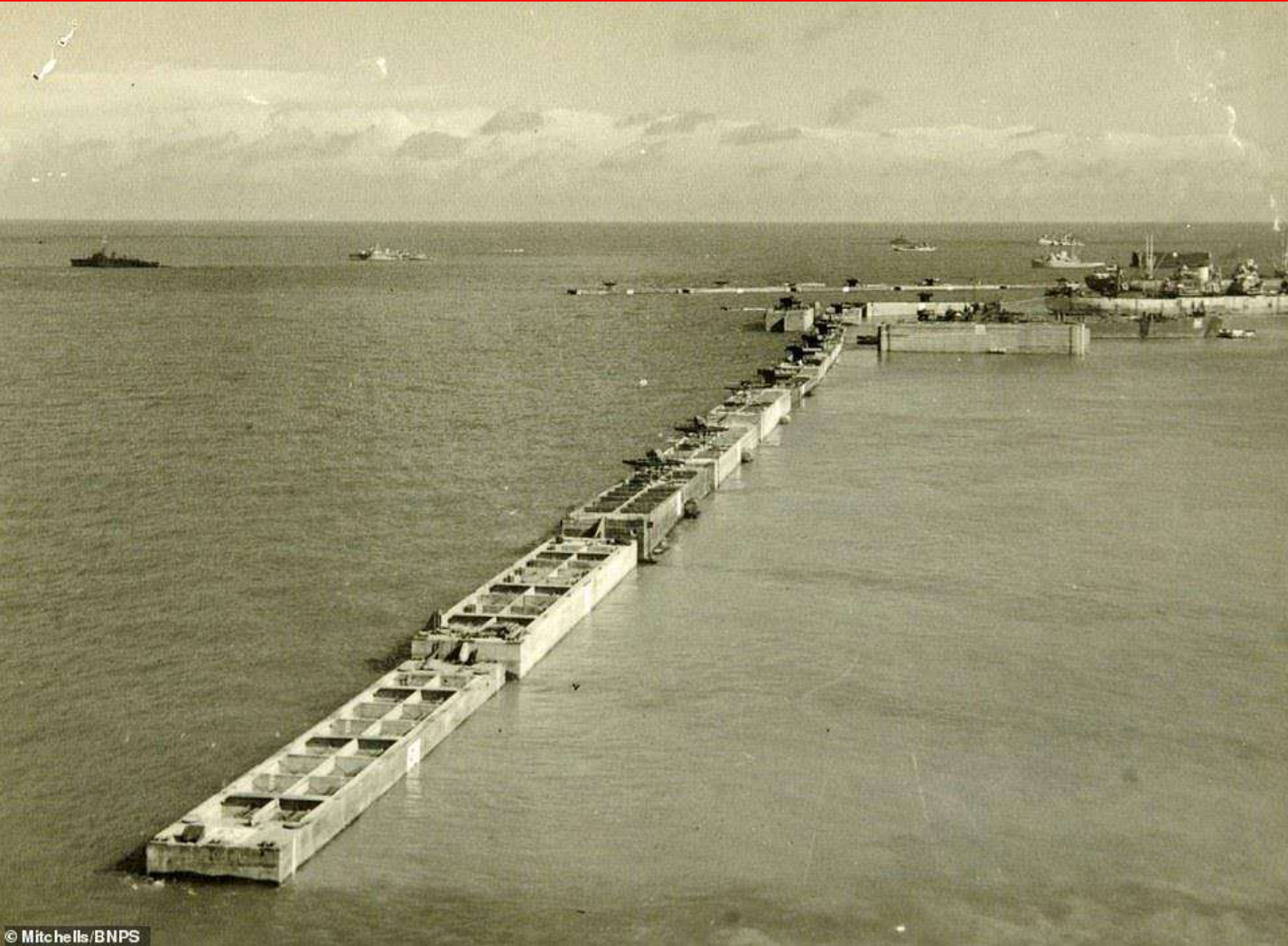


3rd PIANC-APAC CONFERENCE - SYDNEY
ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



Alfonso Capote
Anthony Michell

3rd PIANC-APAC CONFERENCE - SYDNEY
ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



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ABOUT CONCRETE CAISSONS AND FLOATING DOCKS

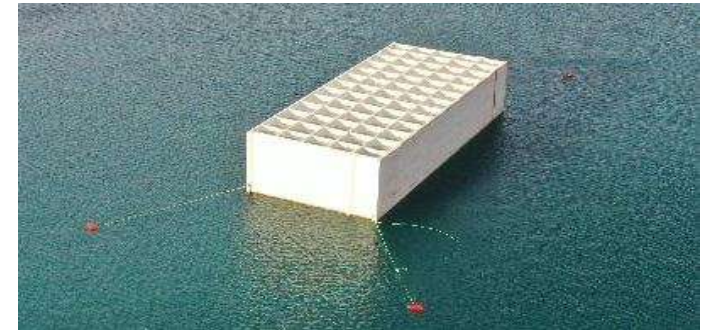
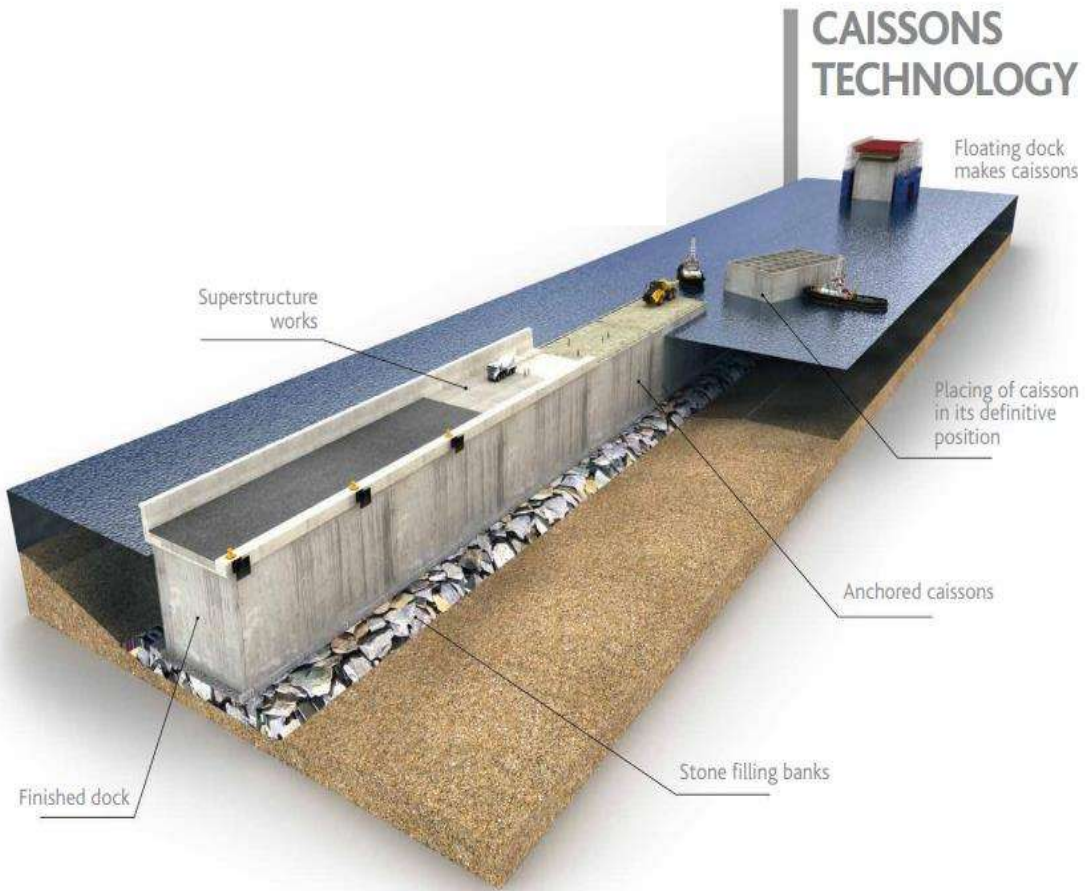


SPEED **MONOLITHIC** **ENVIRONMENTAL FRIENDLY**
SIMPLICITY **BIG LOADS** **CHALLENGING LOGISTICS**
HARD GROUND **POLYVALENCE**

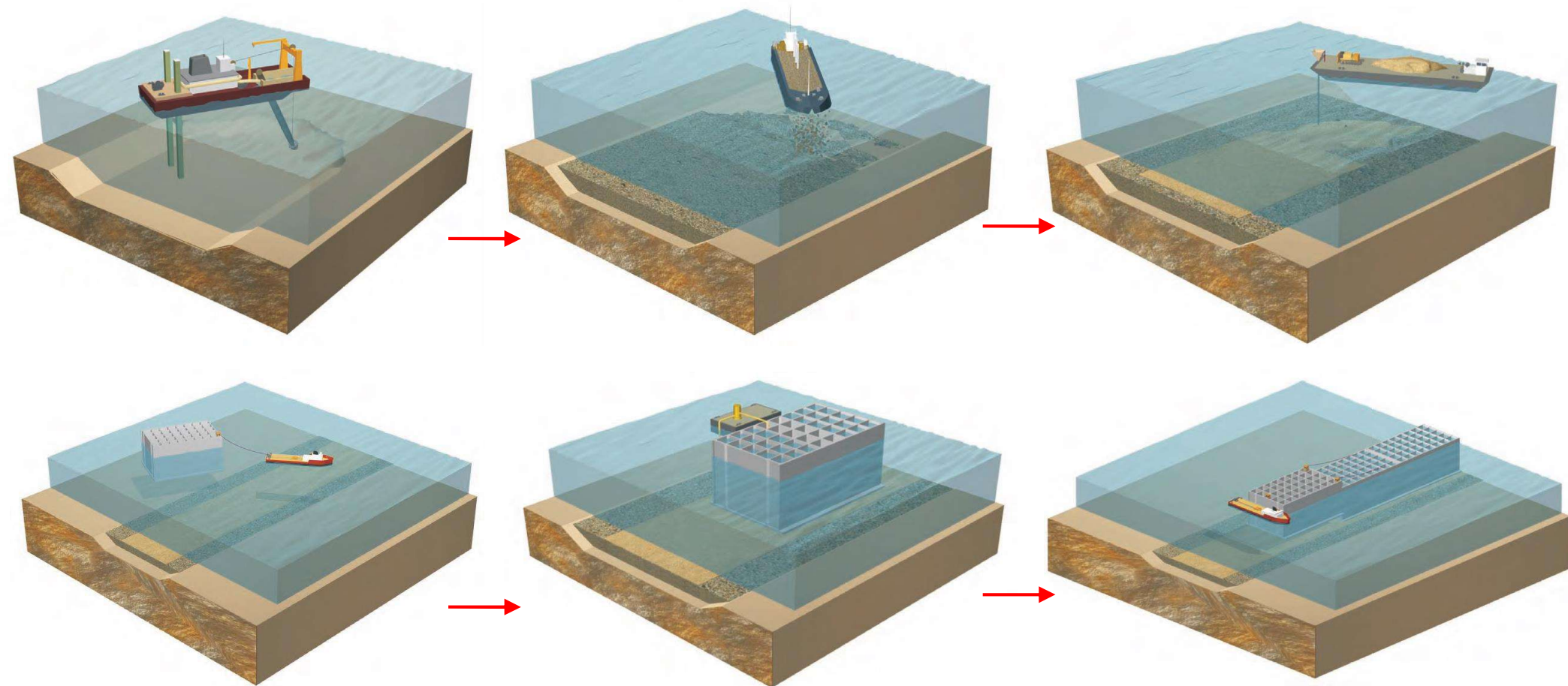
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CAISSONS TECHNOLOGY



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SOURCE: Guía de Buenas Prácticas para la Ejecución de Obras Marítimas (Puertos del Estado)



IDEAL CONDITIONS FOR CAISSONS:

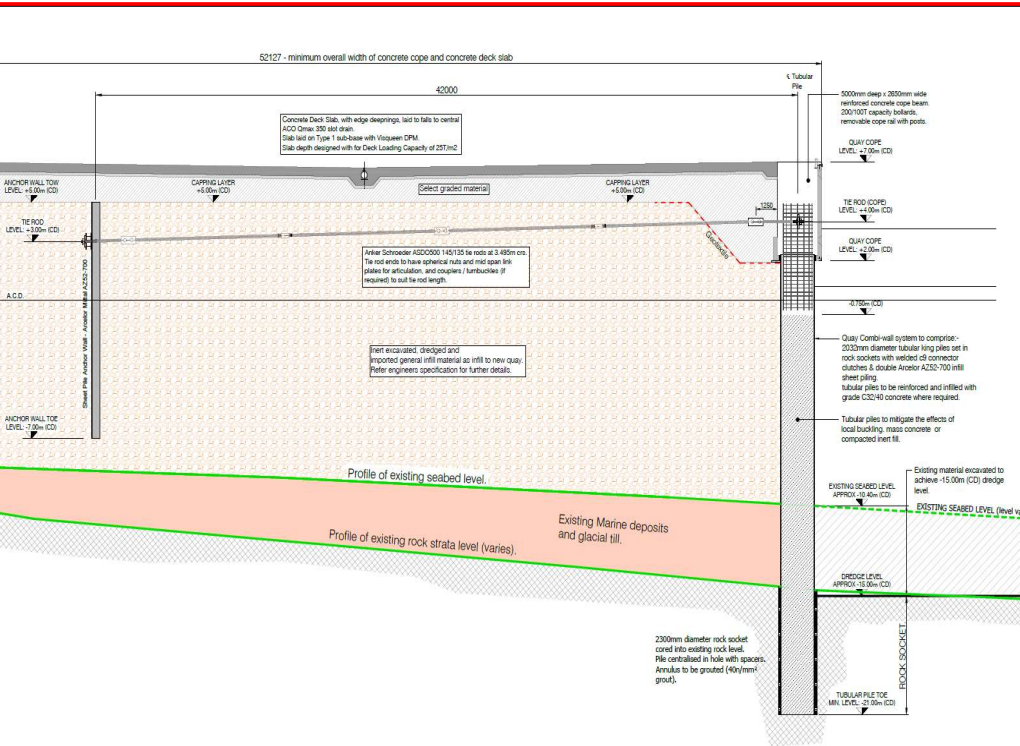
- **Hard ground conditions**
 - High loads transmitted to the ground
 - Reduction of geotechnical risk
- **Sustainability**
 - No noises, no vibrations
 - Off-site fabrication
 - Lower materials consumption
 - Smaller footprint
- **Challenging logistics**

OTHER FACTORS:

- Large water depths
- High loads

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ABOUT CONCRETE CAISSONS AND FLOATING DOCKS

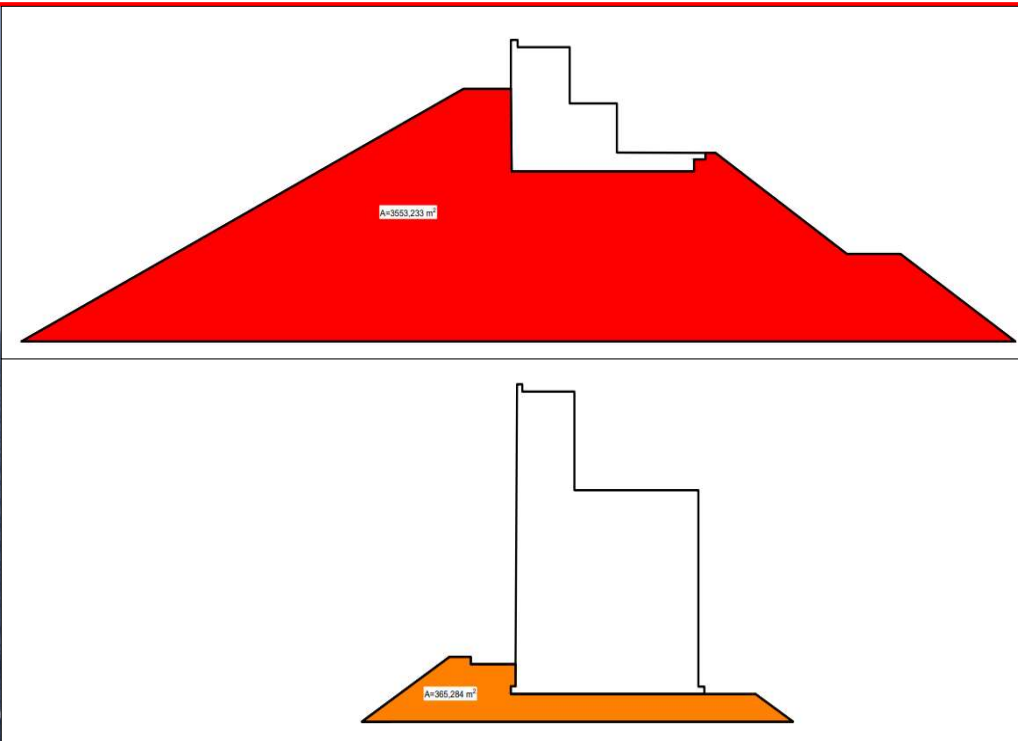


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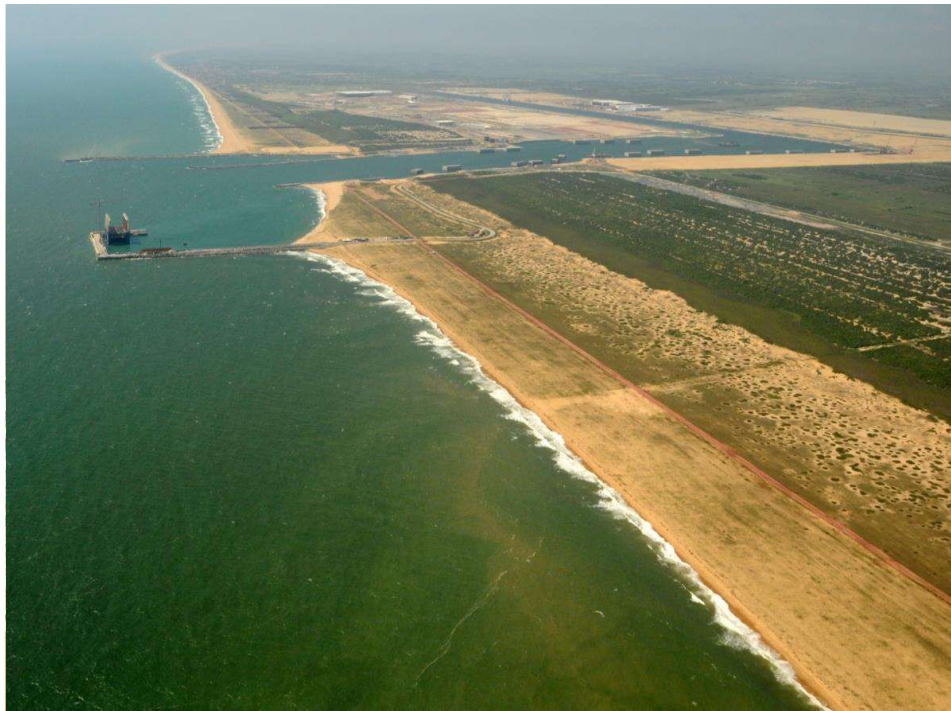
OTHER FACTORS:

- Large water depths
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Example of challenging logistics: Port of Açú (Brasil)



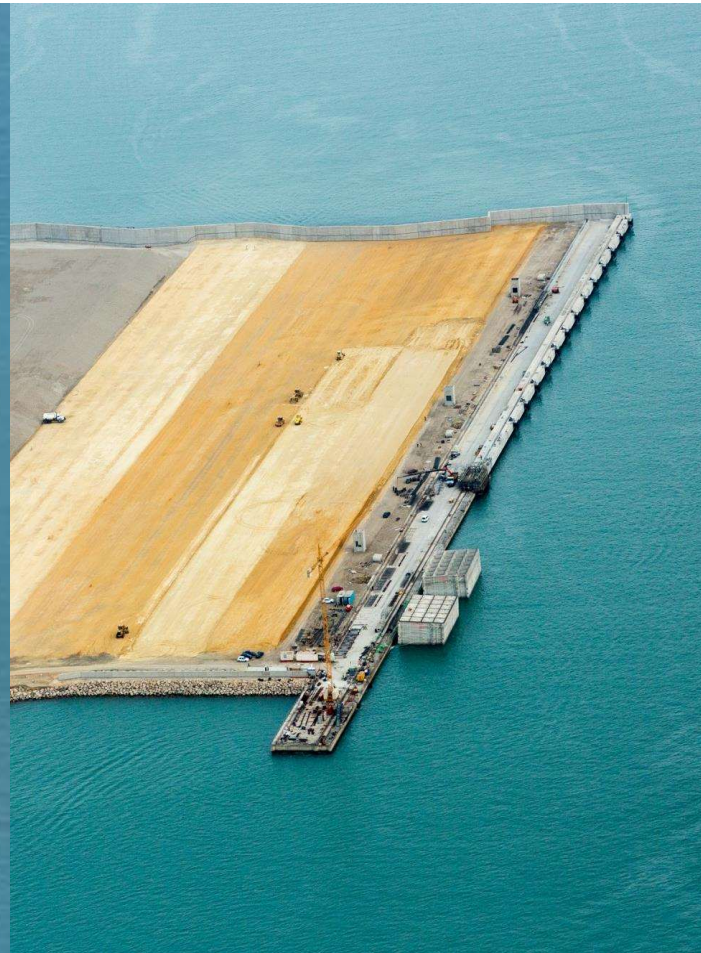
3rd PIANC-APAC CONFERENCE - SYDNEY
ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



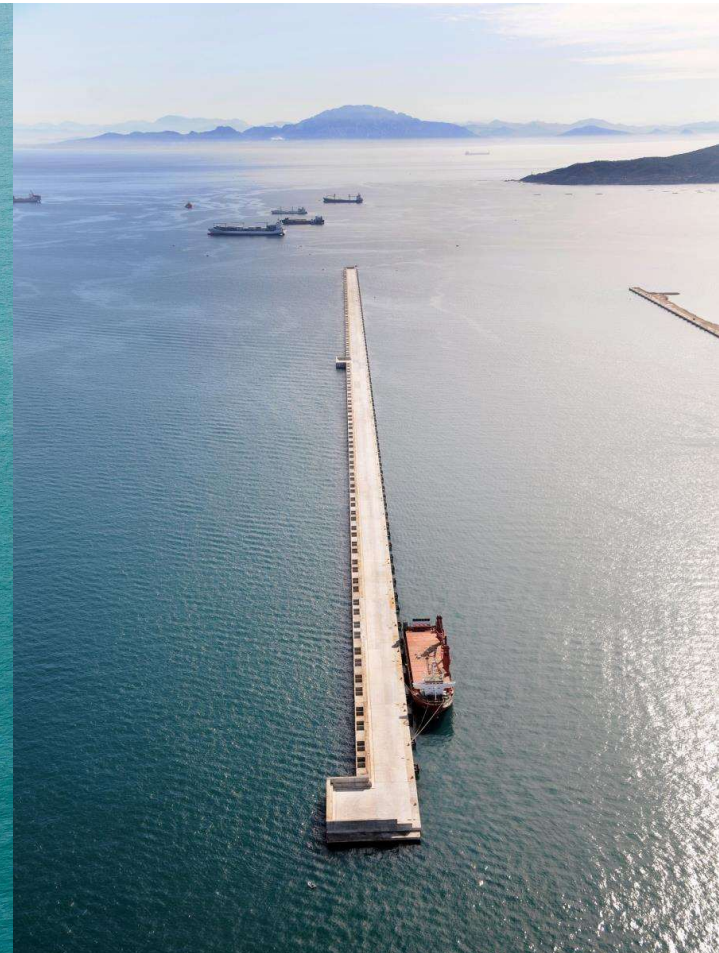
Caissons used for breakwaters



Caissons used for quays



Breakwater + quay



3rd PIANC-APAC CONFERENCE - SYDNEY
ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



