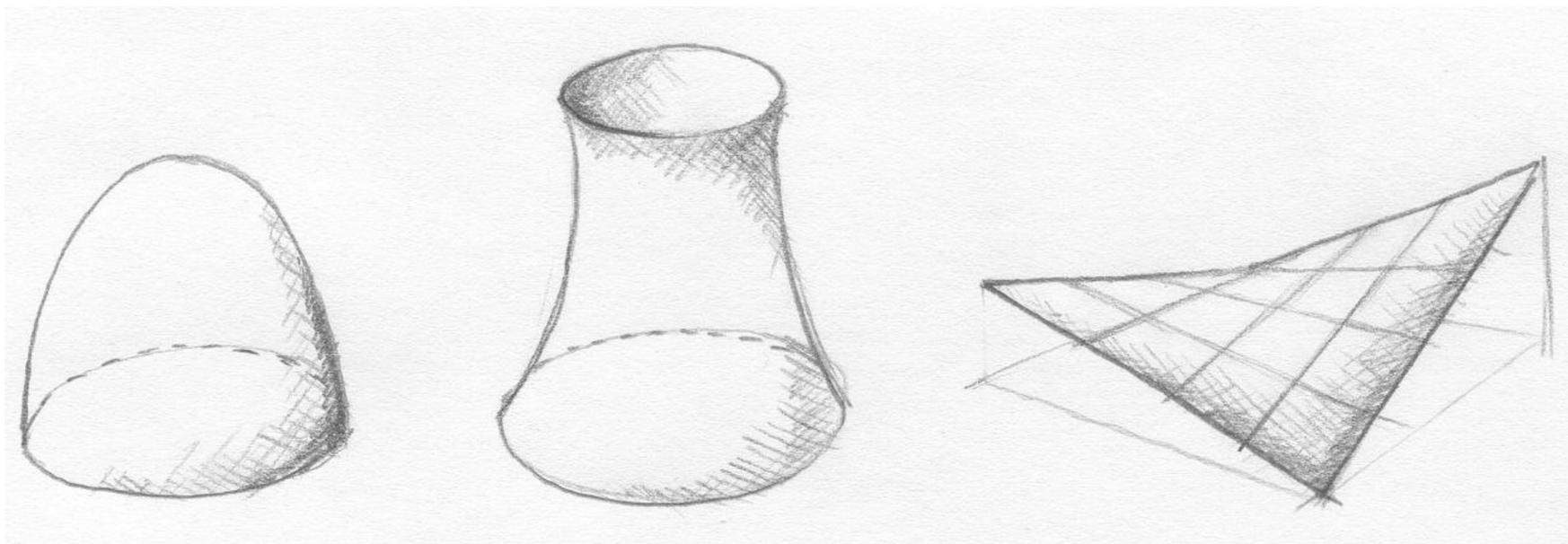
Elliptic shape



Parabolic shape



Hyperbolic shape



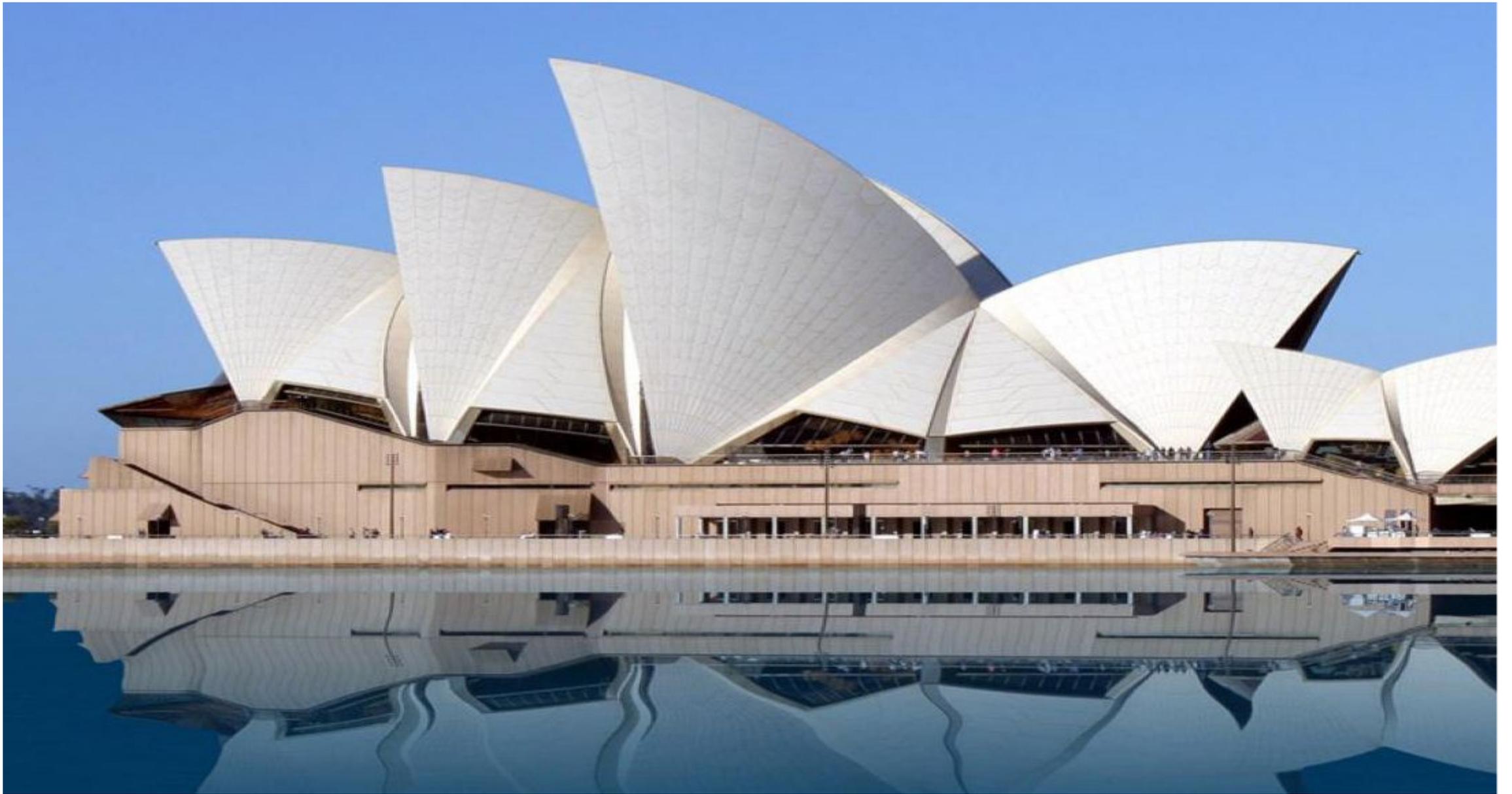
DEFINITION
