

A CASE STUDY IN SUSTAINABLE BUILDING CONSTRUCTION

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THE BUILDING INDUSTRY AND CLIMATE

- Approximately 50% of global carbon emissions come from the building industry.
 - Nearly 27% of global carbon emissions come just from operating buildings.
- Designing innovative buildings with reduced carbon footprint and passive systems is important to fight climate change.

PASSIVE DESIGN IN THE BBVA

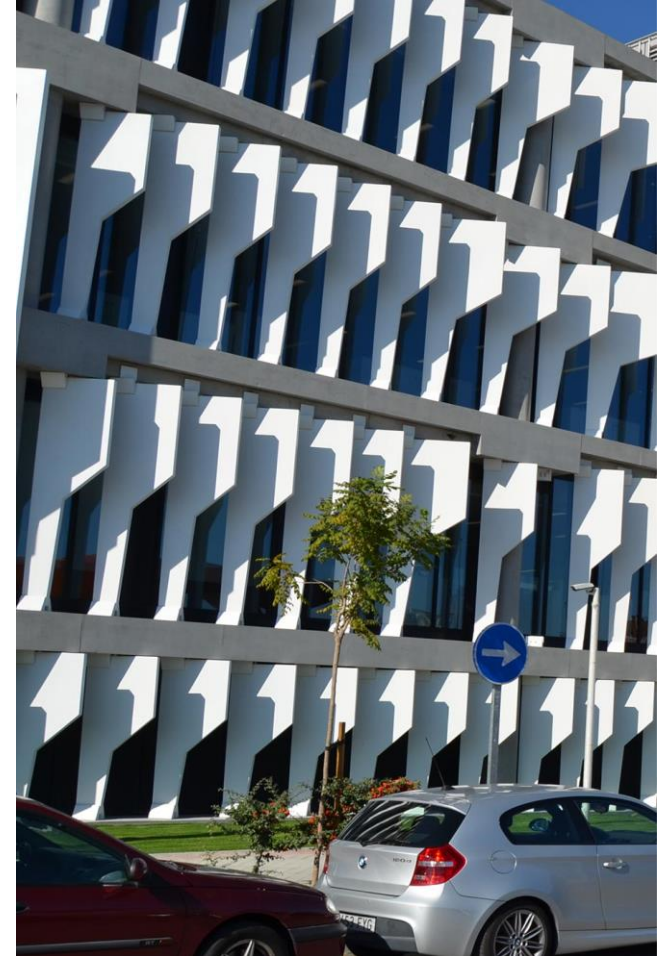


Suhan, C. (2016). [Sede BBVA Las Tablas, Madrid]. Schuco.

- LEED Gold Certified.
- Re-uses 60% of existing buildings on site.
- Gardens and streets for greenery and air flow.
- Concrete insulation.
- Intricate louver system.
- Argon window insulation.

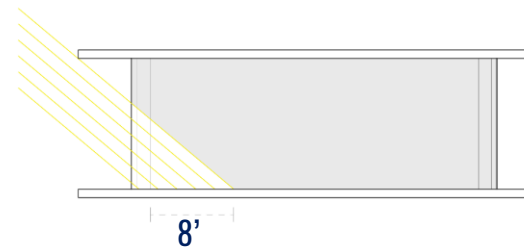
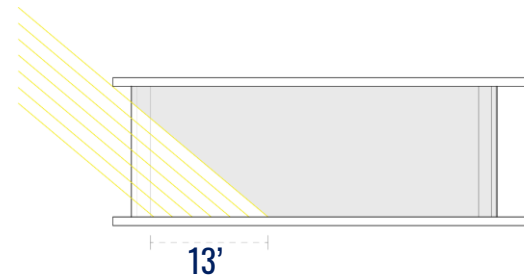
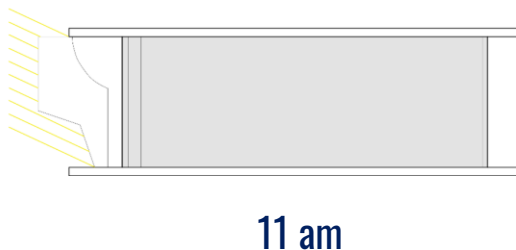
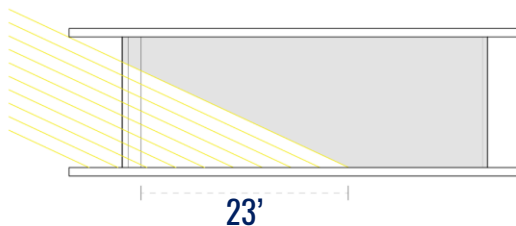
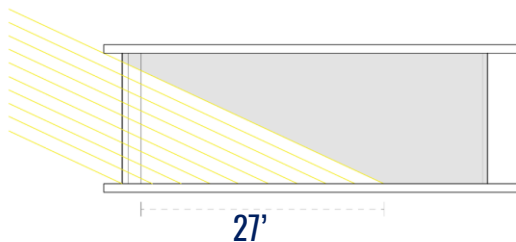
MITIGATING THE IMPACT OF THE SUN: LOUVERS