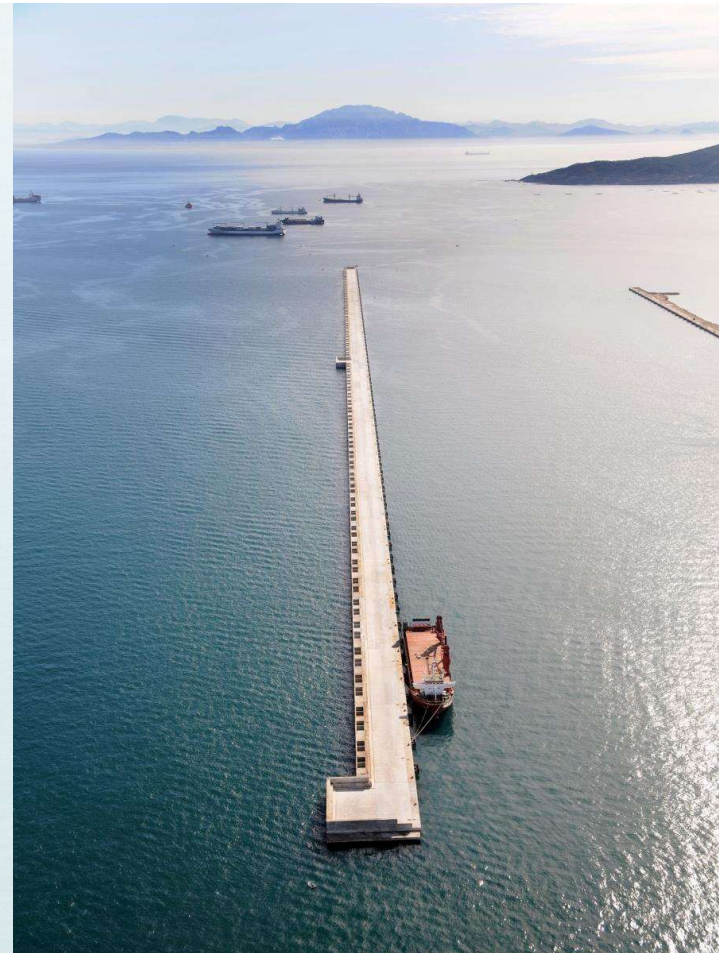
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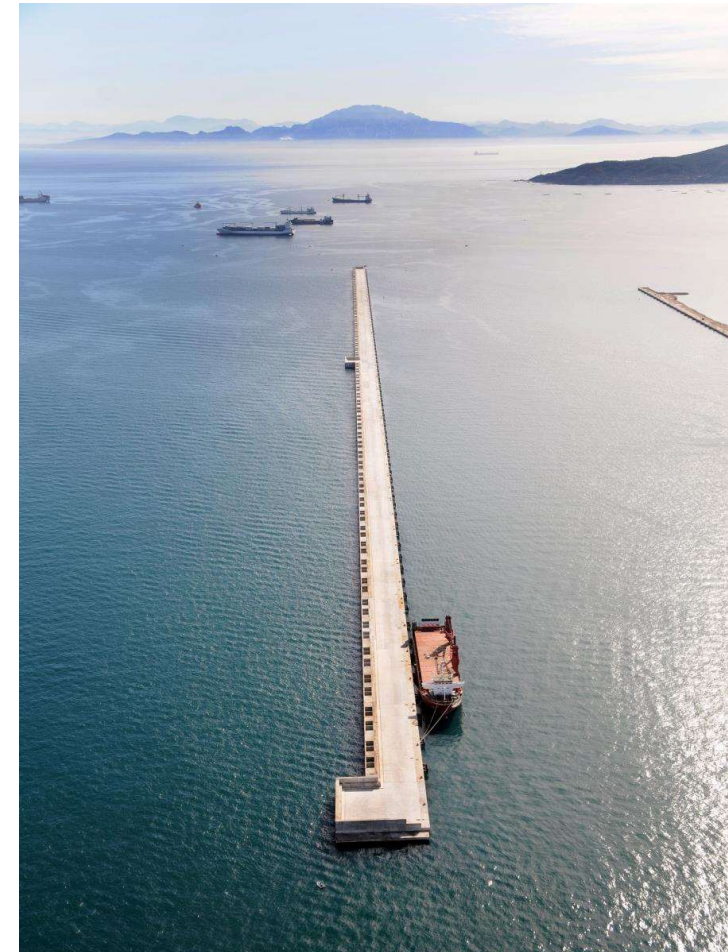
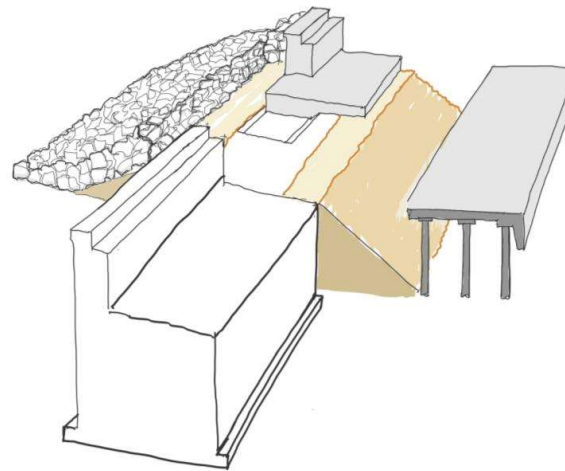
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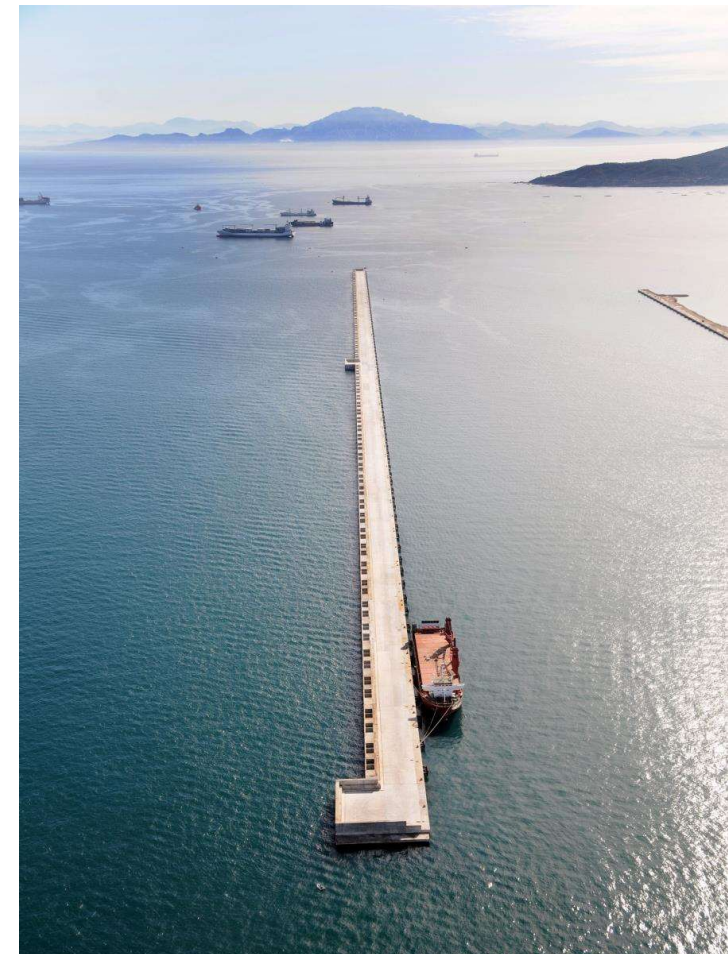
- Two structures vs. one
- Equipment mobilization
- Wider occupation
- Longer schedule

3rd PIANC-APAC CONFERENCE - SYDNEY

ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



Breakwater + quay

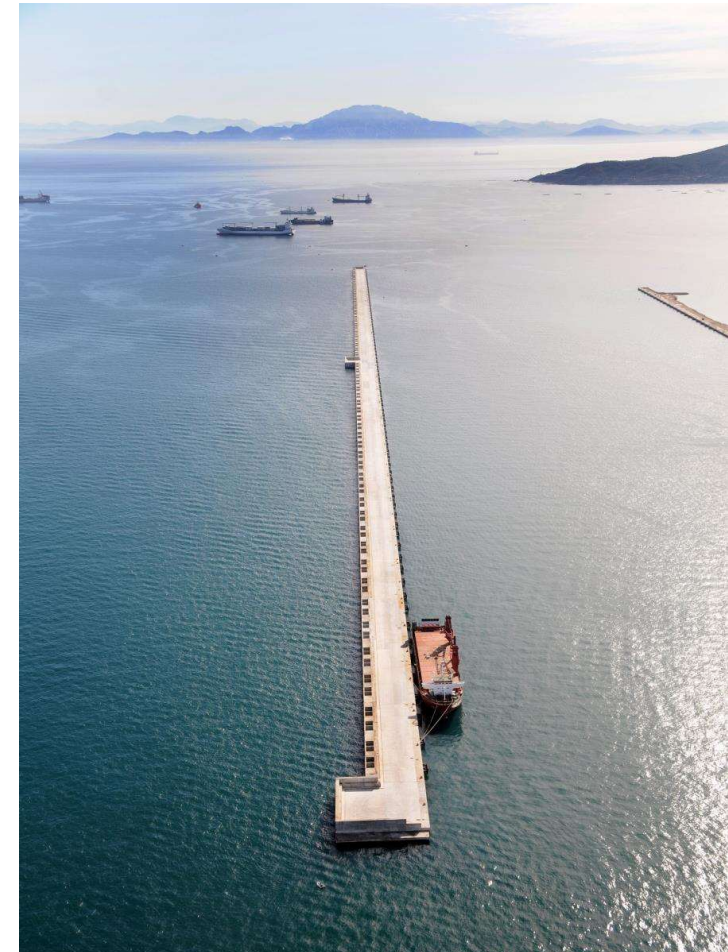
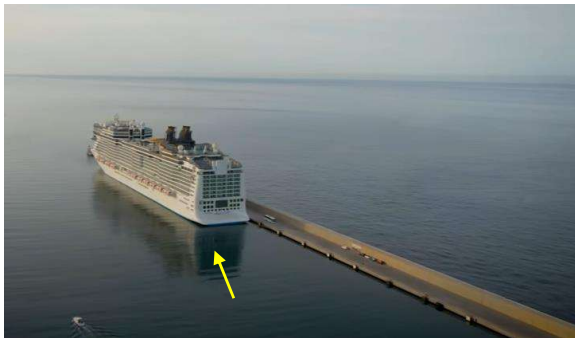
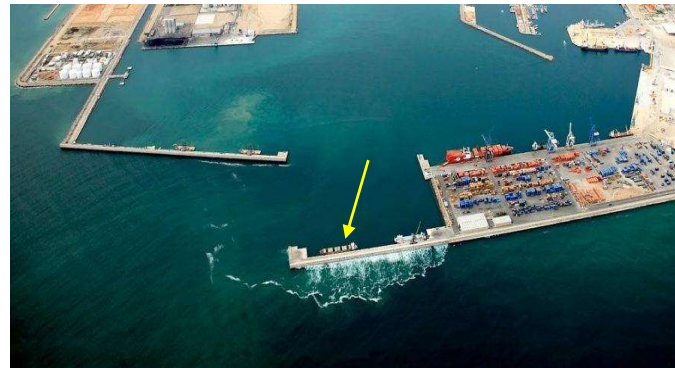


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3rd PIANC-APAC CONFERENCE - SYDNEY ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