CLASSIFICATION
REFERENCES

REFERENCES

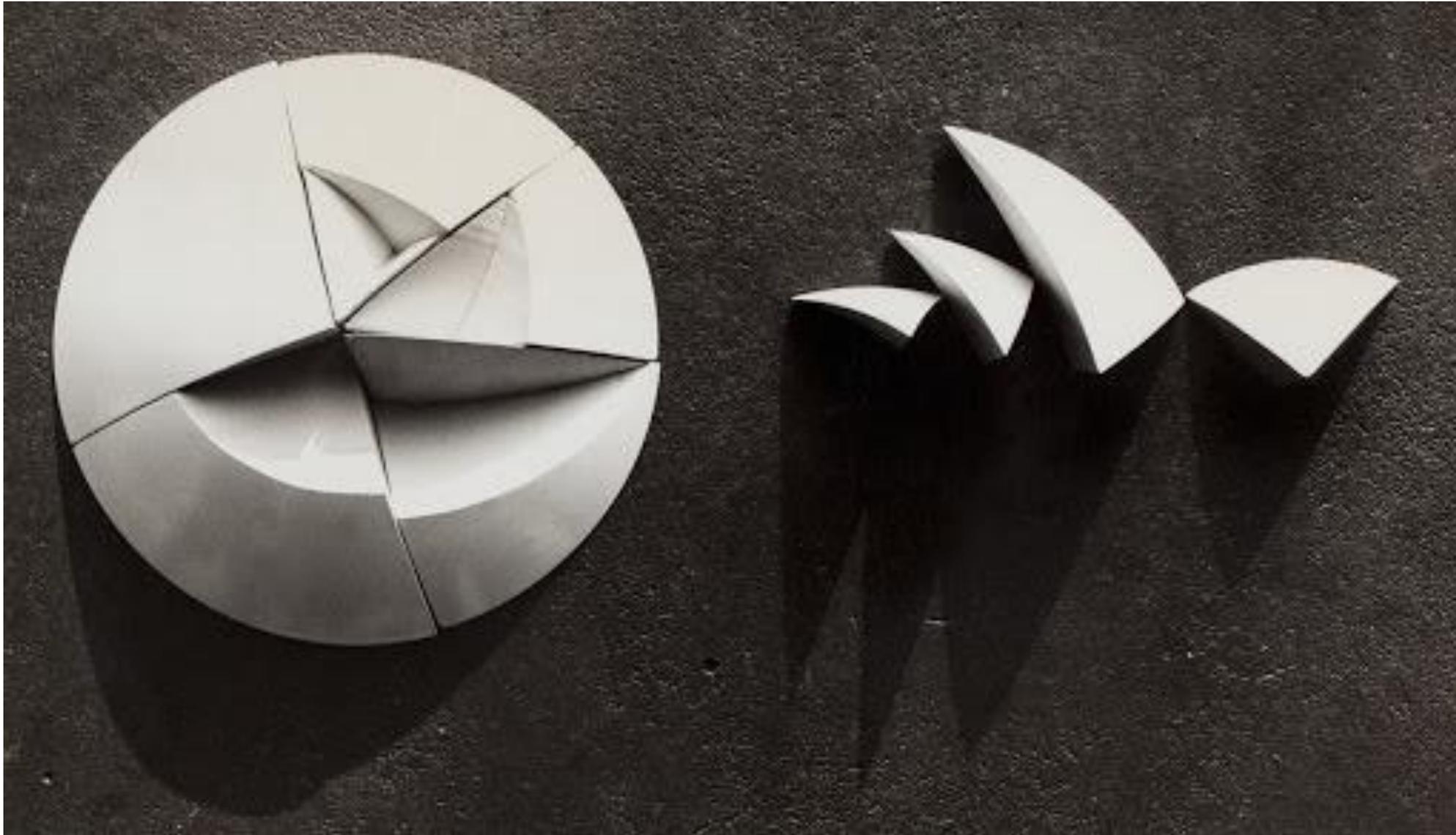
Sydney Opera House

Metropol Parasol

National Ballet School