- Help dissipate the effects of high temperatures Madrid can reach during the summer.
- Allow indirect natural light into the complex.
- Lowers need for air conditioning or artificial light.

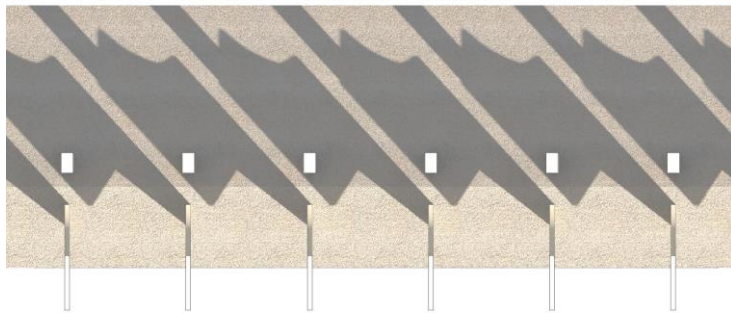


MITIGATING THE IMPACT OF THE SUN: LOUVERS

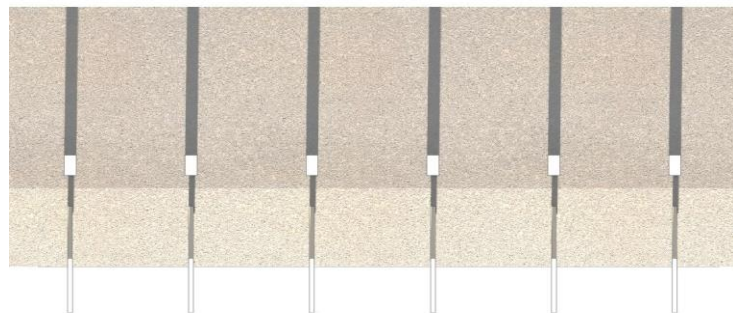
Sectional shading analysis
under different conditions at
different times of the day on
June 14th.



MITIGATING THE IMPACT OF THE SUN: LOUVERS



Taken at 11:00 am



Taken at 1:00 pm (solar noon)

Shade created by louvers in plan at different times of the day on October 15th.



