بسم الله الرحمن الرحيم

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BURJ AL ARAB CONSTRUCTION

Group members

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OVERVIEW

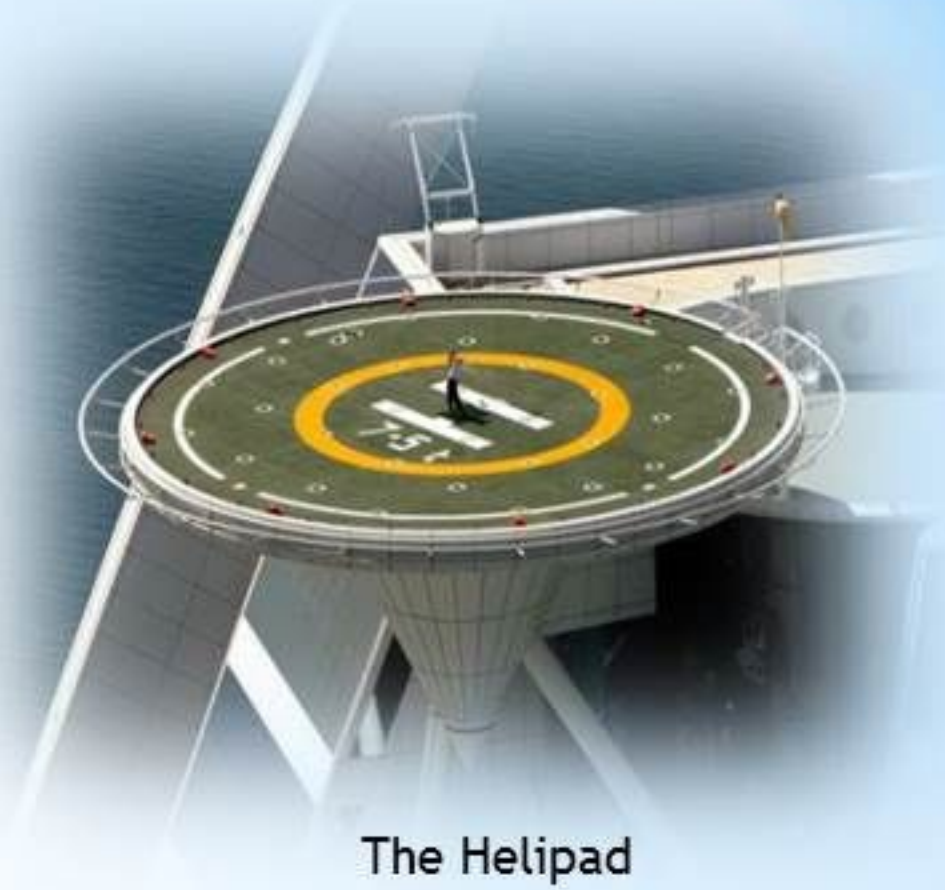
- Location of burj al arab
- Experience
- Description and its dimensions
- The burj al arab island
- Steel Works
- Concept architect
- Amazing facts about burj al arab
- Materials used in construction
- Island construction process
- Exterior

LOCATION

- United Arab Emirates – Dubai
- Private Island (280 m Offshore)

EXPERIENCE

- World's Tallest Hotel (321 m)
- World Class Accommodations



The Helipad

- The most technologically advanced meeting and conference facilities available

A Conference Room

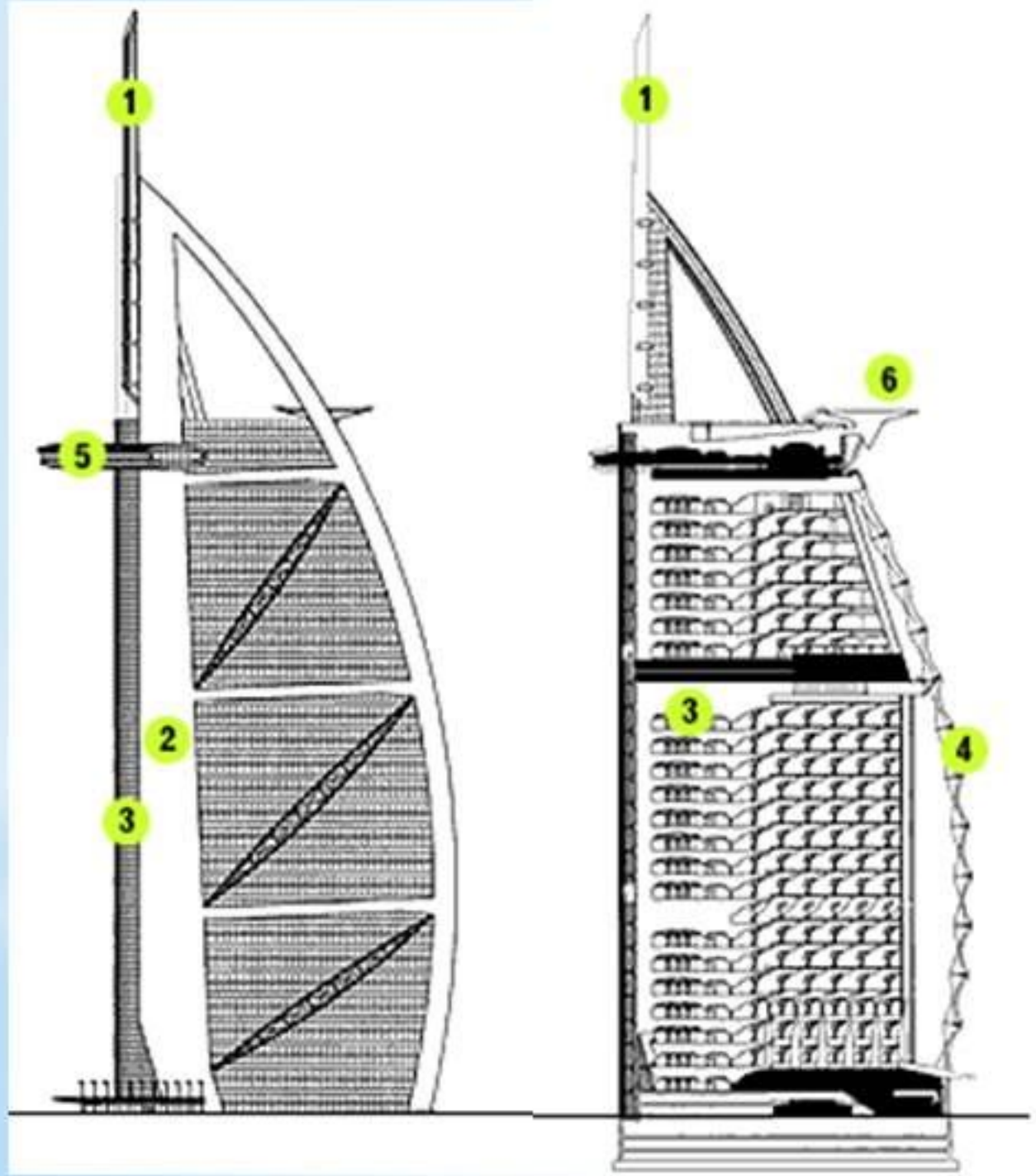
DESCRIPTION

- In English "Burj Al Arab" Means the Arabian Tower.
- Burj Al Arab Was One Of The most Expensive Buildings Ever Built. It Is One Of The World's Only Two "7 Star" Hotels.
- Burj Al Arab is shaped like a Sail.

THE BURJ AL ARAB CONSTRUCTION DETAILS

- Status: built
- Construction Dates:
  - Began: 1994
  - Finished: 1999
- Floor Count: 60
- Elevator Count: 18
- Units / Rooms: 202

THE BURJ AL ARAB CONSTRUCTION



1. mast
2. steel exoskeleton
3. reinforced concrete spine
4. fiberglass fabric wall
5. restaurant
6. helicopter landing pad

The Burj al Arab Island Dimensions

Heights

Height of atrium: 182m

- Height of helipad from sea: 212M
- Height of top of accommodation from island: 190m
- Height of top of mast from island :321m

CONCEPT ARCHITECT

- Tom Wills-Wright

Tom Wright is the architect and designer of the Burj al Arab in Dubai, UAE

STEEL WORKS IN BURJ AL ARAB

- 90% of the steel structures constructed were outside the building.
- Burj al Arab building is made of 12,000ton of structural steelworks.
- Total steel works are phased into Exoskeleton rear leg, Horizontals, Diagonals, Rear brace frame, Helipad, Sky restaurant, Atrium and Mast.

DOES THE HOTEL STAND ON ROCK?