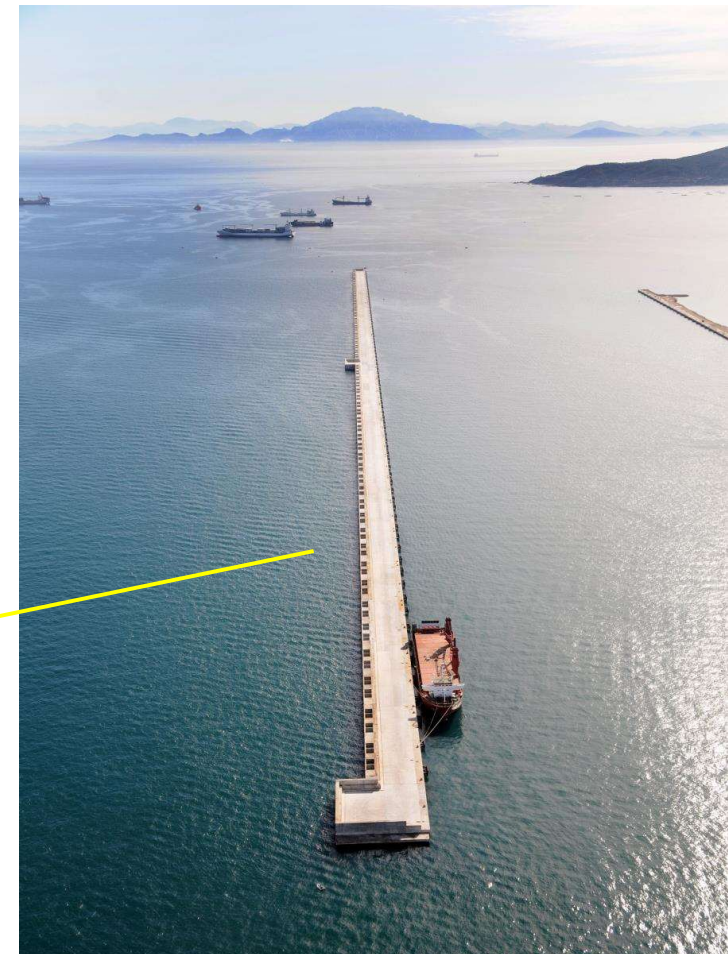
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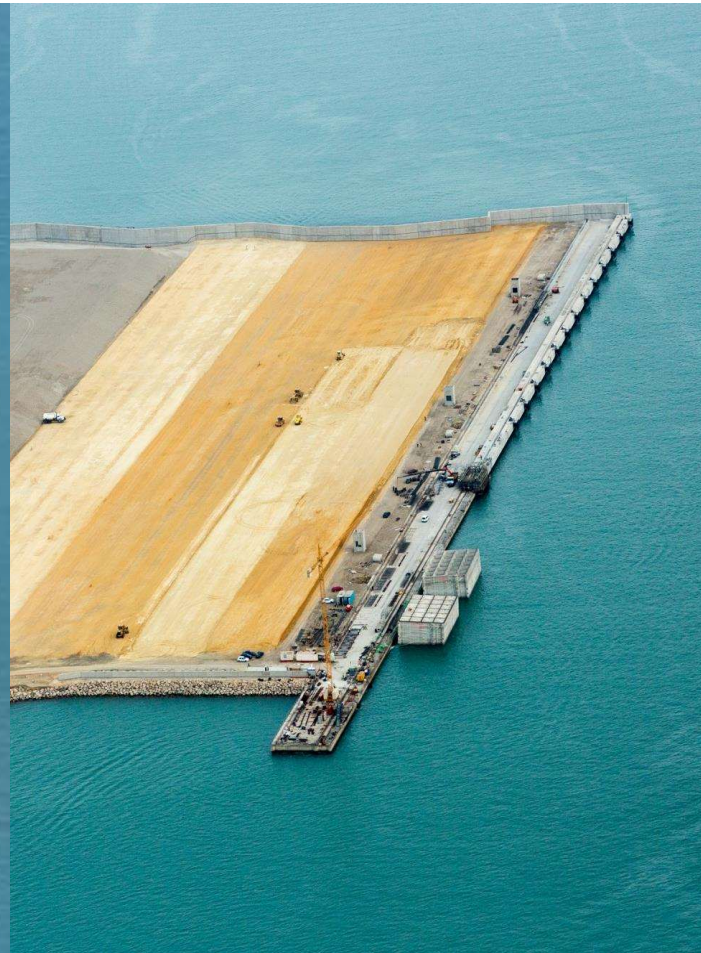
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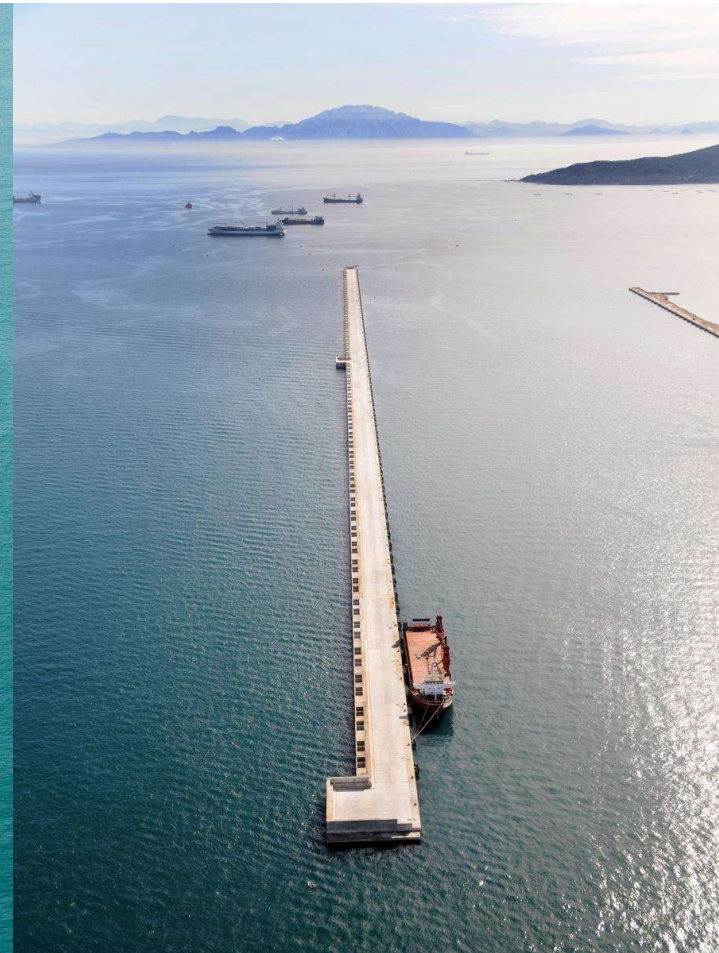
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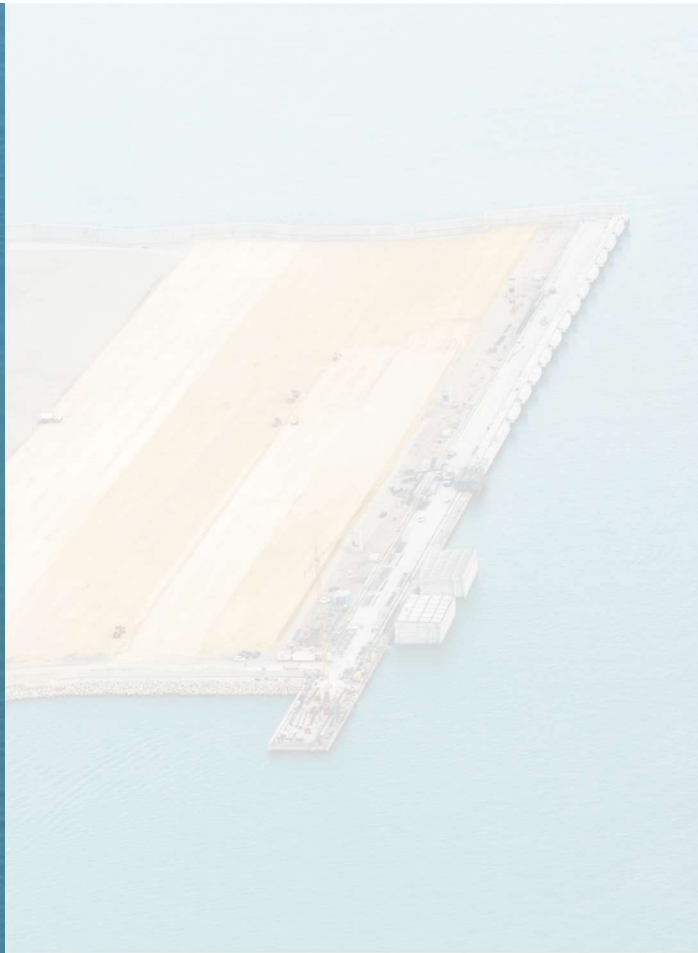
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ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



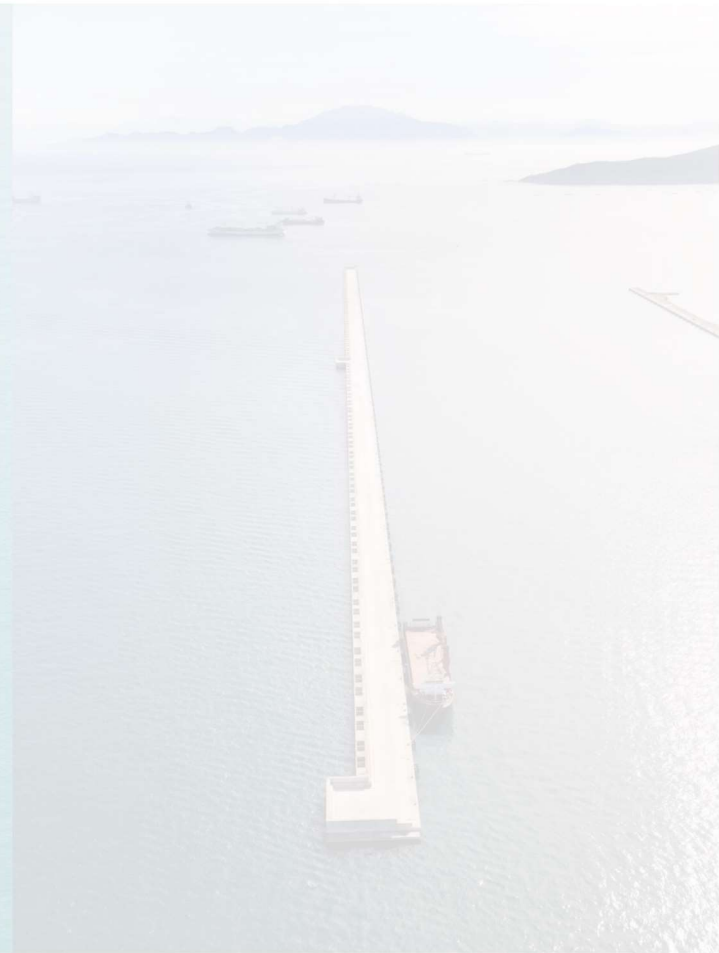
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Caissons used for quays



Breakwater + quay



3rd PIANC-APAC CONFERENCE - SYDNEY

ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



Caissons used for breakwaters



For large water depths:

- Faster construction
- Lower materials consumption
- Smaller footprint



Port of Almería, Spain



Port of Açú, Brazil

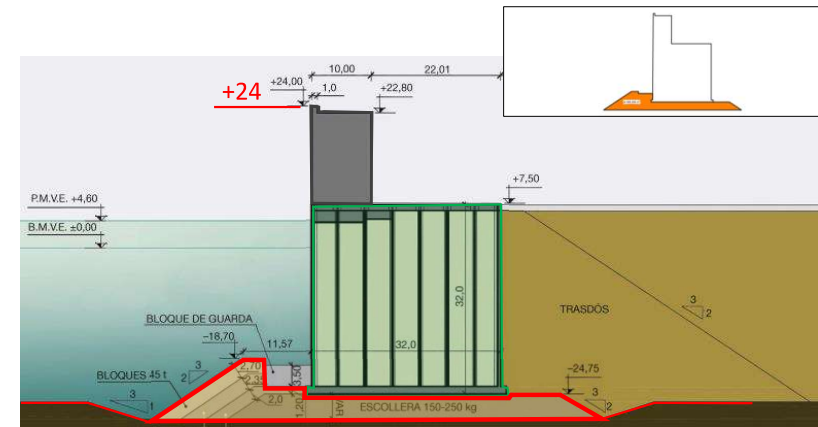
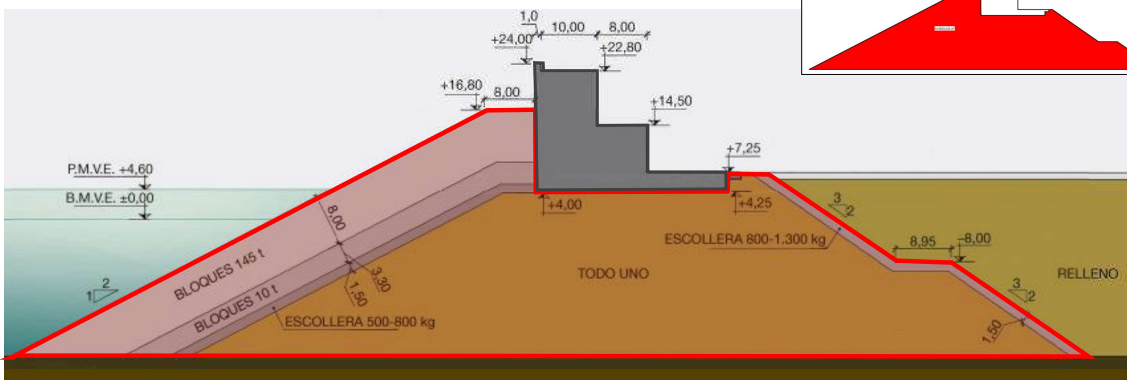
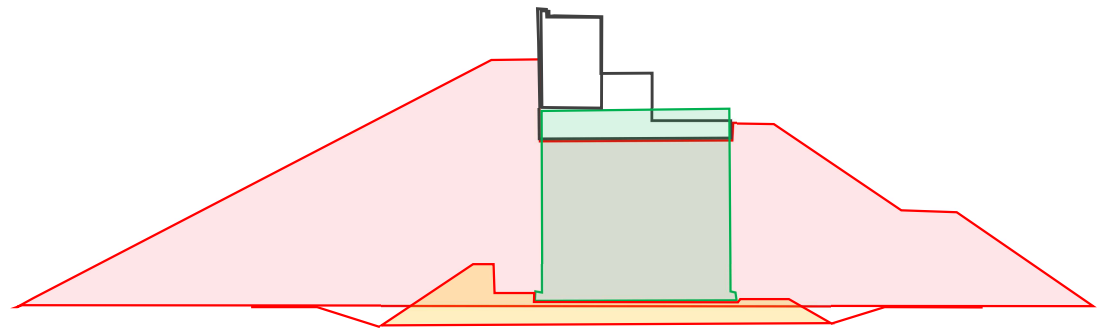


Dabhol Port of Ratnagiri district of Maharashtra, India

Caissons used for breakwaters



30m water depth
 $H_s = 9,50\text{m}$



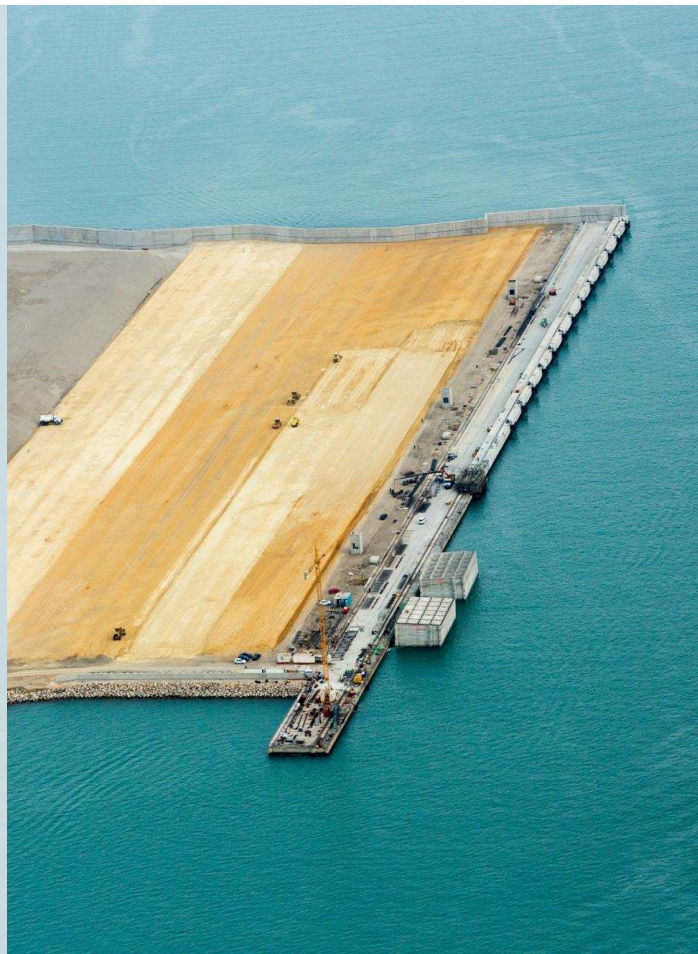
3rd PIANC-APAC CONFERENCE - SYDNEY ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



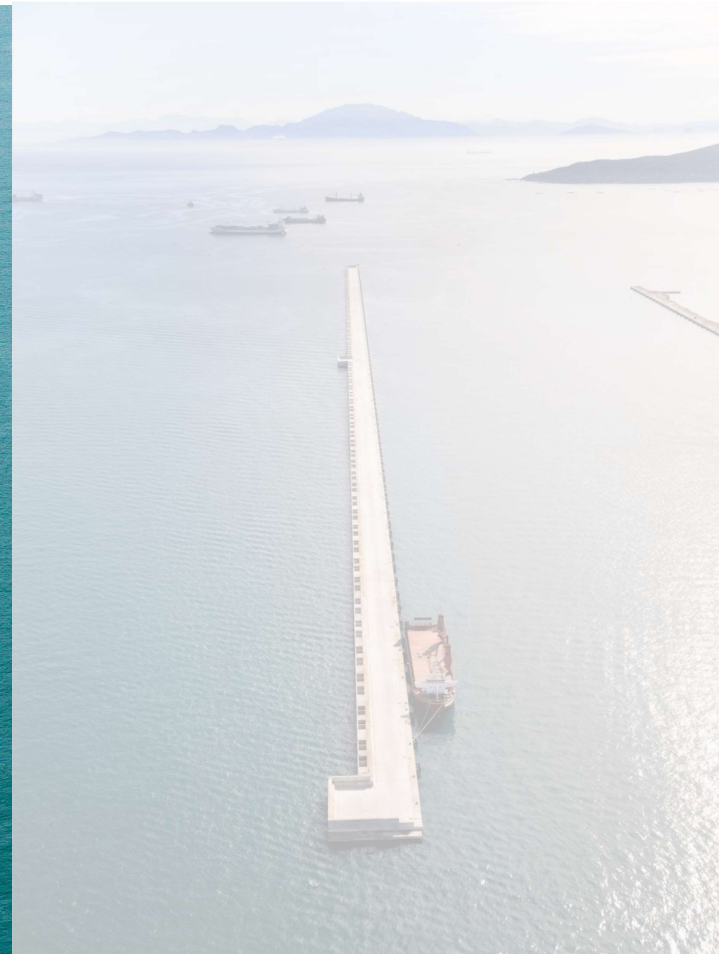
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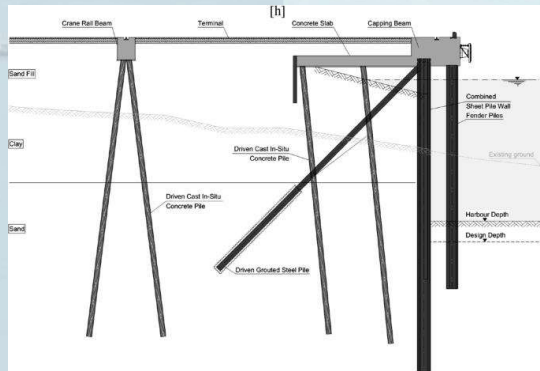


Breakwater + quay



3rd PIANC-APAC CONFERENCE - SYDNEY

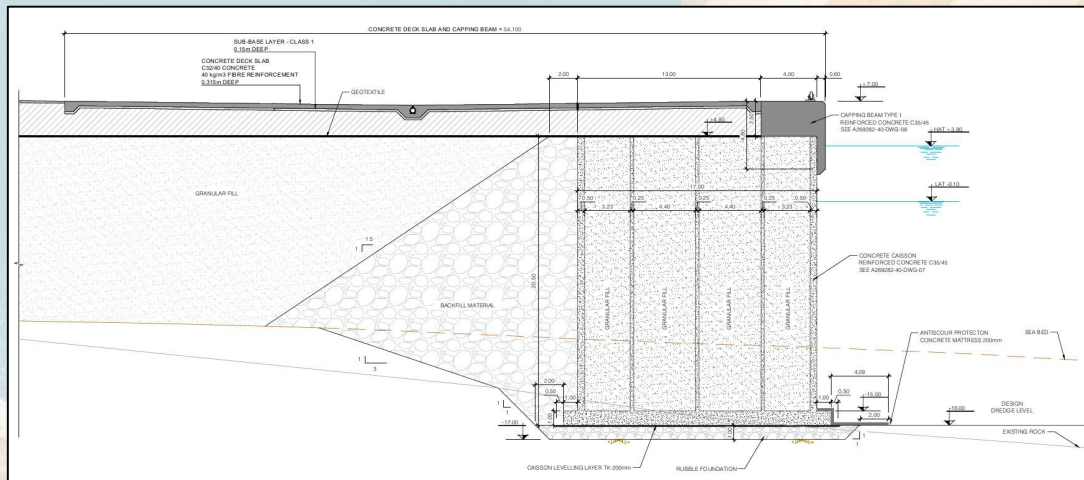
ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