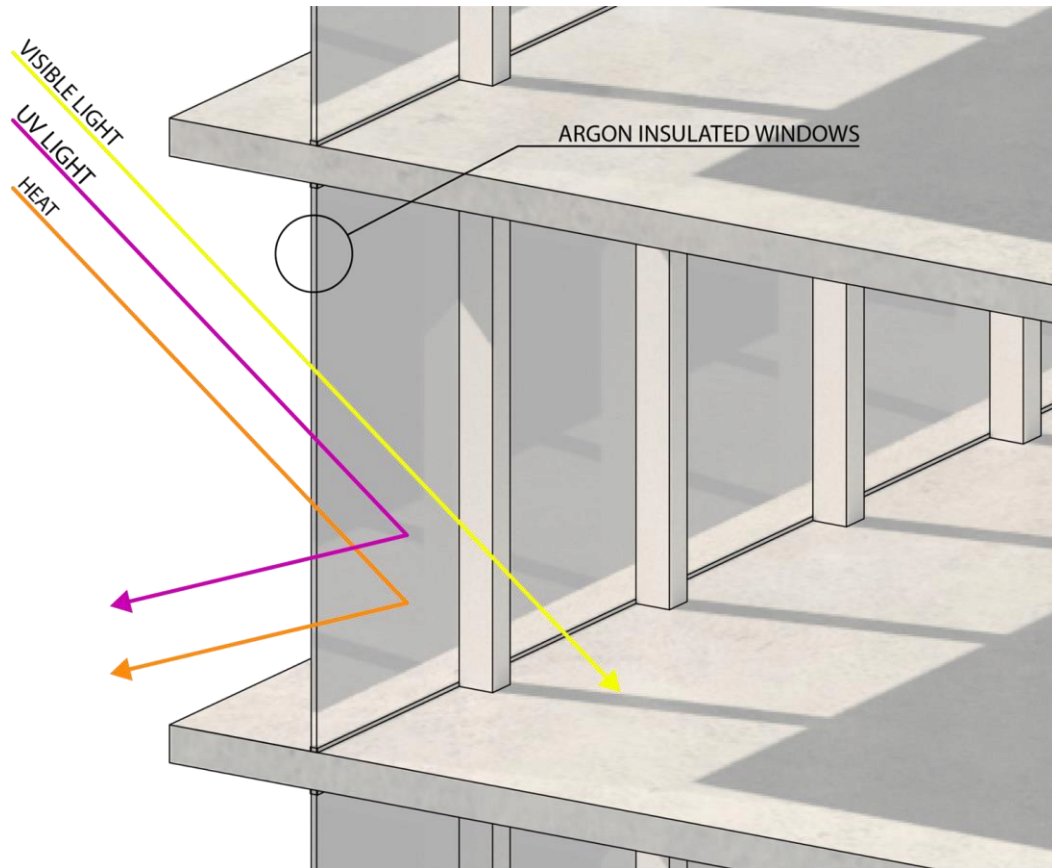
Taken at 5:00 pm

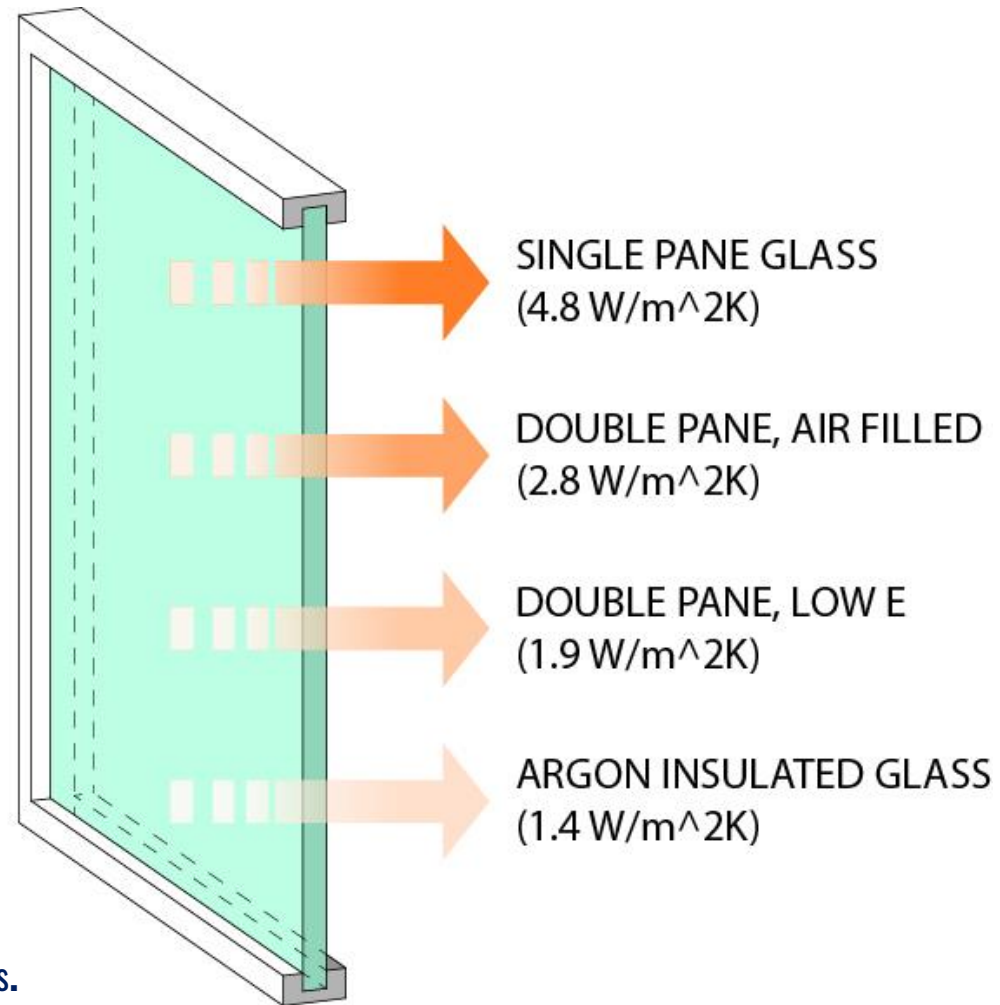
MITIGATING THE IMPACT OF THE SUN: ARGON INSULATION