- The building is built on sand, which is unusual as most tall building are founded on rock. The building is supported on 250M longed , 1.5M diameter columns that go 45 meters under the sea. As there is only sand to hold the building up the columns rely on friction.

OTHER AMAZING FACTS...

- The diagonal trusses on the side of the building are as long as a football pitch and weigh as much as 20 double-decker busses. They were built 15 KM from the site and brought by road to Dubai on huge 80 wheel lorries which had to be specially imported from South Africa. The highest truss took a day to lift into place.

If one man was to build the building himself it would take about 8,000 years to finish

OTHER AMAZING FACTS...

MATERIALS

- Carbon
- Fiber
- Concrete
- Fabric
- Glass
- Gold
- Steel

* MATERIALS

- The architectural materials of the hotel consist of only a few mediums. Outside the exterior facade consists of 50,000m2 of glazed curtain wall of 35,000m2 aluminium cladding designed by Al Abbar Group.
- Glass and steel make up the remaining portions of the exterior. Like the exterior the interior Steel structure is also cladded with 6mm composite aluminium panels.

Island Construction Process

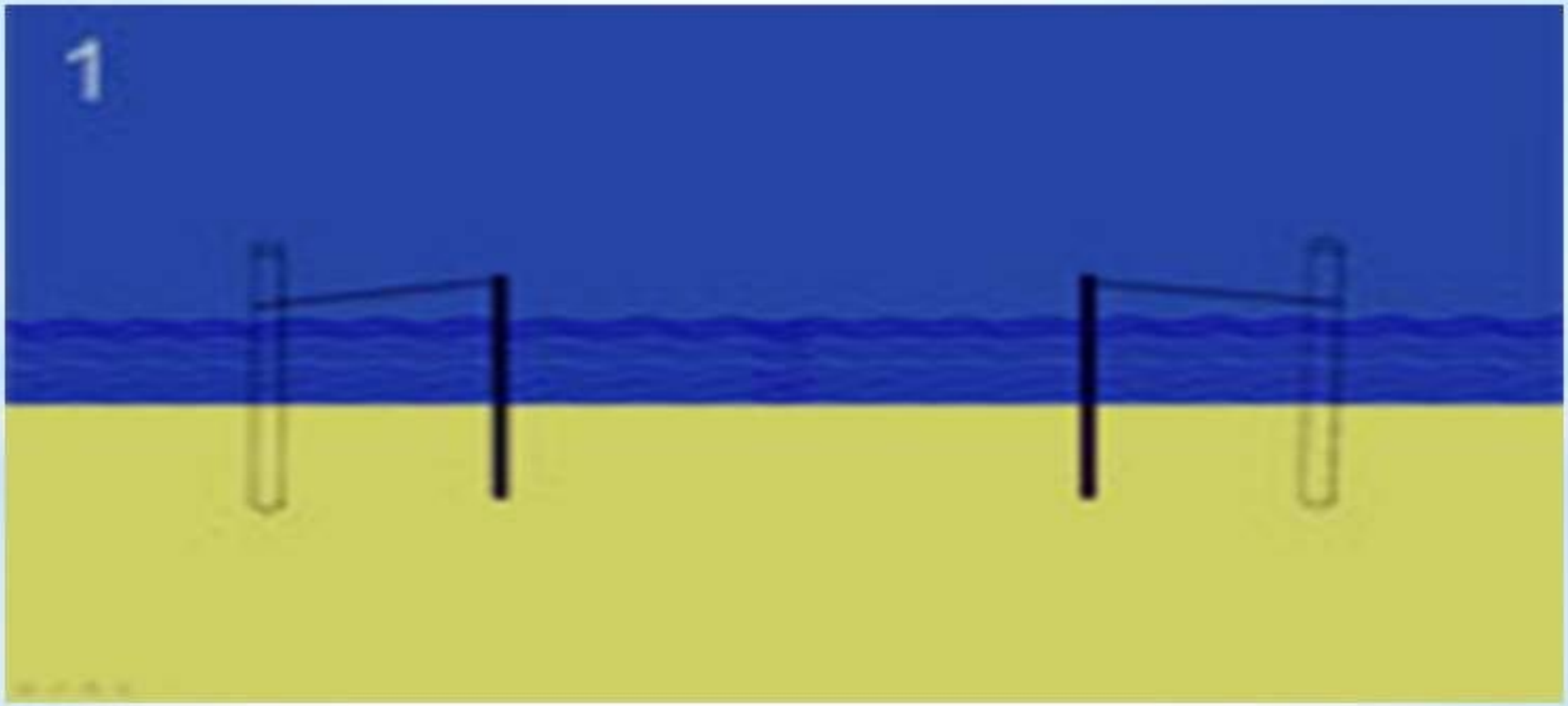
It took 3 years to complete the island from total 5 years construction period

ISLAND CONSTRUCTION PROCESS

- Number of piles: 230
- Length of piles: 45m
- Diameter of piles 1.5m
- Depth of lowest basement under sea is 7m below sea level.

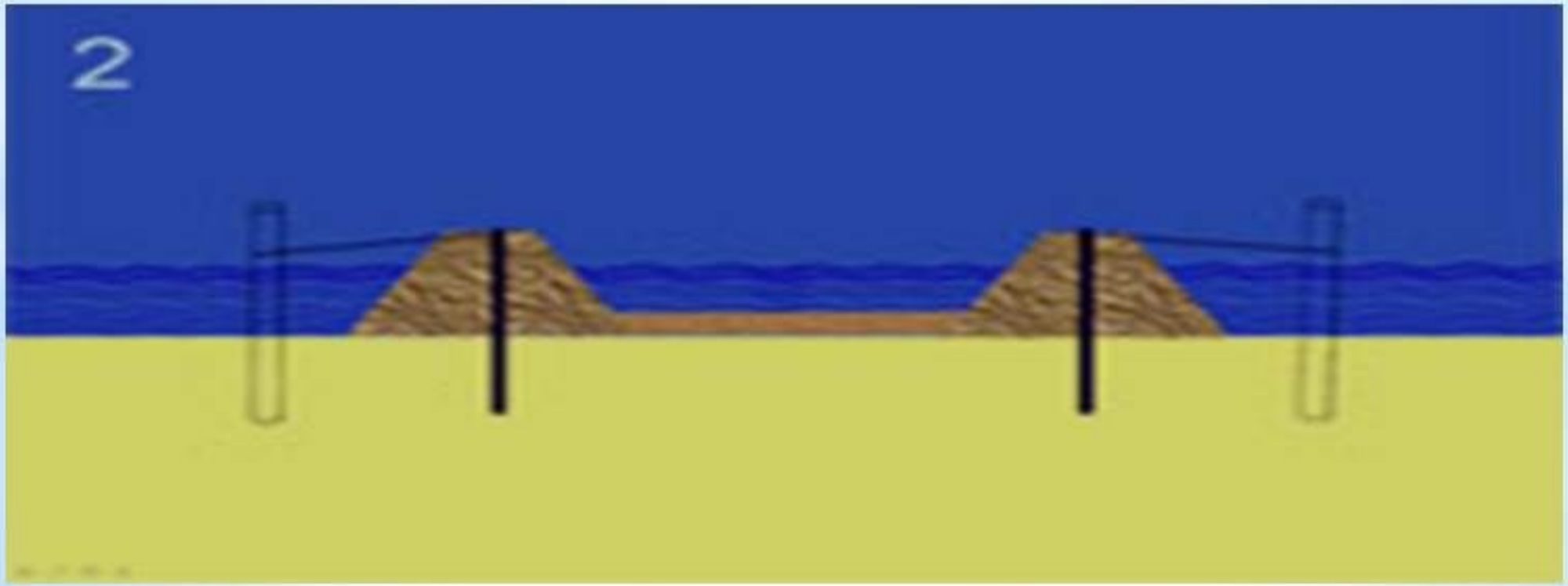
ISLAND CONSTRUCTION PROCESS

- Temporary tube piles driven into sea bed
- Temporary sheet piles and tie rods driven into sea bed to support boundary rocks (see figure 1)