Sydney Opera House | 1957-73 | J. Utzon | Sydney



Geometry

Spherical
solution:
Shells as
parts of a
sphere

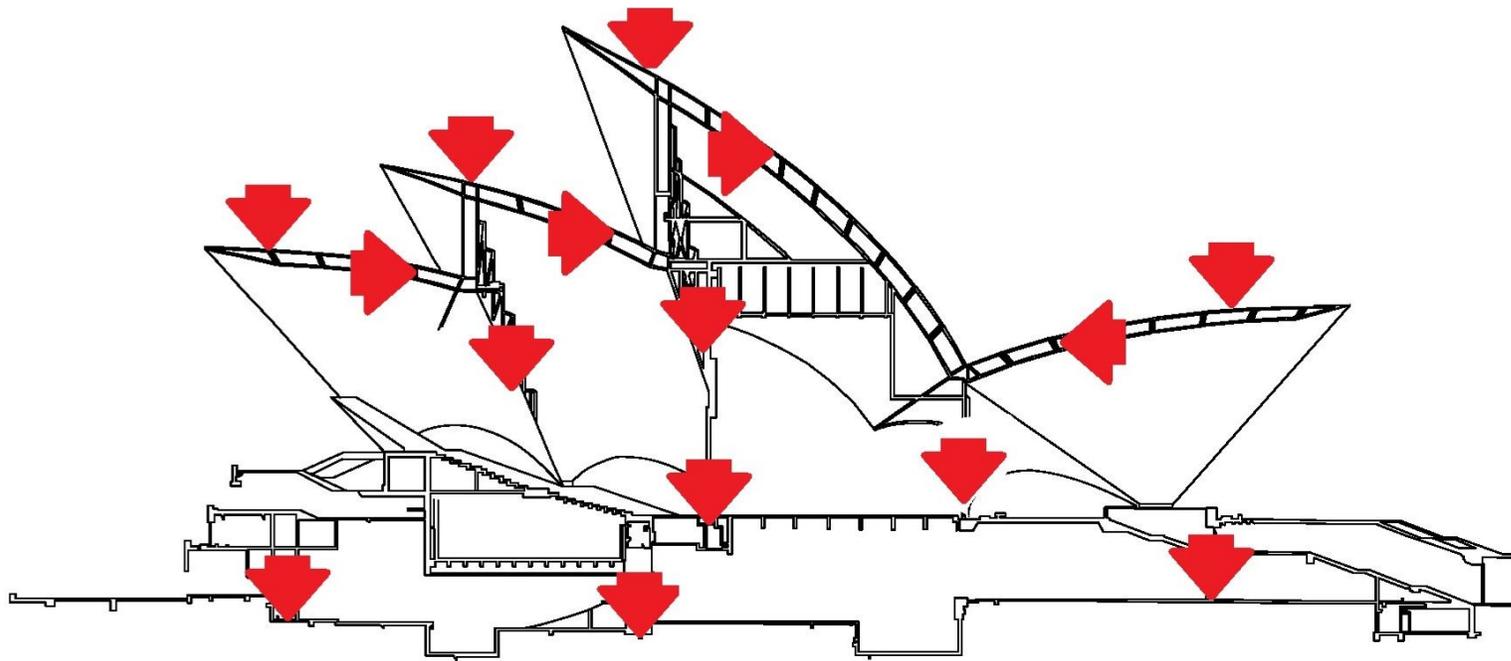