U-value: the rate of transfer of heat through a structure.

Avg. U-value for argon insulated glass: **1.42 W/m²K.**

Avg. U-value for typical double glazed glass: **2.84 W/m²K.**





Avg. U-values for different window types.

CONSTRUCTION OF LA VELA CONCRETE POST TENSIONING



Less
Weight



Less
Concrete

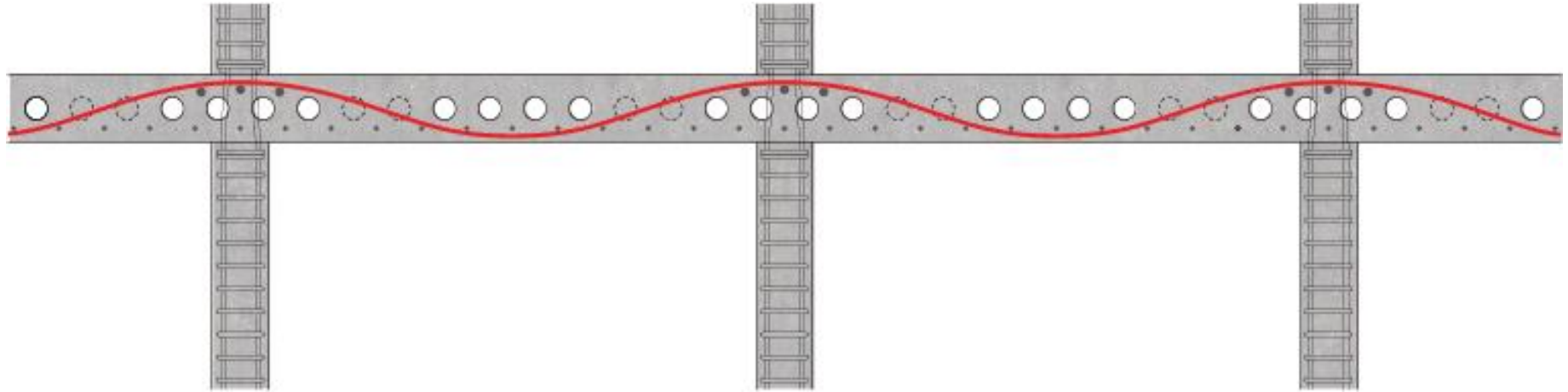


Less Steel
Reinforcement

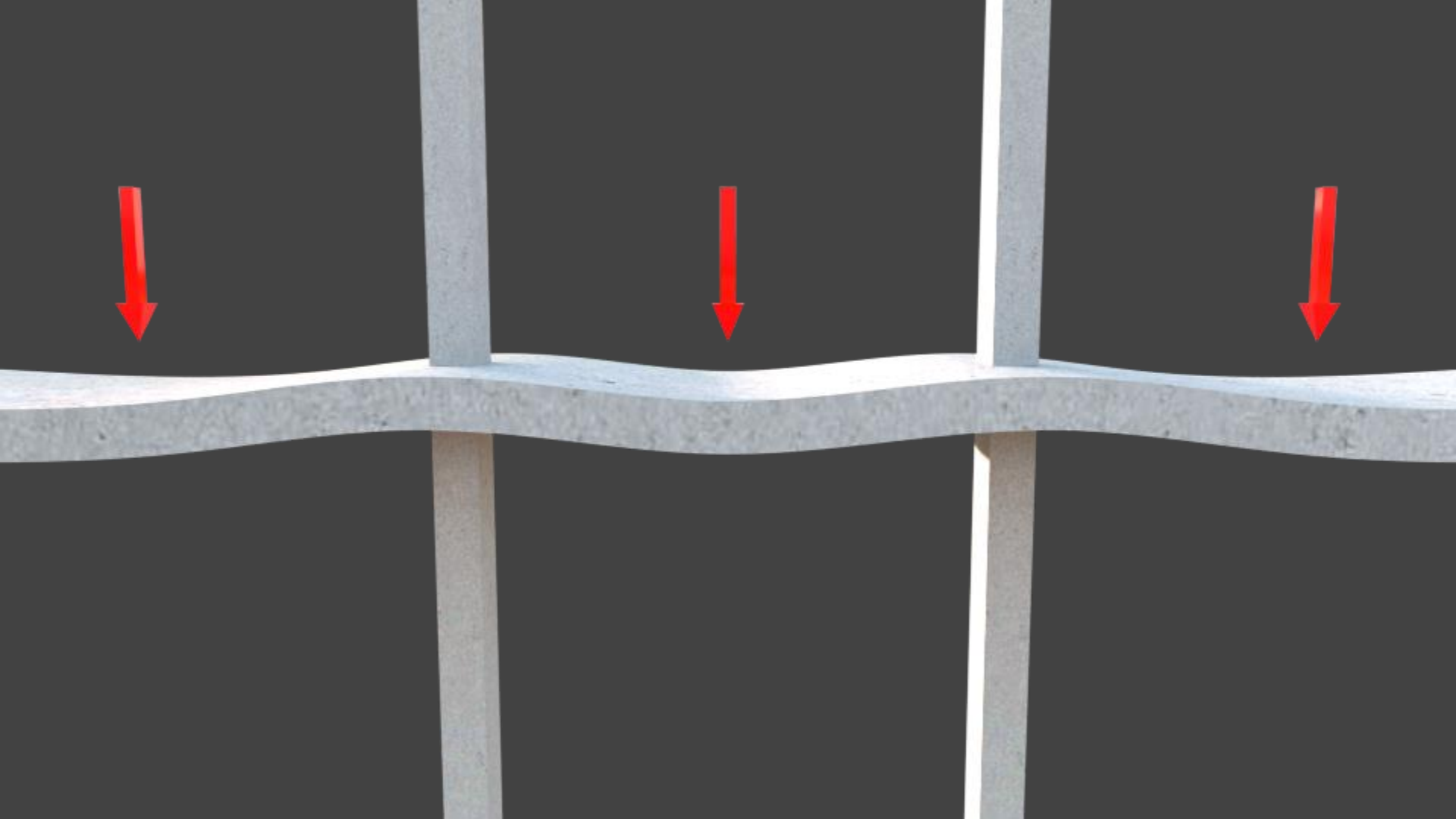


Cidoncha, S. (2014, January 31). [Envelope curvature. "La Vela" phase 2.]. Metalocus.