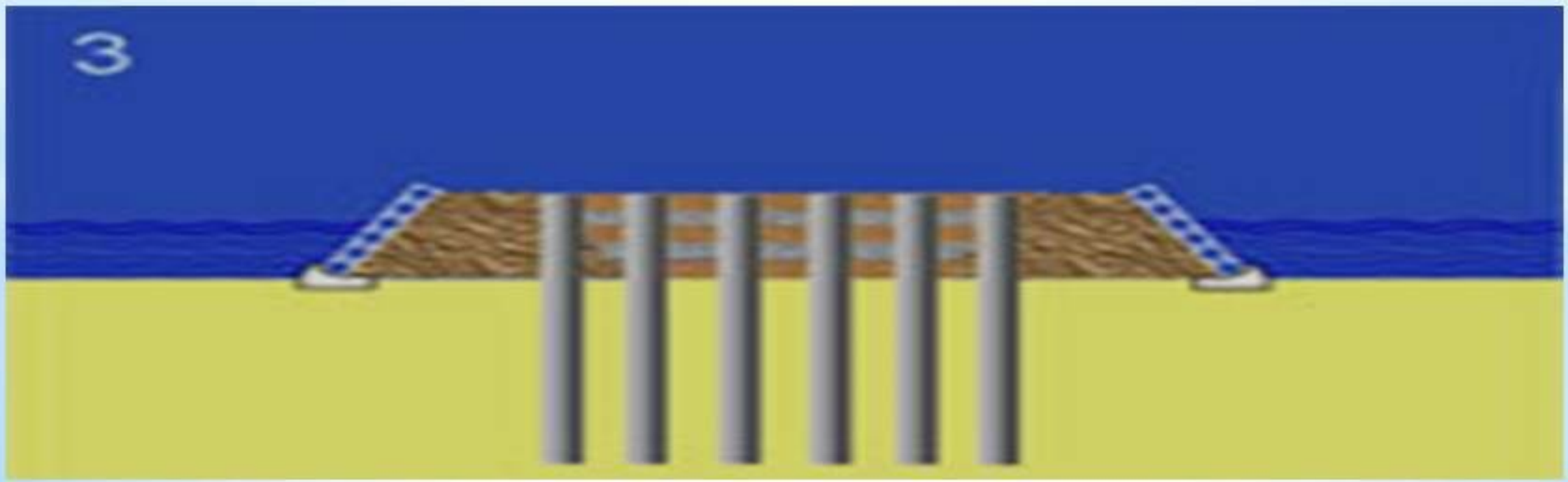
ISLAND CONSTRUCTION PROCESS

- Permanent boundary rock bunds deposited either side of sheet piles
- Hydraulic fill layers deposited between bunds to displace sea water and form island (see figure 2 with fill layers partially complete)



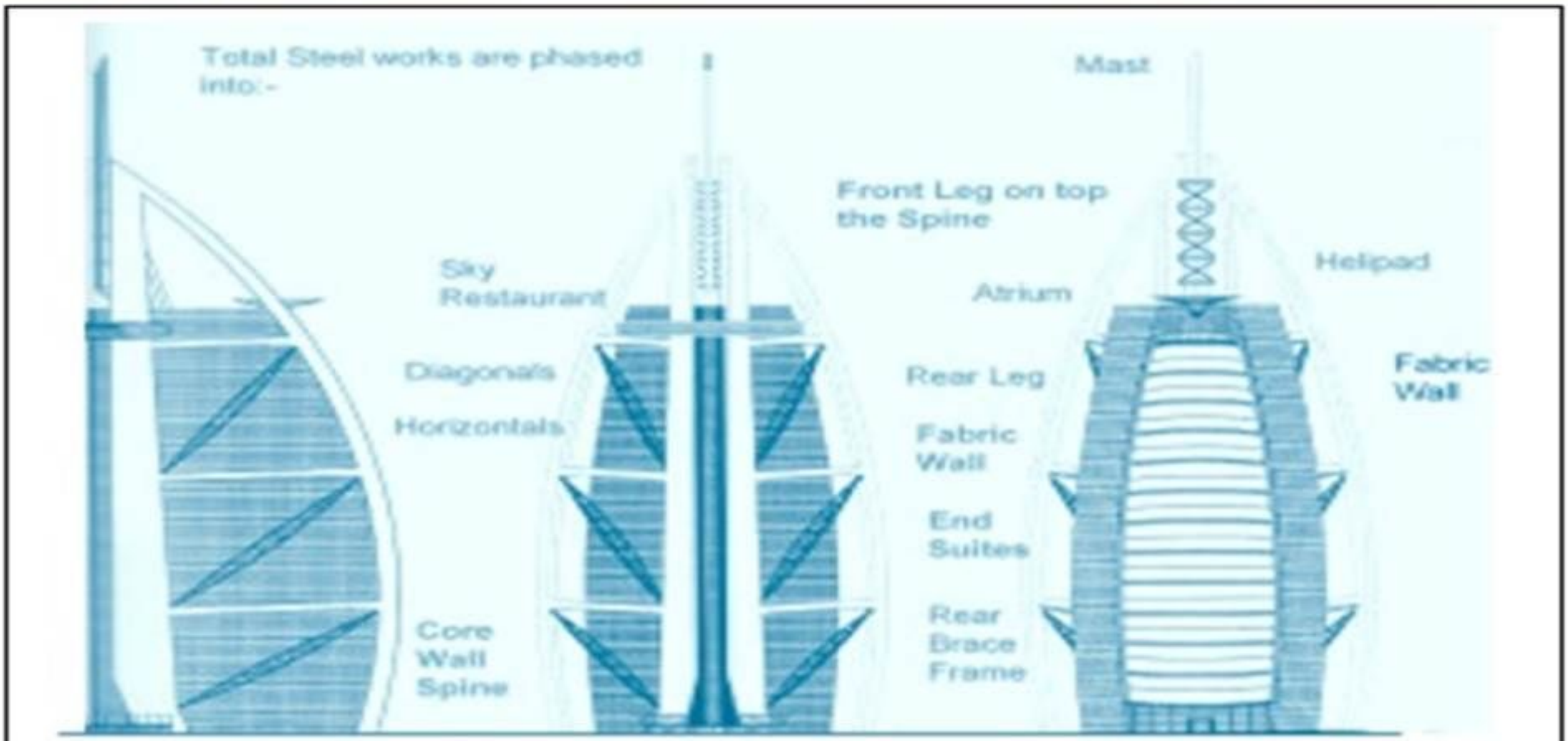
ISLAND CONSTRUCTION PROCESS

- Permanent concrete armor units placed around island to protect it from the waves
- 2m diameter 43m deep piles driven through island and sea bed below to stabilize structure (see figure 3)



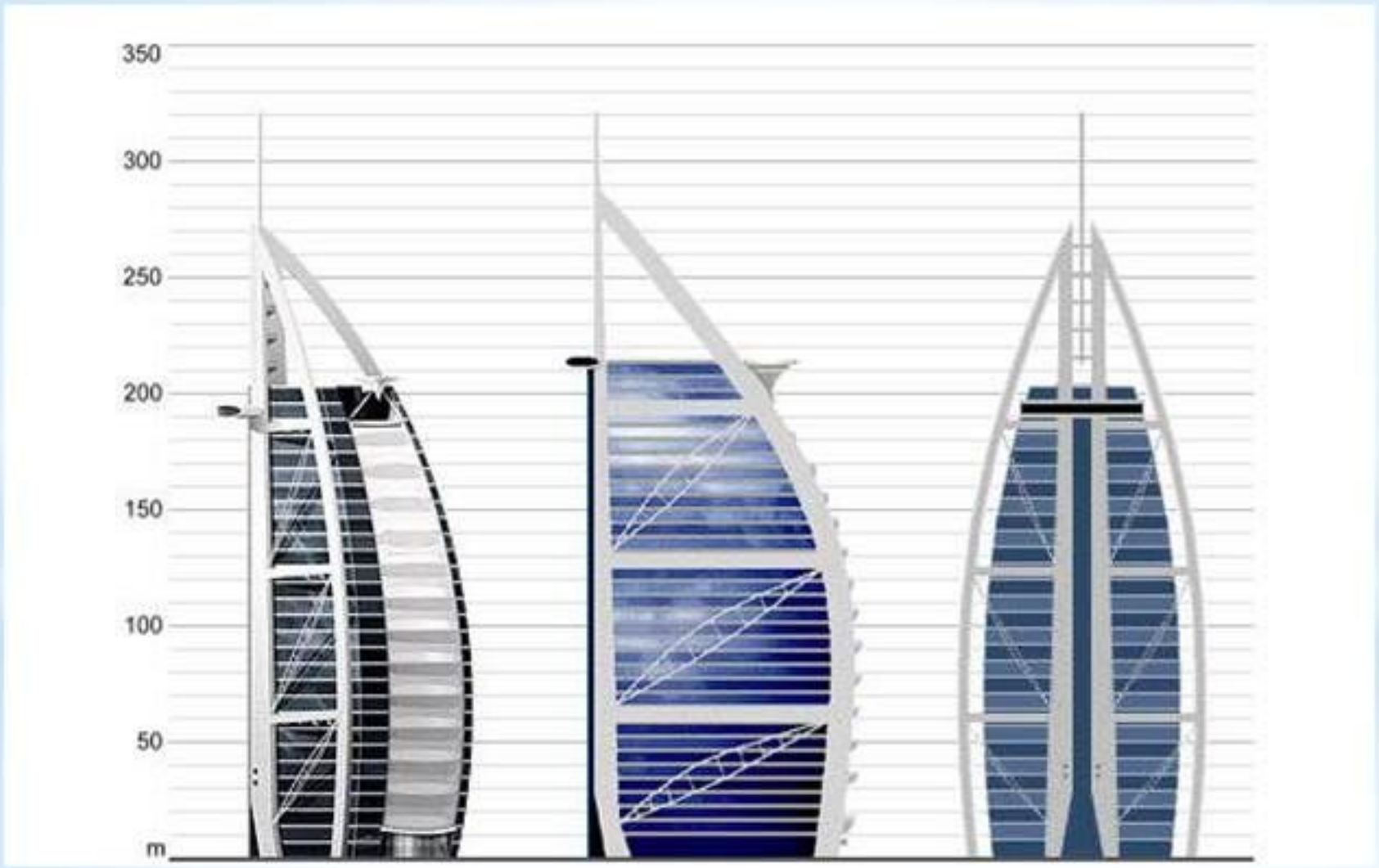
THE STRUCTURE

- The hotel structure is composed of concrete walls, a steel "exoskeleton," and a concrete core.



