

Louvre Abu Dhabi Noel Yi

In 2007, the UAE agreed to pay 1 billion euros to the French for using the Louvre name, art loans, special exhibits, and management advice and support. Immediately in 2007, Jean Nouvel and Buro Happold teamed up for the project.

The Louvre Abu Dhabi is an art museum, There are a total of 55 buildings and the facades of the buildings are made up of a total of 3900 panels of ultra-high performance fiber concrete. Nouvel envisioned a museum in the sea. Since the museum is connected to the sea it needs to be careful of flooding and storms. Thus the basement is waterproofed and the main area is protected by marine piles, concrete breakwaters, tidal pools, and wearing walls.

The large dome is meant to resemble light shining through palm trees and Nouvel had a vision of a rain of light under the dome. The dome itself creates a complex filter of the desert sun. Buro Happold tracked the sun's path over the site for a year to understand the characteristics and exact angles of light. The dome is designed to where the natural light is directed over the galleries with more shadows in the public walkways. The special glass was installed in the windows and ceilings to protect the artwork from damaging sun. There are three layers of blinds built into the glass with two diffusers and one black-out blind. There were about 8000 stars at the top composed of aluminum and steel and created in all shapes and sizes to guide the streams of light. The sun's rays pass through two openings in the dome, before being blocked by a third layer. This is how as the position of the sun changes, the reflective elements of the cladding redirect the light within the museum complex.

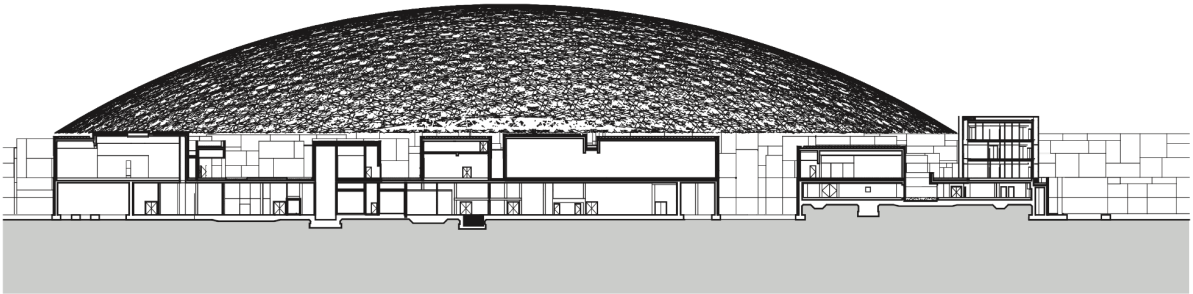
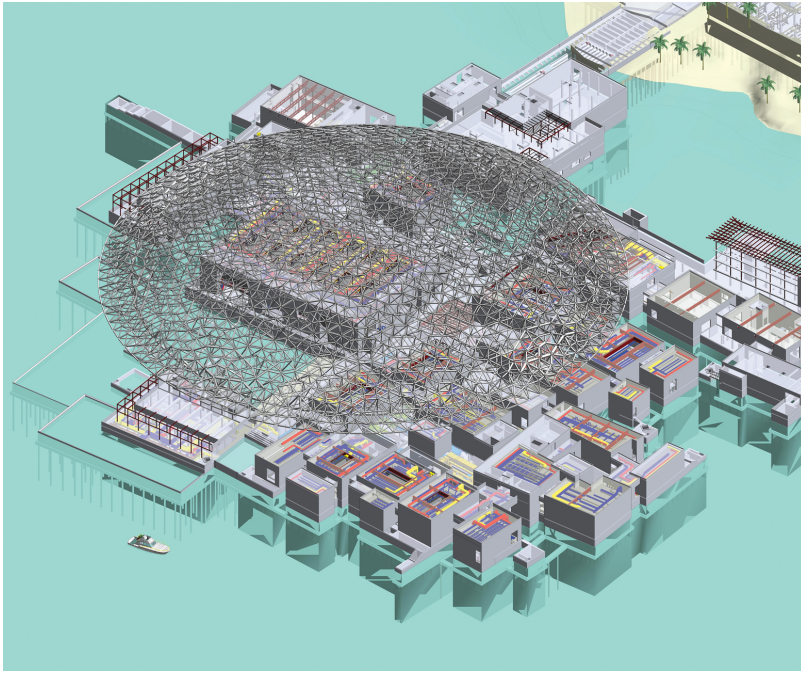
The dome weighs 7500 tons(15,000,000 lbs) and is 180 meters in diameter. The dome consists of eight different layers with the four outer layers clad in stainless steel and the four inner layers clad in aluminum and separated by a steel frame five meters high. The frame itself is made of 10,000 structural components pre-assembled into 85 elements and each element weighs about 50 tons. They were initially rested on 120 temporary support towers and were later braced together using steel joints. When construction work was complete it was lowered onto four permanent piers configured as a square each being 110 meters apart. The piers are hidden within the museum buildings to give the impression that the dome is floating and the distance from the ground floor to the underside of the cladding is 29 meters.

Additionally, to earthquake-proof the dome, each of the four supports has curved surface spherical bearings that allow the structure to shift beneath the dome as the earth shakes and the isolated structure remains still. The sliding bearings also allow the dome's steelwork to tolerate the shift in temperature from hot days under the desert sun to cooler nights. The perimeter of the structure is strengthened by a ring-shaped truss which prevents the dome from spreading and eliminates the need for external lateral braces.

Without clear walls between the inside and outside area, it has still been able to create a microclimate in such a hot climate. It combines the solar shading effect of the dome roof, optimized roof perforations to allow daylight without excess solar gain, exposed thermal mass

such as stone floor and cladding that benefit from nighttime cooling, and light-colored and reflective materials. Additionally, a highly insulated and air-tight building envelope with efficient HVAC systems helps as well. All of these help in creating a comfortable temperature within the art gallery that helps both people and the art.

Section Views



section AA

References

Block, India. "New Photographs Reveal Engineering behind the Louvre Abu Dhabi's Dome."

Dezeen, 9 Feb. 2022,

<https://www.dezeen.com/2017/12/11/new-photographs-reveal-engineering-behind-louvre-abu-dhabi-dome-architecture/>.

Es, Karl van. "Louvre Abu Dhabi Is a Magical Museum on the Sea." *Avontuura*, 11 Feb. 2020,

<https://www.avontuura.com/louvre-abu-dhabi-by-ateliers-jean-nouvel/>.

"Louvre Abu Dhabi." *Buro Happold*, 13 Jan. 2022,

<https://www.burohappold.com/projects/louvre-abu-dhabi-2/>.

Writer, Staff. "Louvre Abu Dhabi." *Ateliers Jean Nouvel*,

<http://www.jeannouvel.com/en/projects/louvre-abou-dhabi-3/>.