CONSTRUCTION OF LA VELA CONCRETE POST TENSIONING

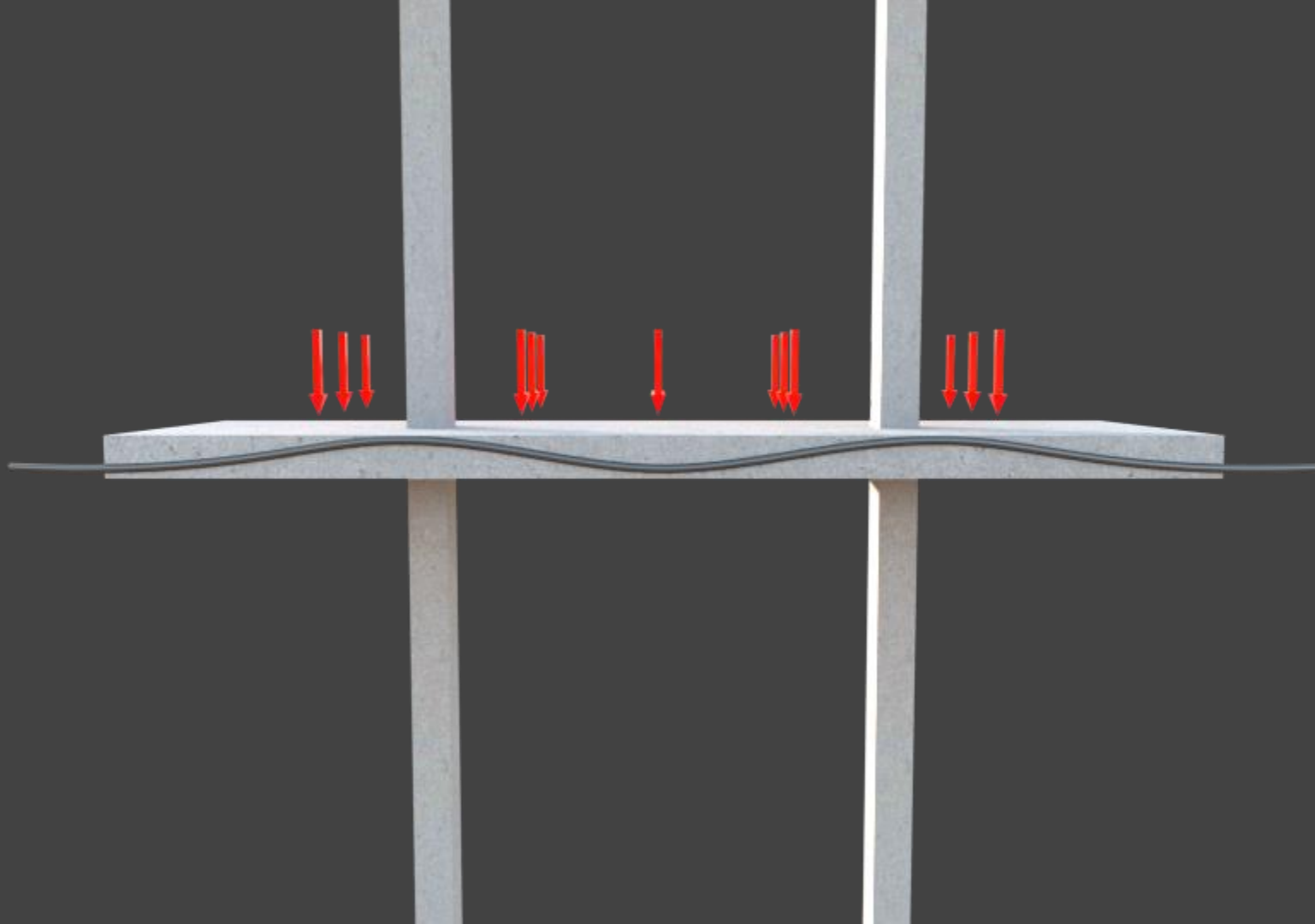


Longitudinal section showing placement of