THE STRUCTURE

- Exoskeleton Frame



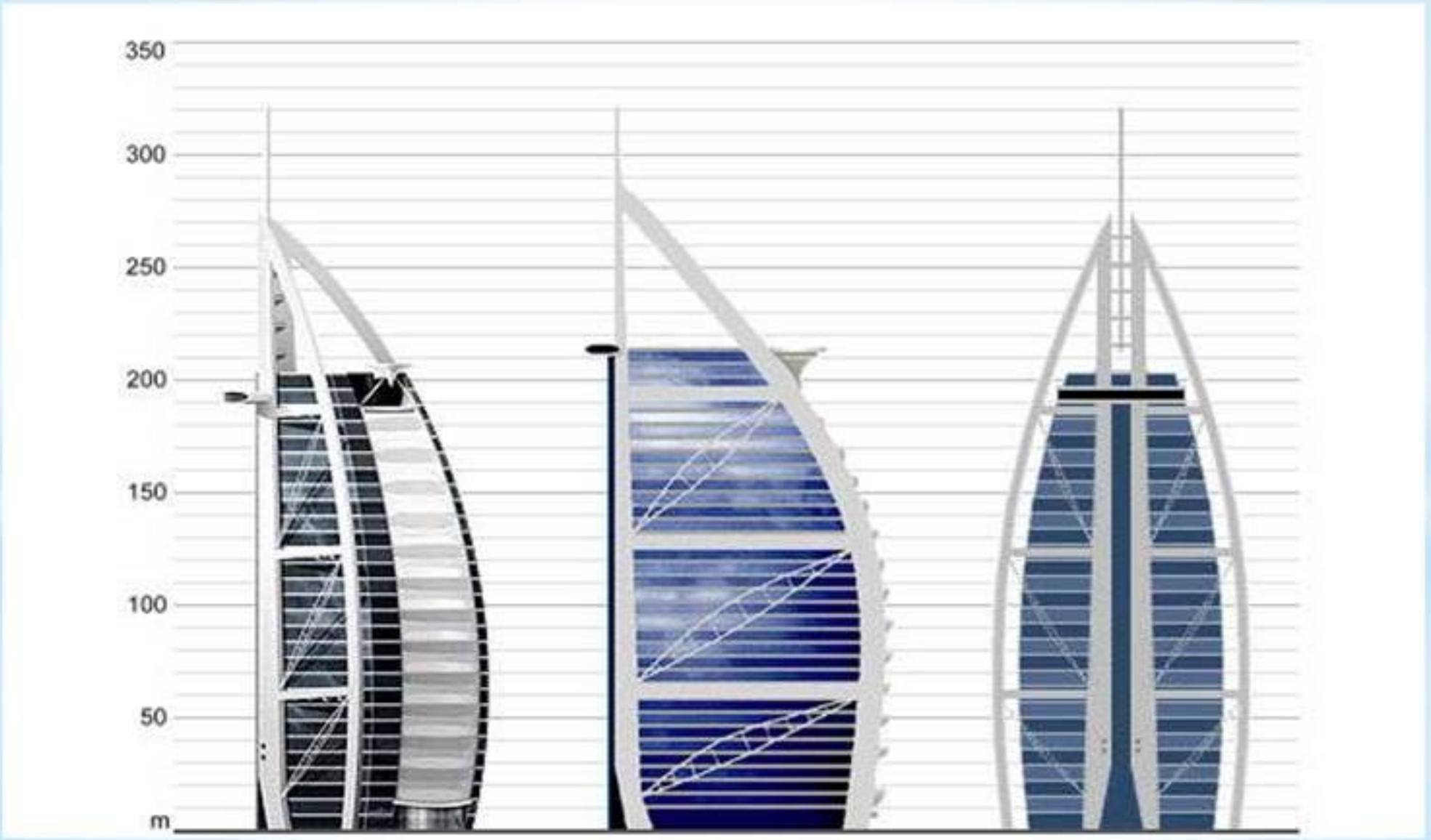
THE STRUCTURE

Exoskeleton Frame

- The exoskeleton is made up of two legs on both sides of the building.
- The structure was made of two build up H sections of 1.8 metre wide by 4.5 metre deep plate girders (inner and outer legs) connected by a lattice braced members.