Materials

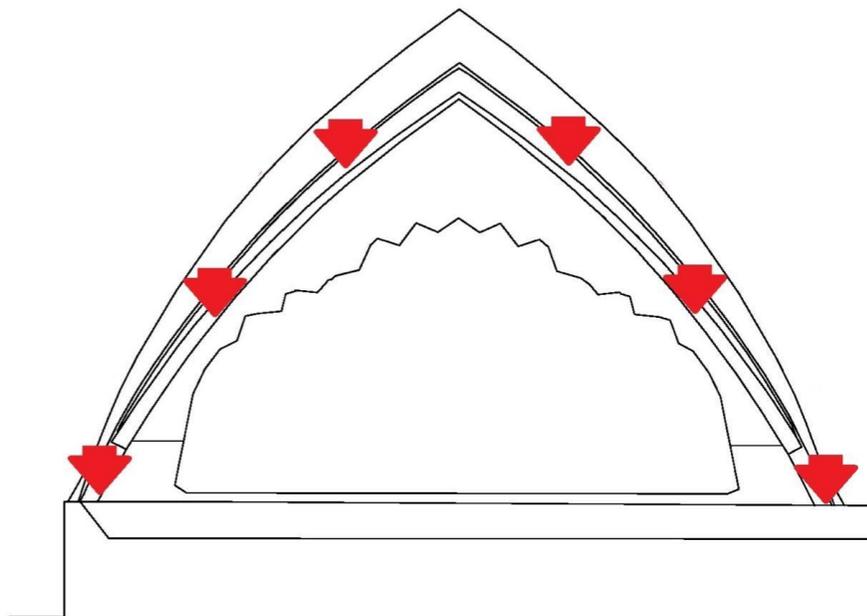
-white and
cream mate
tiles

-precast
concrete
ribs

-steel wire

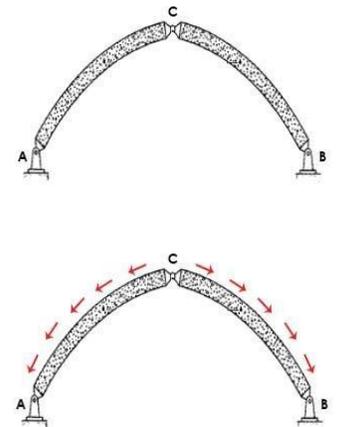