rebar, hollow cores, and post-tensioning cable.

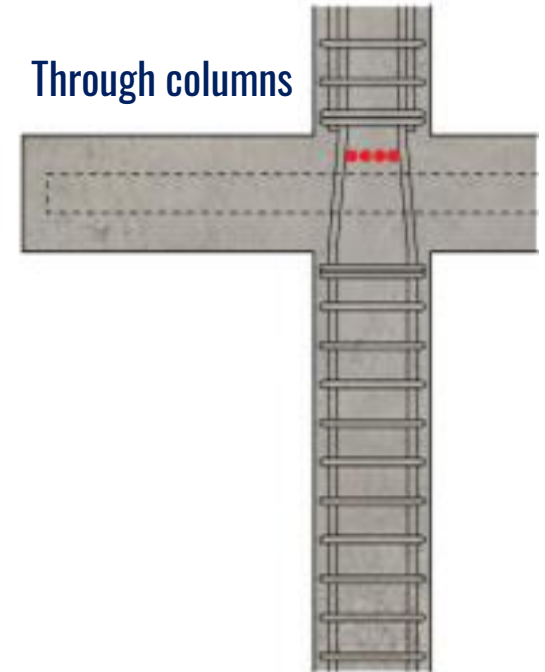
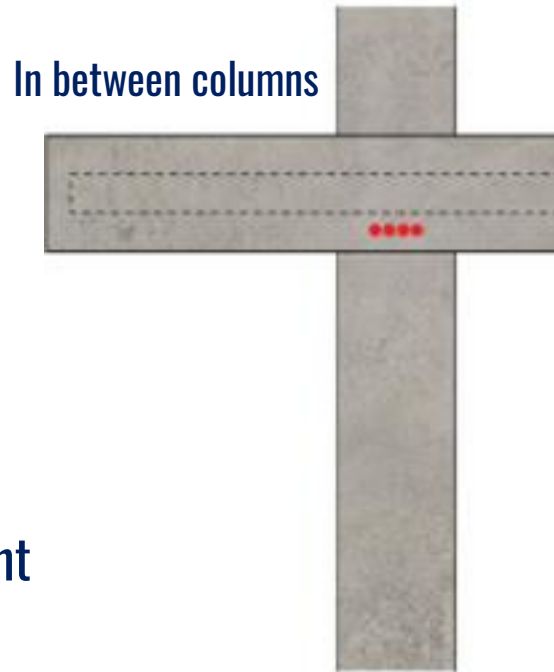