THE STRUCTURE

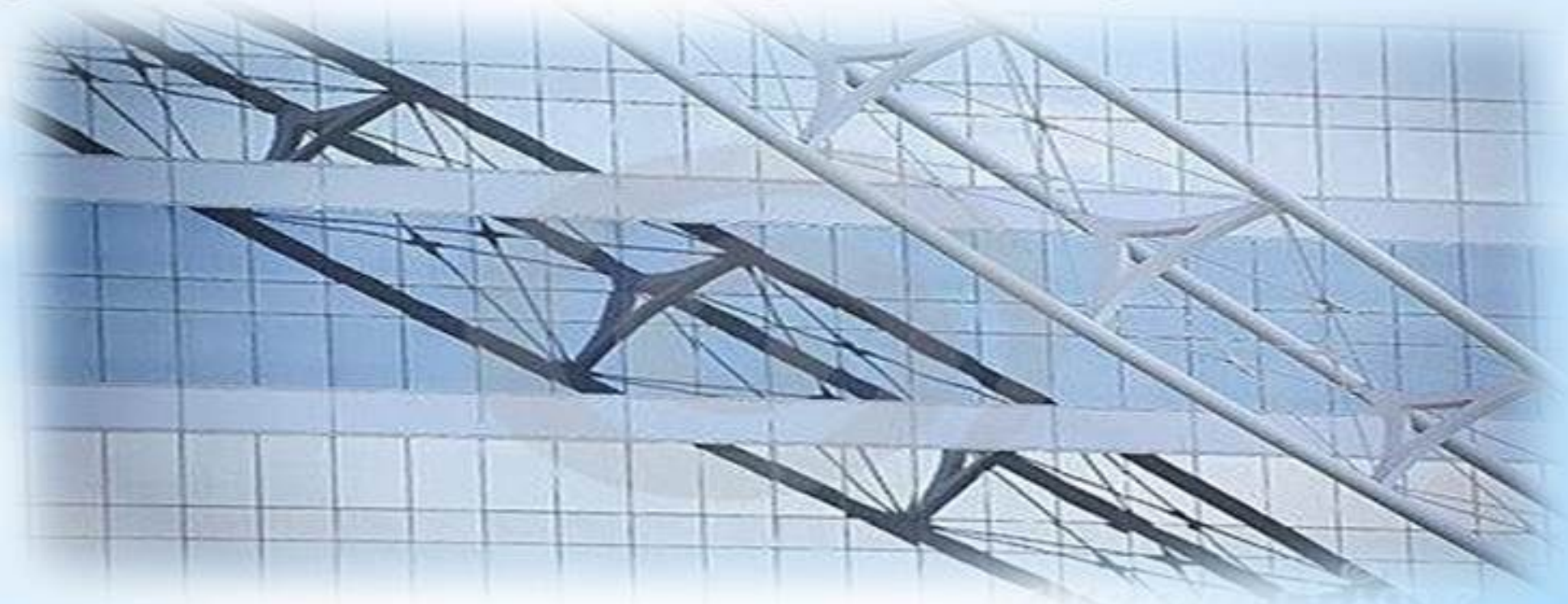
- Trusses



THE STRUCTURE

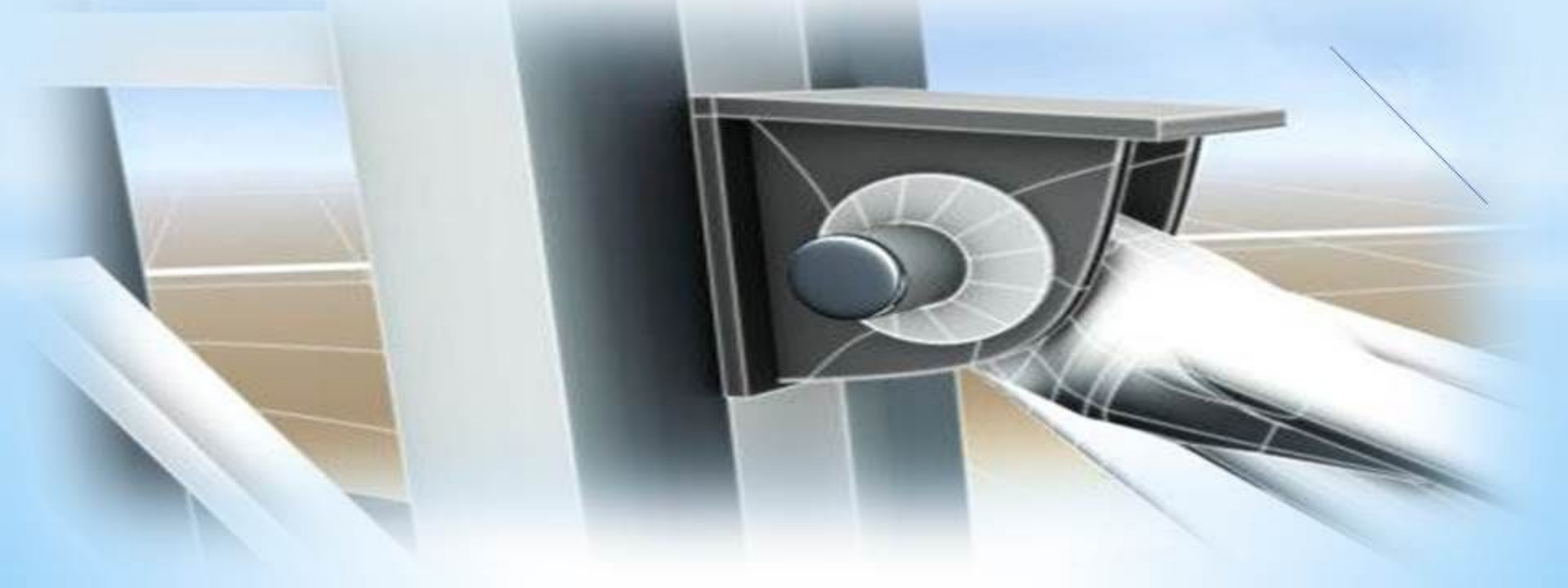
Trusses

- The diagonal trusses is made of steel with welded connection.
- The diagonal trusses down each side of the building were 85 meters long and weighed 165 tons.



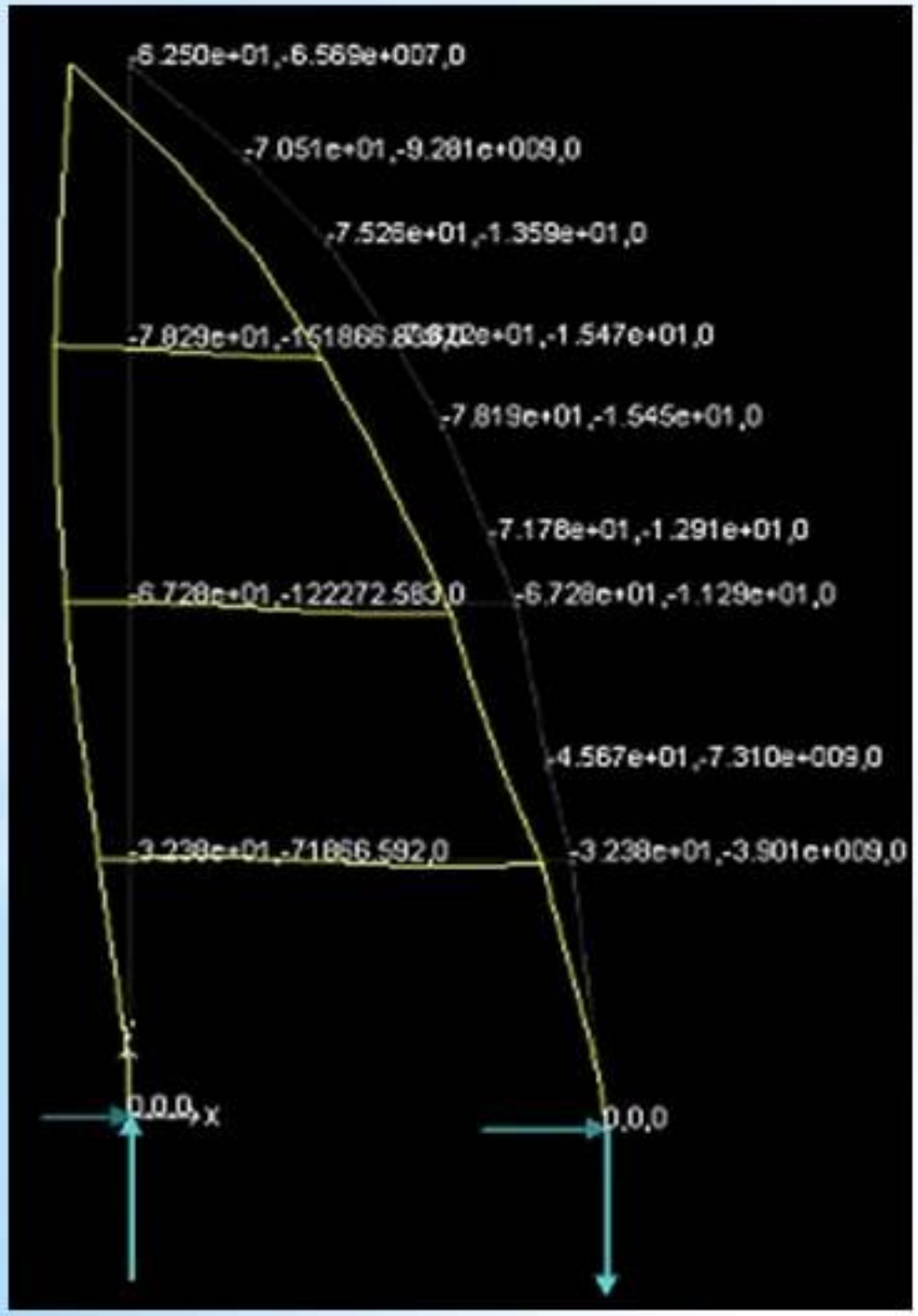
THE STRUCTURE

- The trusses were connected to the exoskeleton using giant washers with offset holes and steel pins.