Vertical loading



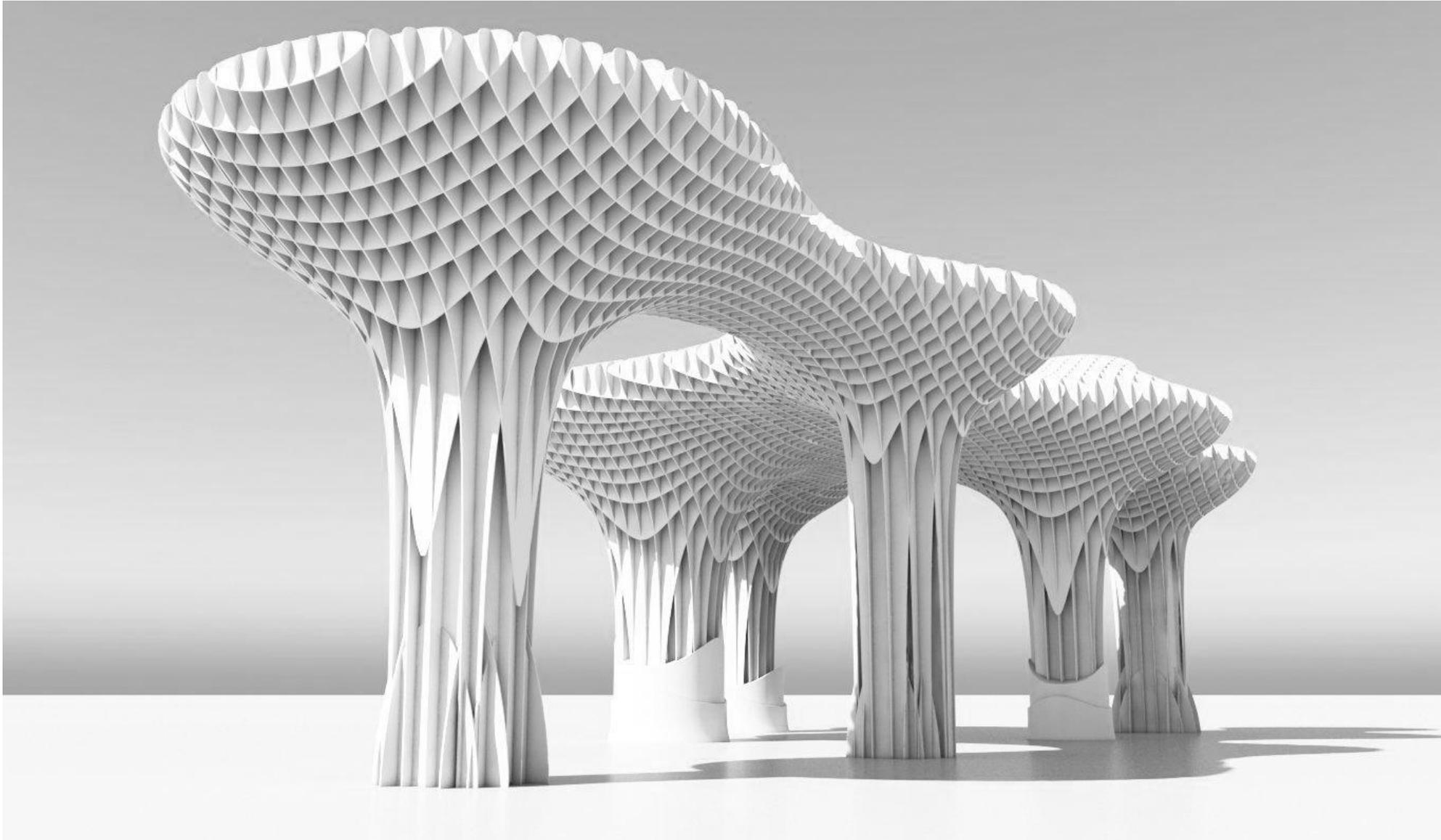
Horizontal loading

Structure
Three hinged
arch
(determinate
system)