7 AFFORDABLE AND CLEAN ENERGY



13 CLIMATE ACTION



3rd PIANC-APAC CONFERENCE - SYDNEY

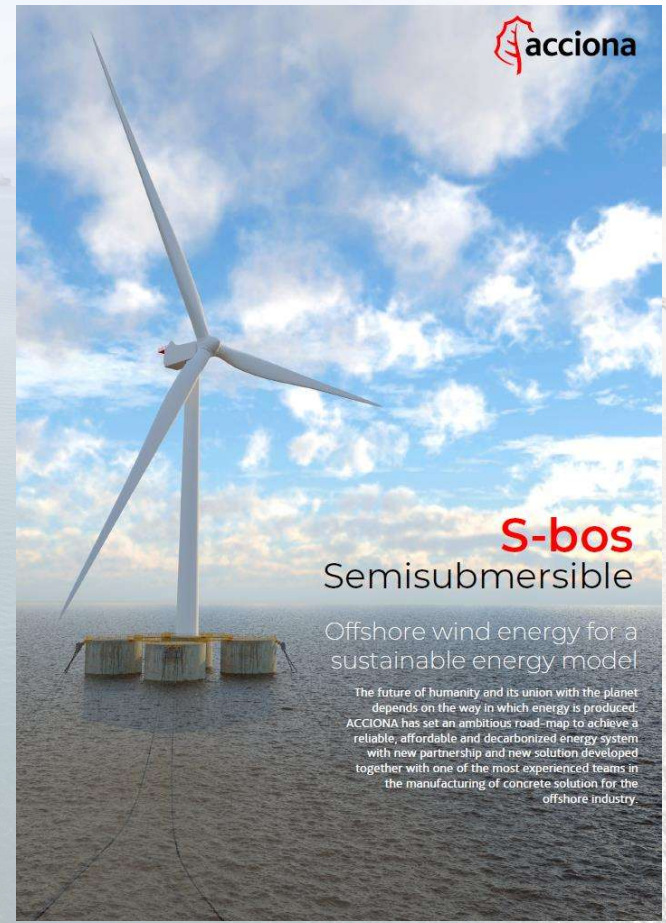
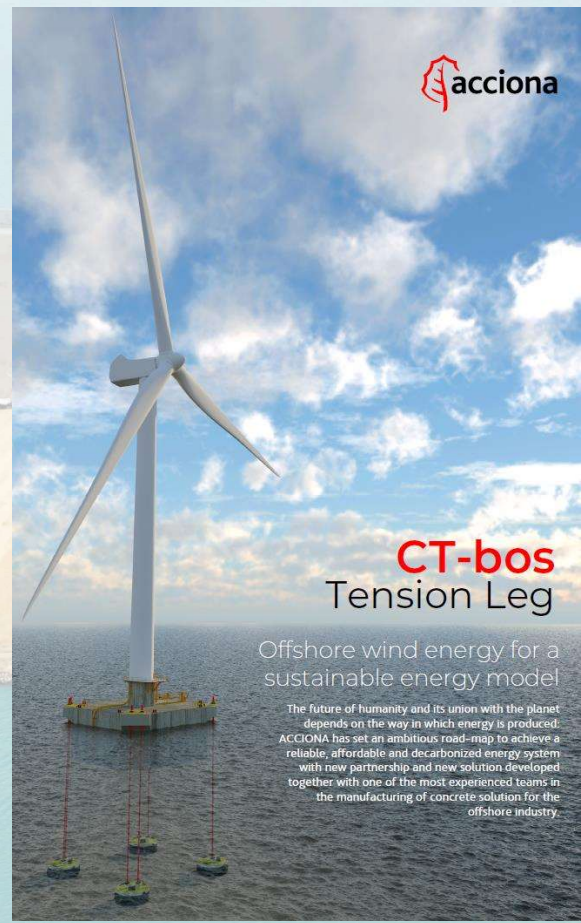
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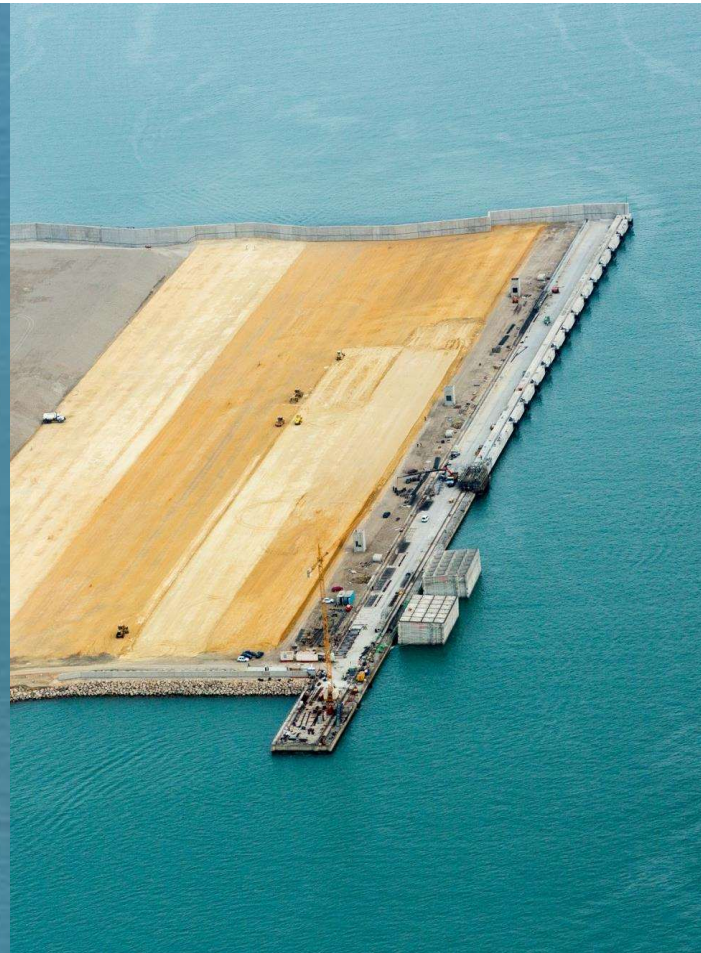
3rd PIANC-APAC CONFERENCE - SYDNEY
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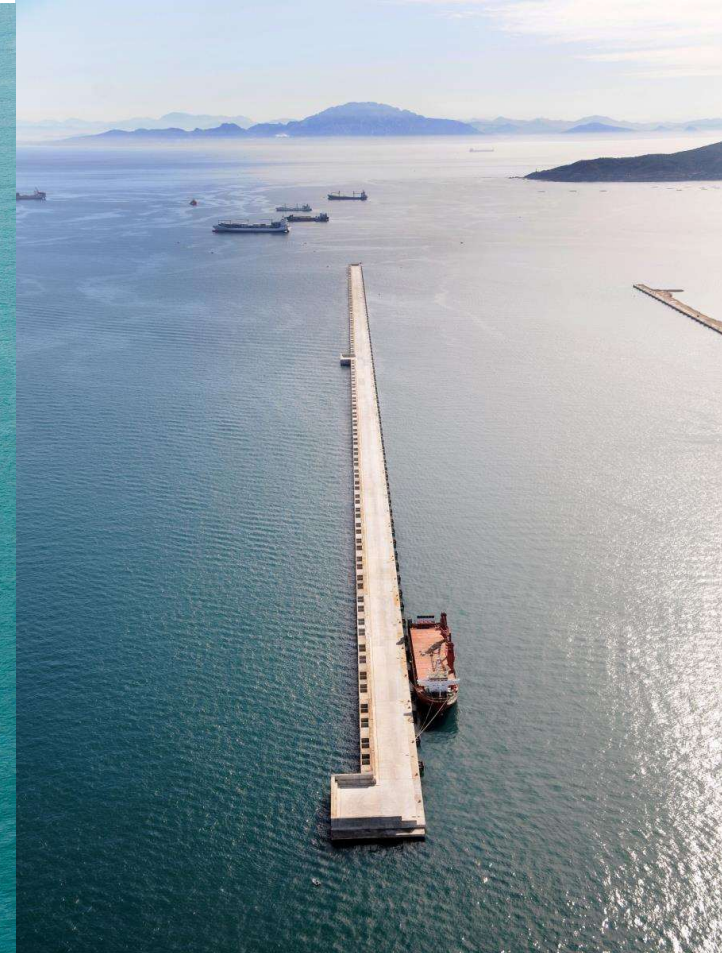
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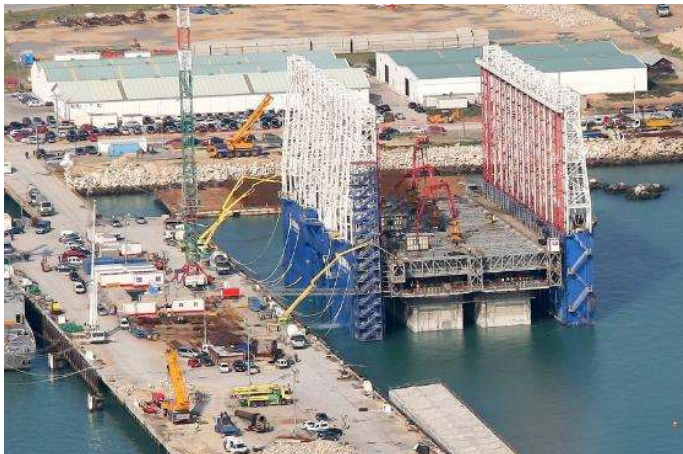
ONSHORE FABRICATION



DRY DOCK



FLOATING DOCK



SPECIAL FACILITIES



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ONSHORE FABRICATION



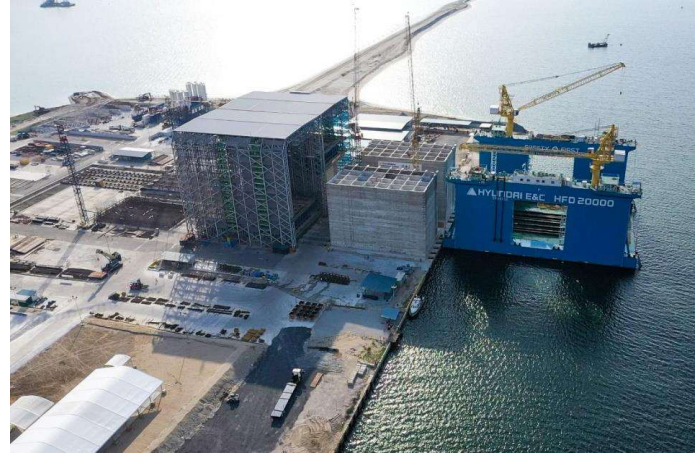
FLOATING DOCK



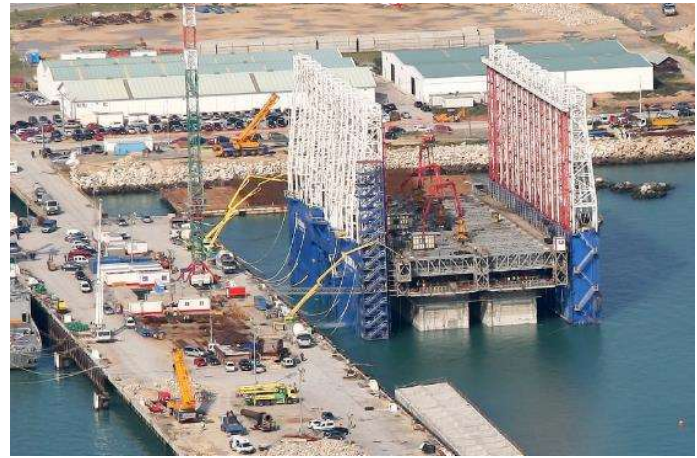
3rd PIANC-APAC CONFERENCE - SYDNEY ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



ONSHORE FABRICATION



FLOATING DOCK

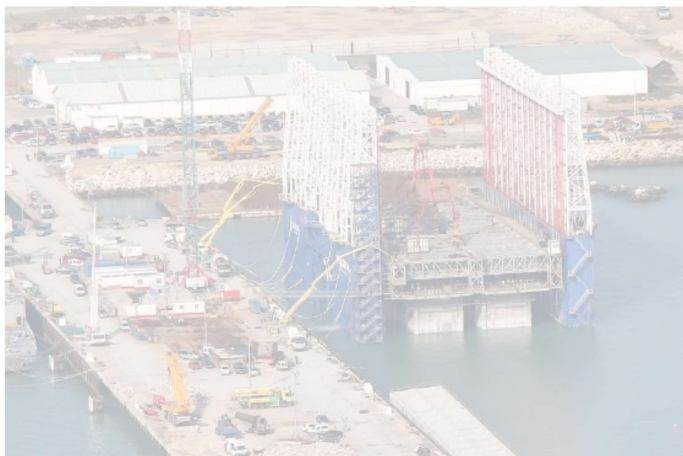


ONSHORE FABRICATION



- Onshore surface required
- Enough bearing capacity or time for ground improvement
- Launching device required
- Several production lines
- Typically used for large number of caissons