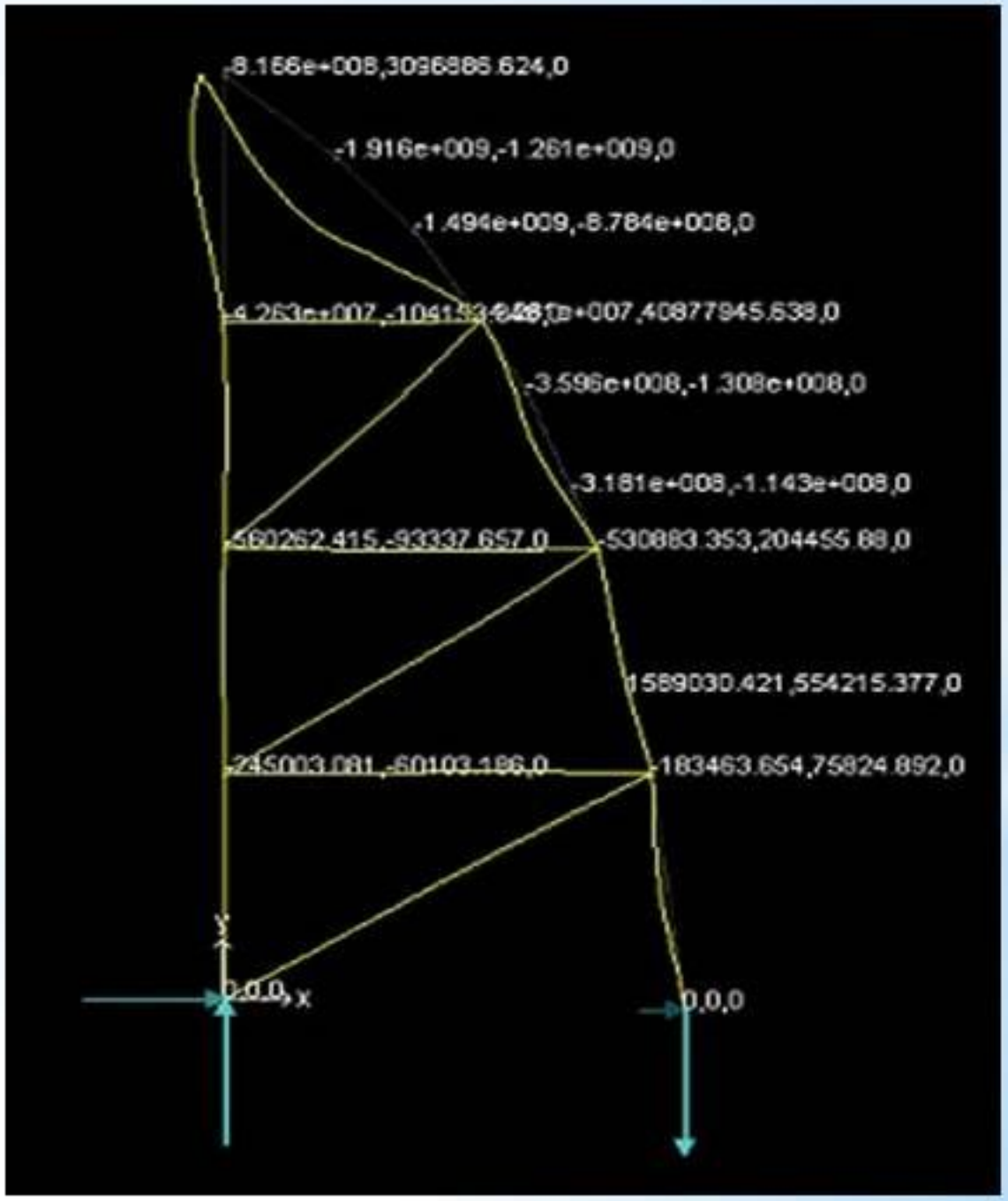


• LATERAL LOADS

Without Bracing



With Bracing

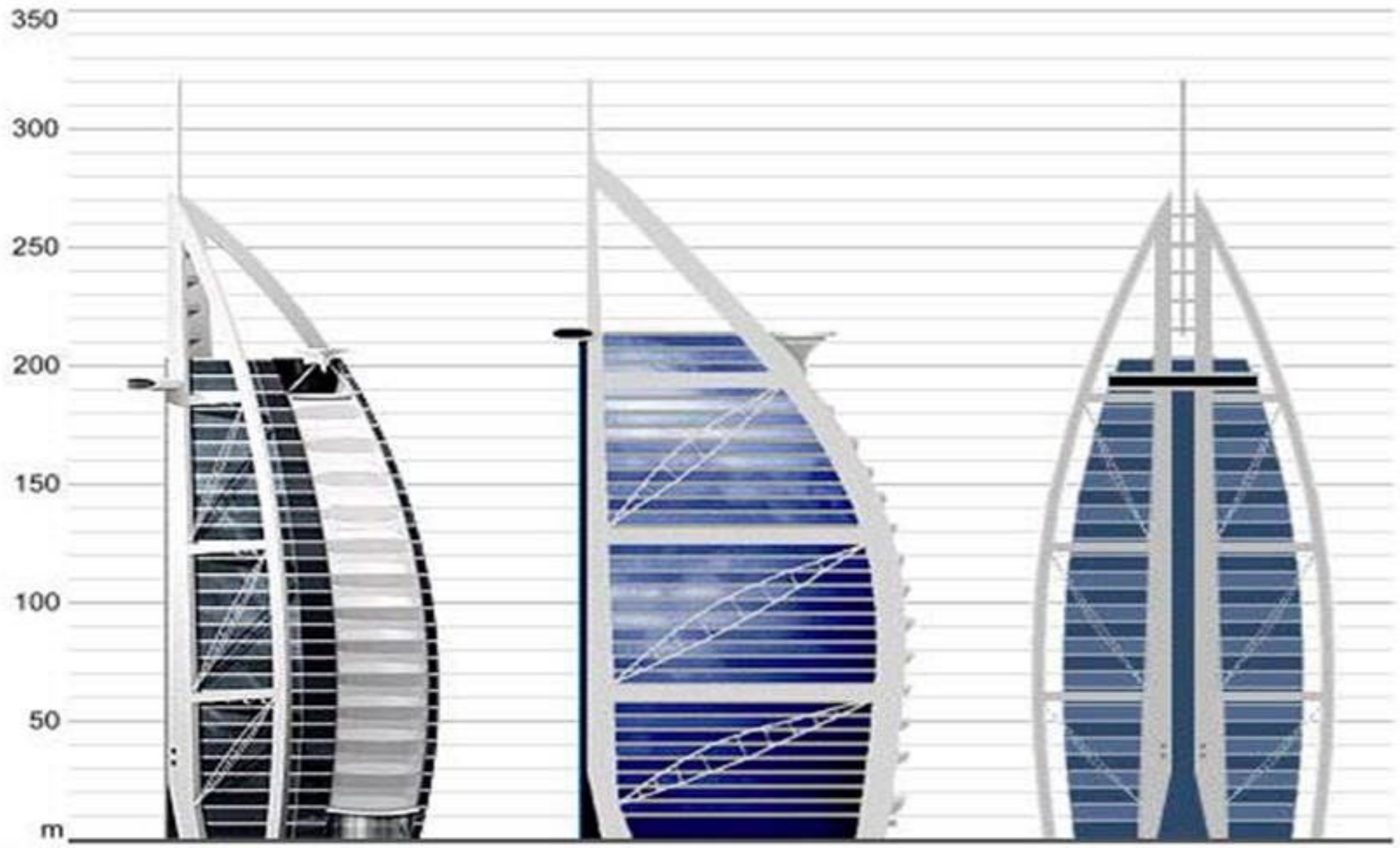


LATERAL LOADS

- Building is built to withstand a fifty year wind of 100 miles per hour and a seismic ground acceleration of 0.2 times gravity
- The shape of Burj Al Arab lowers wind forces more effectively then a square building because of the streamlined V and curved fabric atrium wall.