Metropol Parasol | 2005-2011 | J. Mayer Architects | Sevilla, Spain



Concept

Continuous
and visual
structure

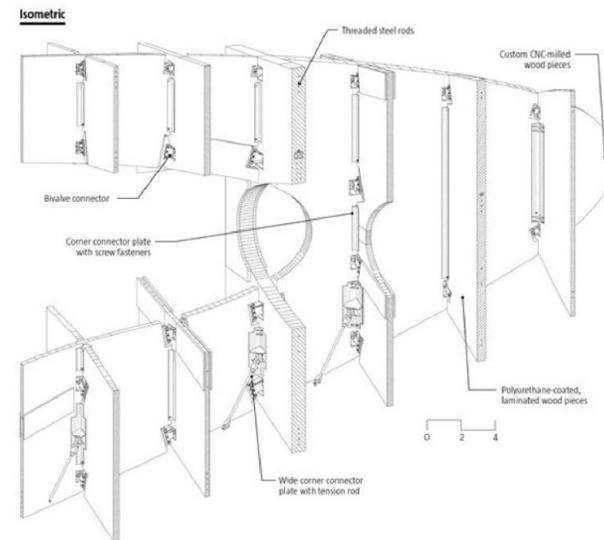
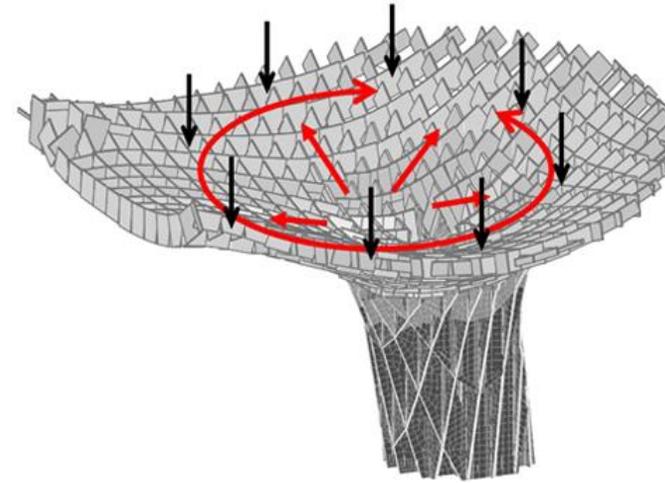
Free form



Materials

- microlaminated wood
- steel
- reinforced concrete

Structure





Cuba's National Art School - ballet | 1961-1965 | Vittorio Garatti | Havana,



Concept
complex of domes
connected to each
other by organic
layering of catalan
vaults

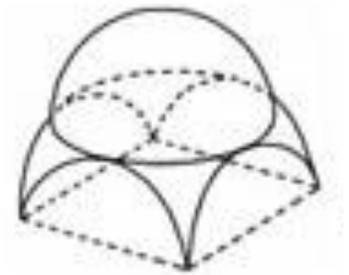


Materials

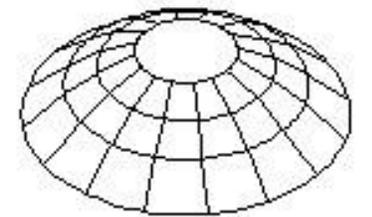
- brick
- tile
- reinforced concrete



Structure
hemispherical on
pendentives domes



rigid-node dome



thank you

Maria Cebrian Lopez | Martina Checconi | Kajetan Herkt