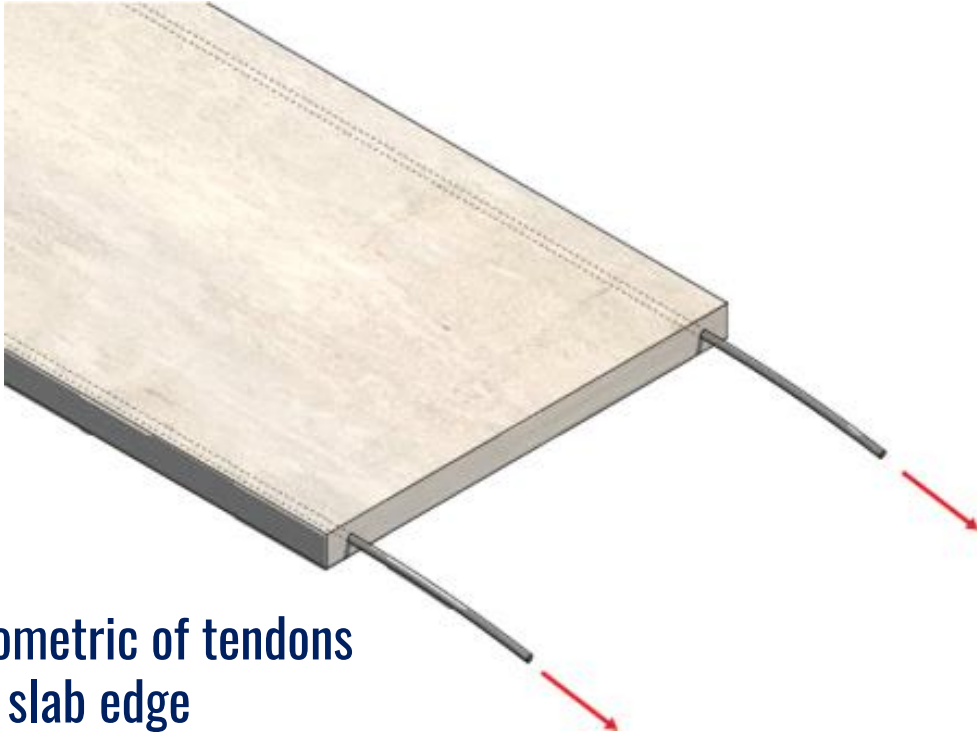


CONSTRUCTION OF LA VELA CONCRETE POST TENSIONING

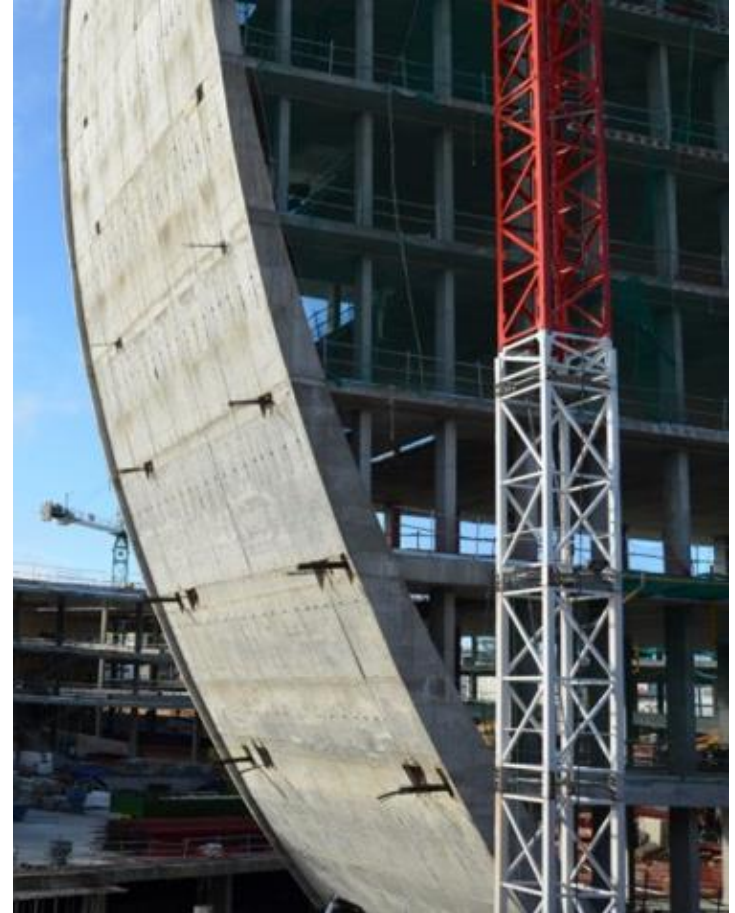


Cross sections at different
lengths of the slab.

CONSTRUCTION OF LA VELA CONCRETE POST TENSIONING



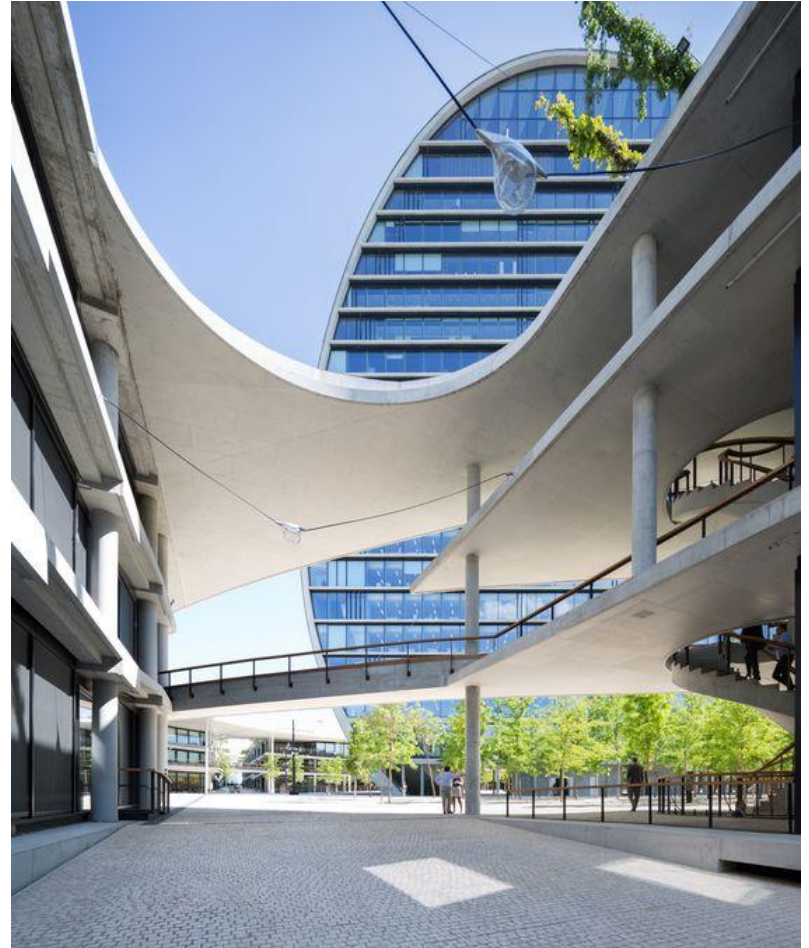
Isometric of tendons
at slab edge



Cidoncha, S. (2014, January 31). [Envelope curvature. "La Vela" phase 2]. Metalocus.

APPLICATIONS OF PASSIVE COOLING STRATEGIES IN SOUTH FLORIDA

- Louvers and argon insulation for direct sun.
- Concrete's insulating properties reduce heat intake.
- Greenery cools and filters the air, and fights noise pollution. Beneficial for areas near heavy traffic.
- Recycling/reusing buildings.



Bescós, R. P. (2017, May 27). *Gallery of Herzog & de Meuron's BBVA Headquarters in Madrid Through Rubén P. Bescós' Lens* - 136 [Photograph].

THANK YOU