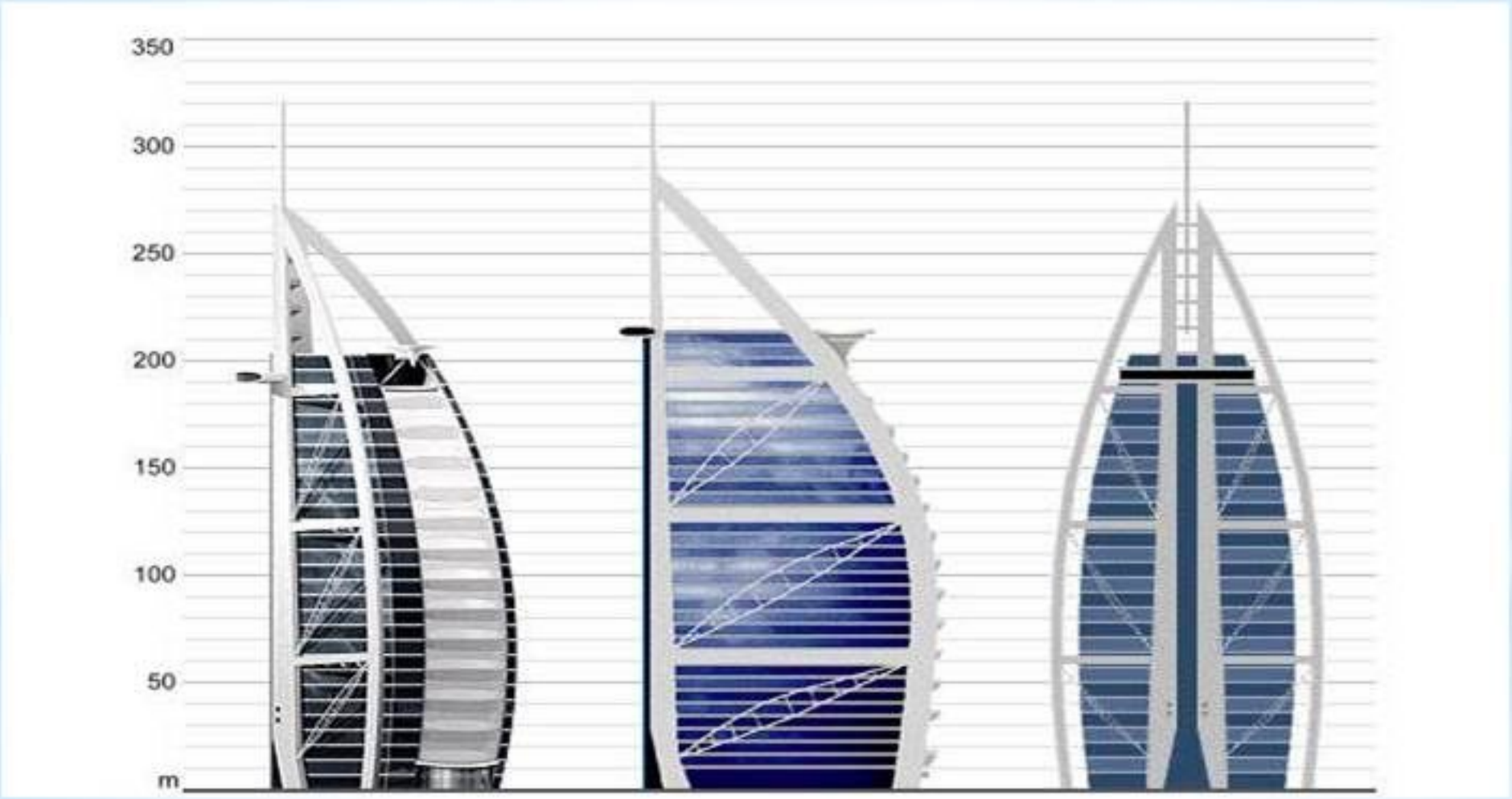
THE STRUCTURE

- Central Spine



THE STRUCTURE

- Membrane



IN CONSTRUCTION

- Concrete Superstructure

IN CONSTRUCTION

- Rear brace frame

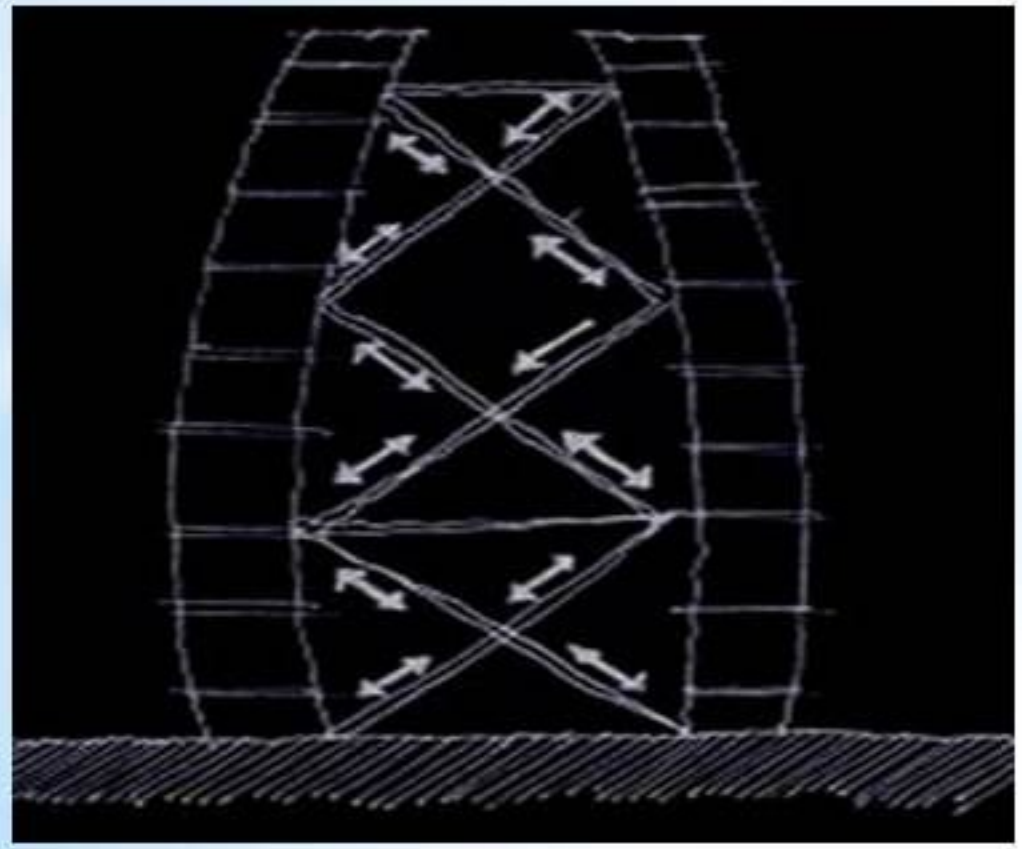
IN CONSTRUCTION

Rear brace frame

- ‘X’ Shape rear bracings are cross bracings of fabricated box sections□
- They tie two cores of the building to give stability to the structure□
- Assembled and welded at ground and then lifted to position

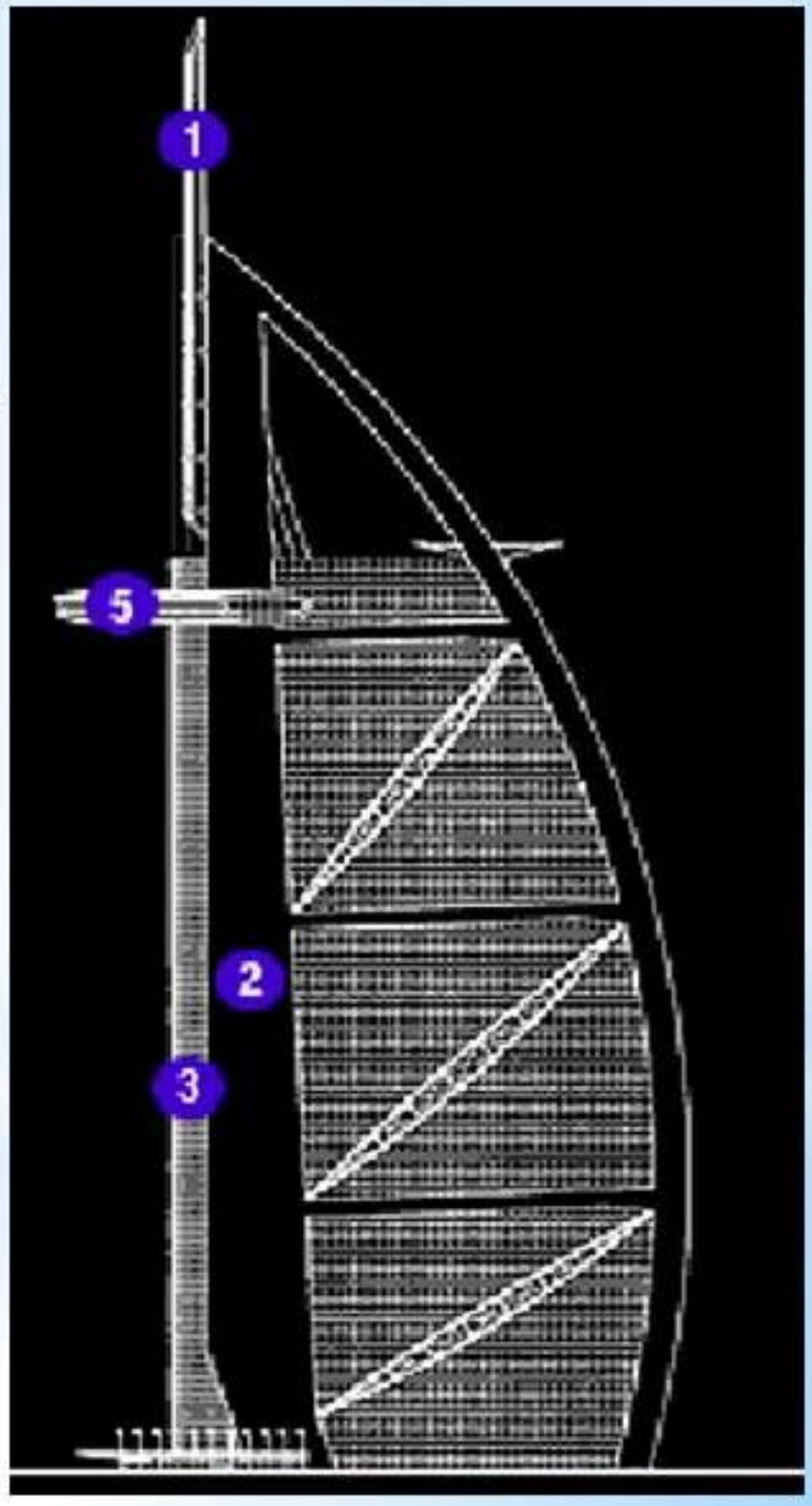
ANALYSIS-BRACING

- Braces steel frame diagonally
- Resists Lateral Loads
- Reduce Moment and Deflection