FLOATING DOCK



3rd PIANC-APAC CONFERENCE - SYDNEY

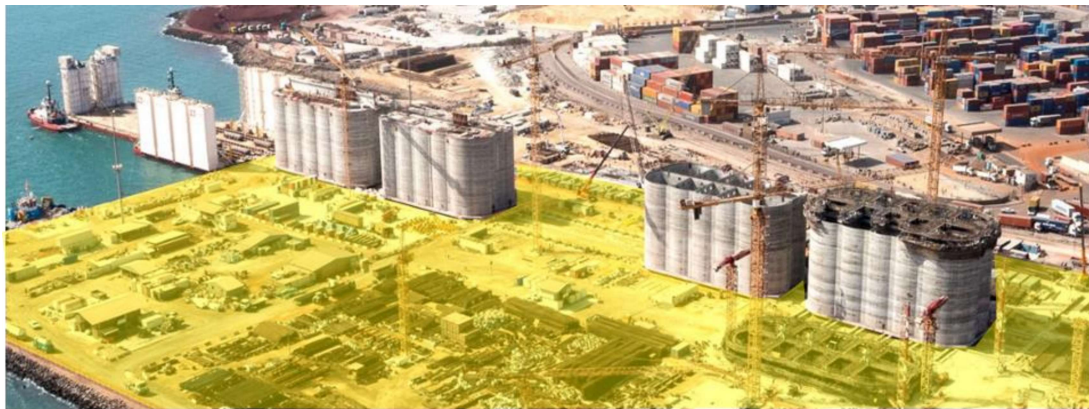
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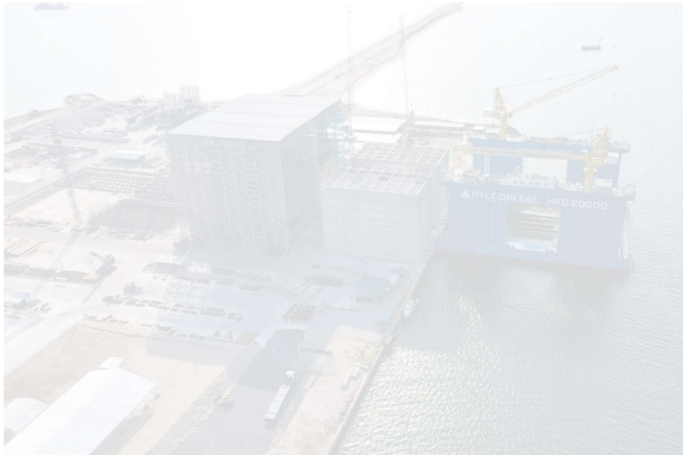
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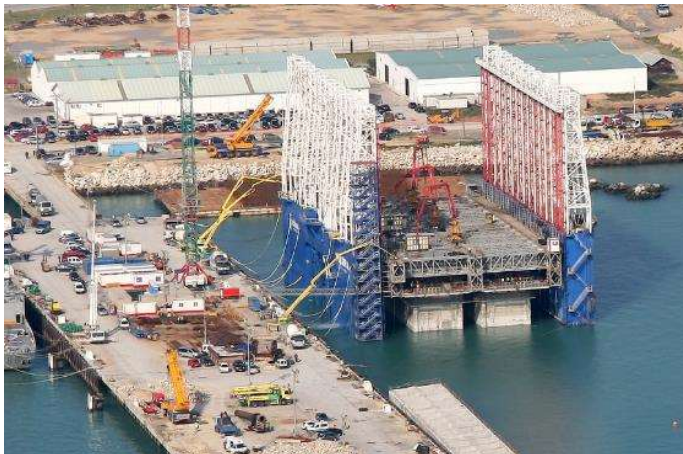


ONSHORE FABRICATION



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FLOATING DOCK



- Fast set up and earlier starting
- Low requirements at the port
- Floating dock required
- Early contact with sea water

3rd PIANC-APAC CONFERENCE - SYDNEY

ABOUT CONCRETE CAISSONS AND FLOATING DOCKS



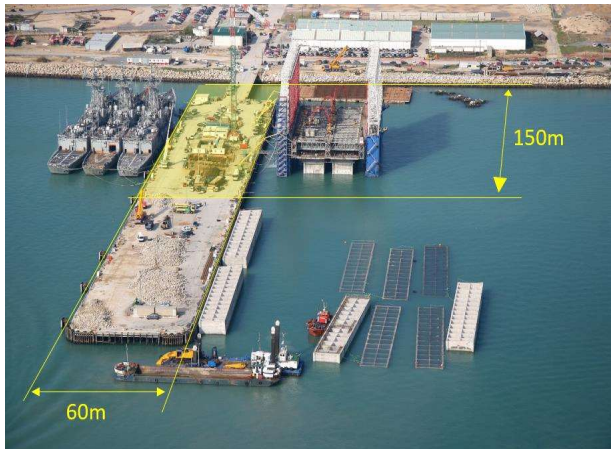
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FLOATING DOCK

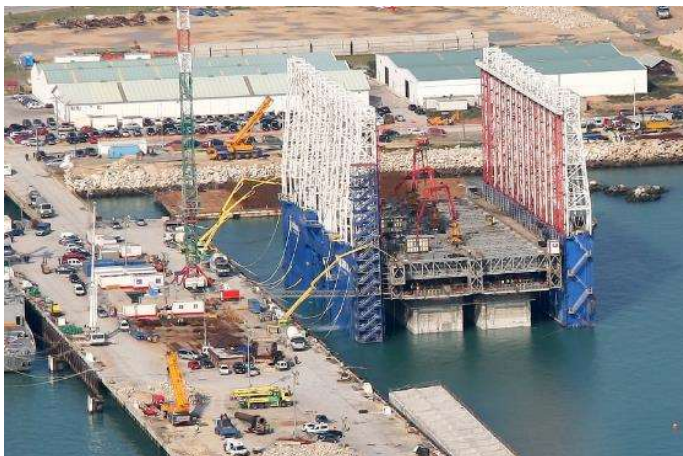


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FLOATING DOCK



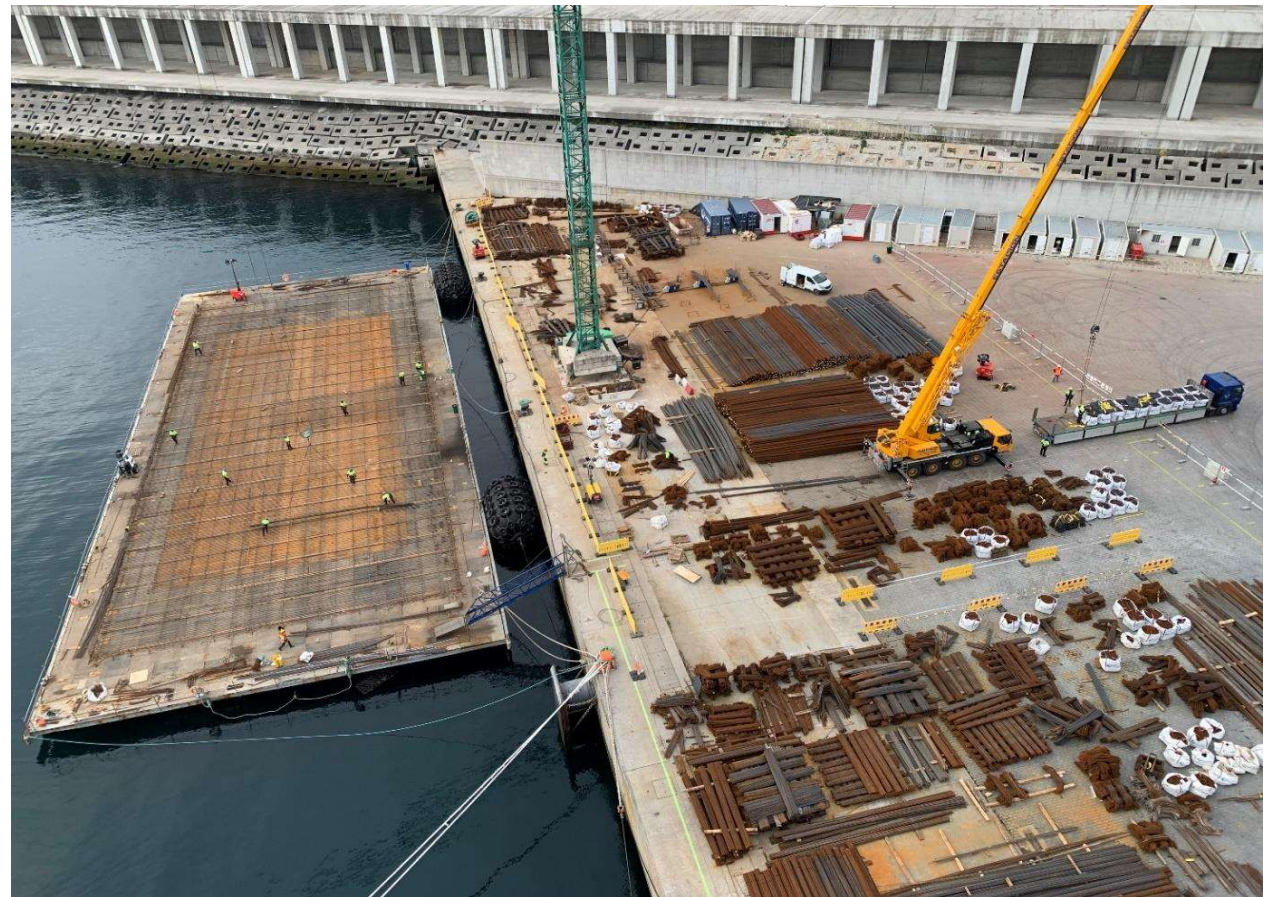
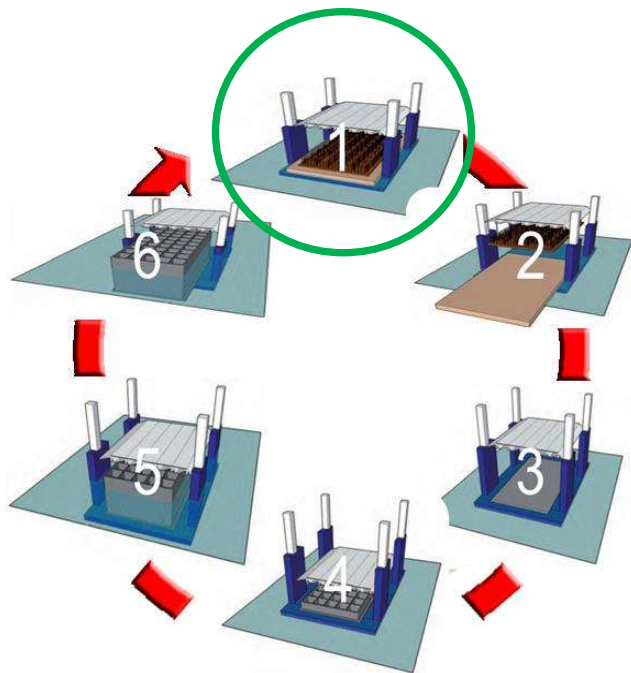
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Caissons fabrication with floating dock

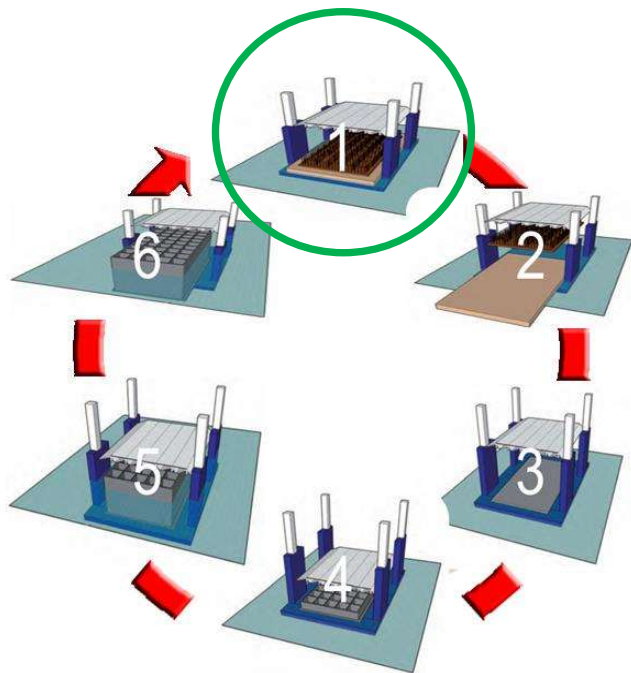


- Able to fabricate caissons 67m long and 34m height
- Patented system based on 15 jacks on each side that pull the formwork upwards
- Onshore concrete supply for a 24/7 fabrication
- Fabrication rate 4-5m/day (height)