ANALYSIS-SPINE

- Lateral loads are transferred from steel frame to central spine
- Spine unifies the steel and concrete structures

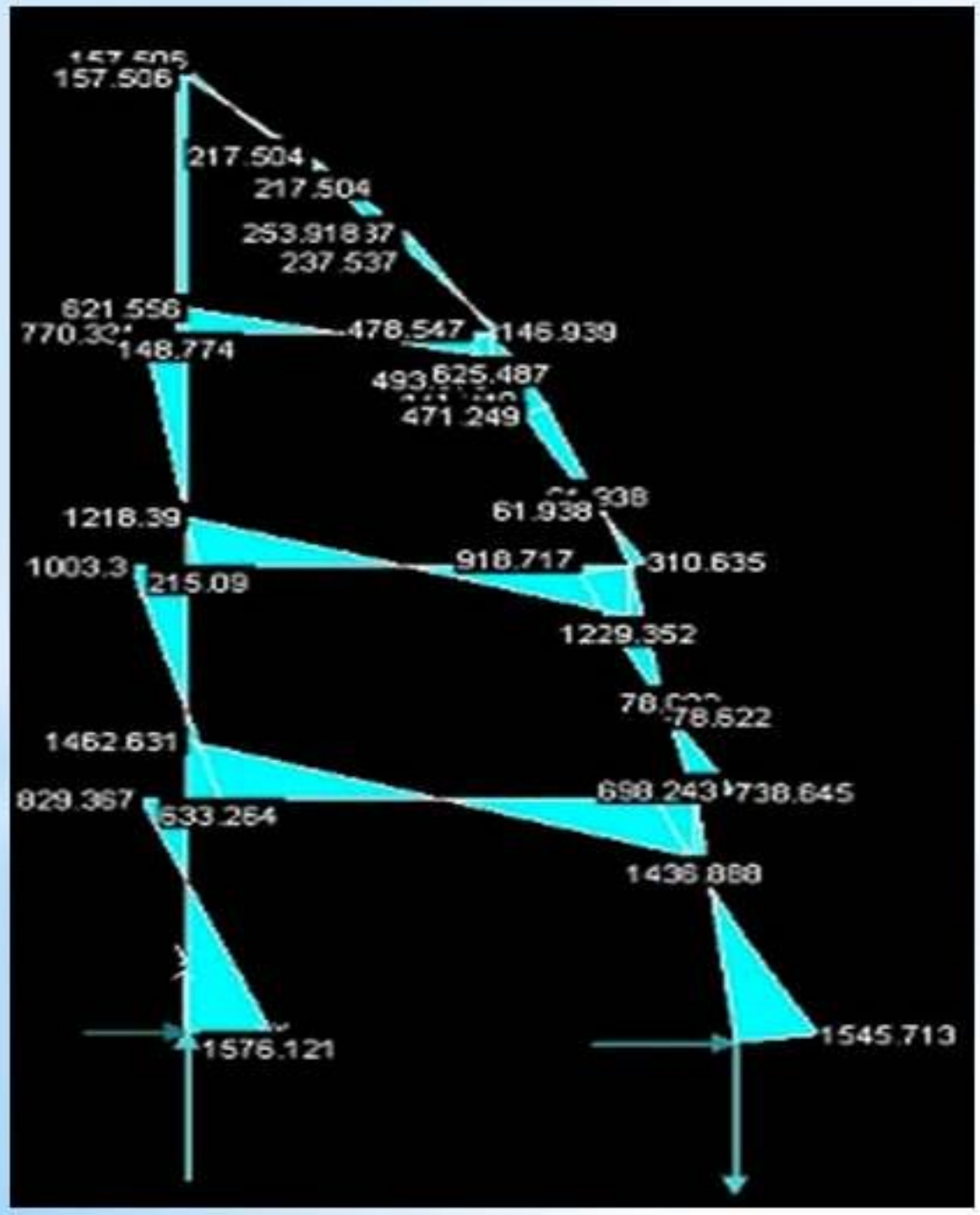


ANALYSIS-FRAME

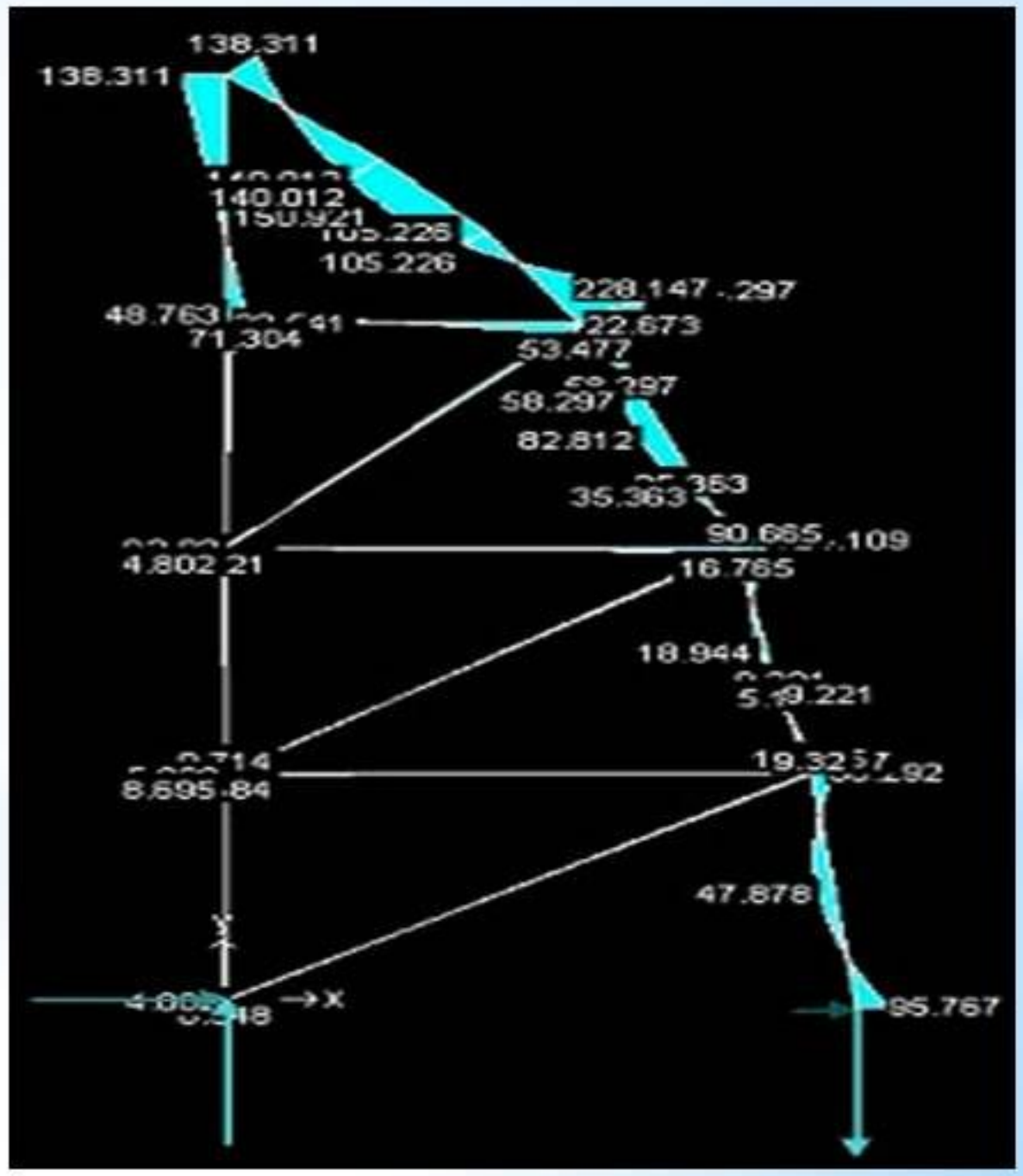
- Whole loads are first passed from reinforced concrete in multi-storey frame to main steel resistant Component and then to the foundation.

MOMENT DIAGRAM

Without Bracing



With Bracing



HELIPAD STRUCTURE

- Structure is at 212m level at the rear side of the building
- Weigh about 330 tons▫
- 2 props of 1m diameter circular steel pipes forming an inverted V shape, tapered at 30degree to the vertical and tied back to the central core by a long spine truss support.


Mike McNicholas
Island Engineer


Rob Ruse
Electrical Engineer


Khuan Chew
Interior Designer


ATKINS
Anthony McCarter
Structural Engineer


Volker Buttgereit
Aerodynamicist


Simon Crispe
Project Architect

Thank You!!!!!!!!!!!!

- ANY QUESTION....????