Caissons fabrication with floating dock



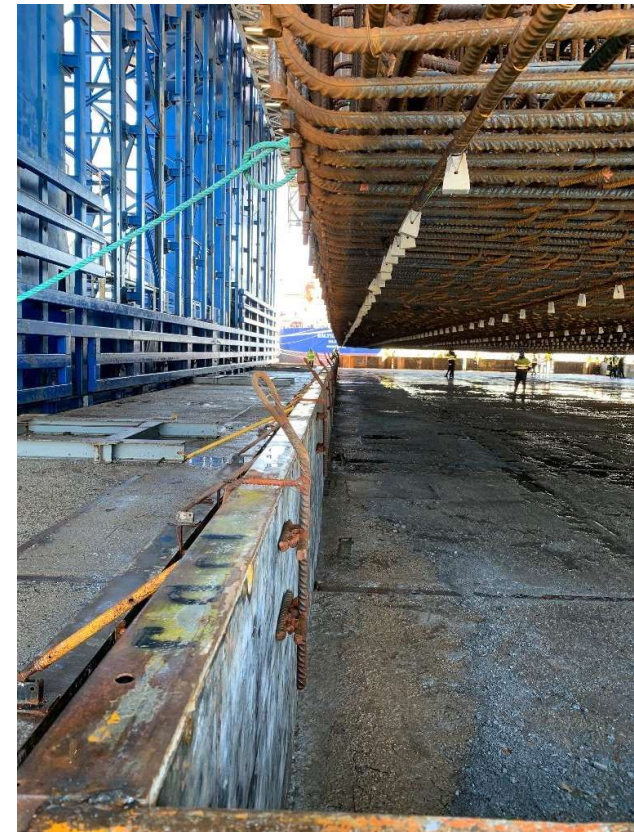
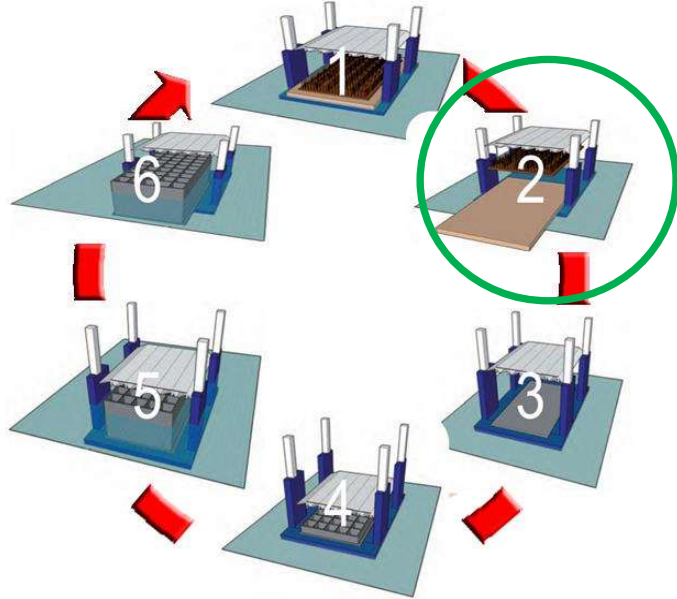
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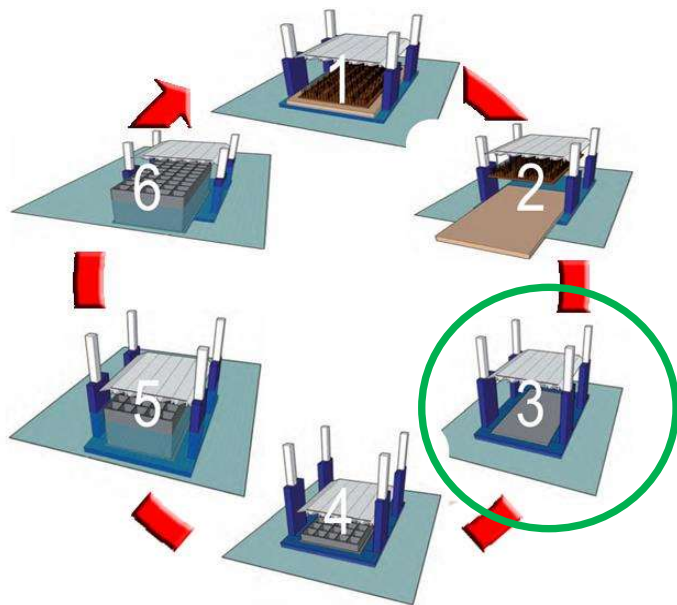
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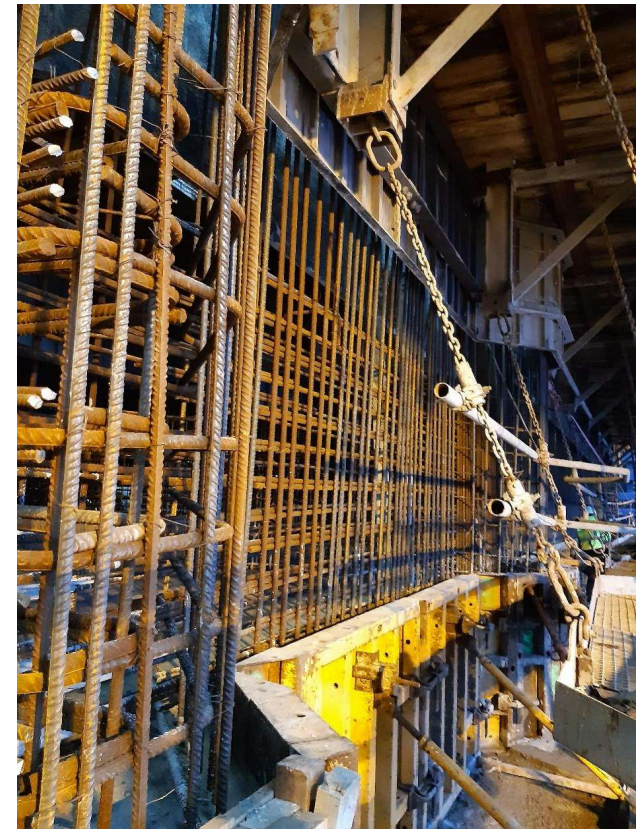
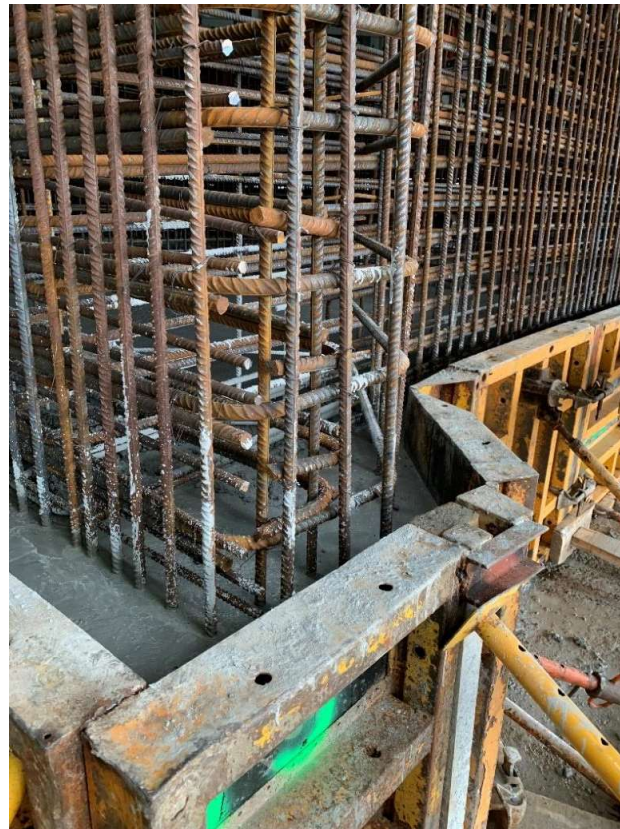
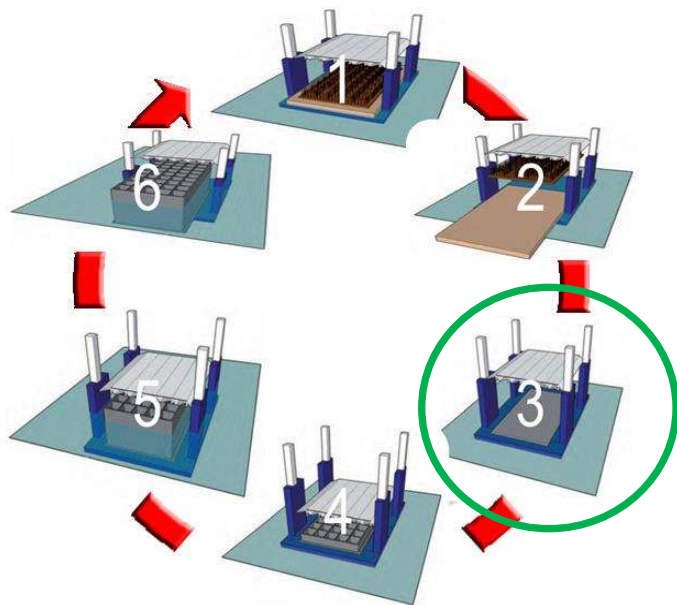
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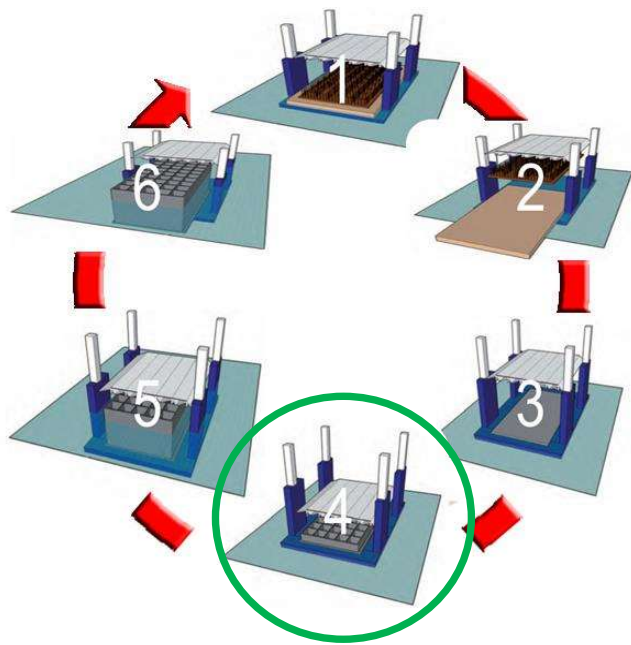
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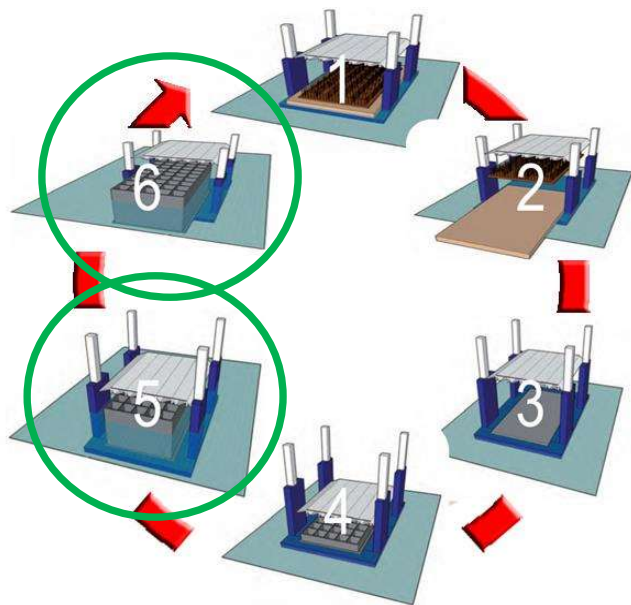
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Caissons fabrication with floating dock



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Caissons fabrication with floating dock

