The Odebrecht Organization

Founded in Brazil in 1944, today the Odebrecht Organization is a diversified business leader laying the groundwork for positive sustainable change worldwide.

The impact of the Odebrecht Organization extends around the world and across a range of enterprises. The depth and breadth of our services create key synergies that set us apart.

- Engineering and Construction
  - Odebrecht Industrial Engineering
  - Odebrecht Infrastructure
- Real Estate Development
- Property Asset Investments
- Latin American Infrastructure Investment
- Integrated Defense Systems
- Transportation, Urban Mobility and Logistics
- Oil & Gas Services
- Water, Wastewater and Environmental Services
- Ethanol and Bioenergy
- Shipyard Construction
- Chemicals and Petrochemicals
PortMiami Wharves Port Strengthening Program

Odebrecht Organization Worldwide

Presence in more than 25 countries

Exports to more than 70 countries
PortMiami Wharves Strengthening Program

Current footprint in the United States

- Engineering & Construction
- Chemicals & Petrochemicals
- Oil & Gas
- Water, Wastewater and Environmental Services

24 YEARS IN THE U.S.
PortMiami Wharves Strengthening Program

- **Client:** Miami-Dade County Seaport Dept.
- **Contract Type:** LS + Unit Price
- **Contract Cost:** 57 M ($50.5 + ALLOW.)
- **Scope of Work:** Construction of 6,000 LF/2000 meter of Cargo Wharf to allow for the future dredge (50’ feet). Improvements of the storm water drainage, upgrade of existing crane rail beam and replacement of (utility service stations, fenders and bollards).
- **NTP:** Sep 2011
- **Schedule Completion Date:** May 2014
- **Duration:** 960 days
- **Number of Subcontractors:** 31
- **Current Status:** Completed 78%
- **Critical Milestone:** Aug 2013 (To allow Deep Dredge)
- **Liquidated Damages:** US$ 145,000 per day no cap
The demanding schedule and challenges presented by the construction in a marine environment require innovative construction methods without any sacrifice to quality, to guarantee the success of the project and limit the risk to both the Owner and the Contractor.
PortMiami Wharves Strengthening Program

What was the largest risk and challenge from a Contractors perspective on the project?

Schedule

Liquidated Damages $145,000 per day no cap
Innovative ideas developed in collaboration with the Port, HDR (Engineer of Record) and Atkins (CEI)

- Precast Stay-In-Place Forming System

- "Rolling Construction"
PortMiami Wharves Strengthening Program

7” Precast Stay –in Place Form
PortMiami Wharves Strengthening Program

Advantages

Quality

• Superior Concrete Quality over Cast in Place Concrete due to the production of precast panels in a controlled environment
• No risk of washout or honeycomb of exterior concrete due to the tremie placement of concrete
• No rubbing and patching required
• Controlled placement of rebar and accessories to close plant tolerances
• Guarantees consistent concrete cover as specified
• Aesthetic finish matches clients 2035 vision of a cargo port in an urban center

Schedule

• Delay risks substantially reduced
• Mitigates possible weather impacts
• Fabrication of panels ahead of construction schedule required for the project site
• No formwork removal required
• Adaptable forming system
Advantages

Environment

- Minimizes the risk of contaminants to be deposited into the water due to spills from leaking formwork
- Reduces the risk of debris entering the water from the formwork removal operation
- No form oil
- Minimizes the risk of form blow-outs

Safety

- Less handling of formwork
- Safer operation, Workers stay out of water, less exposure to tidal and boat wake
- No bulky formwork to assemble and lift
- Reduced the time required to work over an active navigational waterway
Challenges:

- System requires close coordination between sheet-piling/combi-wall, soil anchors and precast block-outs
- Adapting shape of precast panel bottom soffit to as-built sheet pile/combi-wall profile
- Closure of gap between sheet-pile and precast panel
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Backside of Precast Panel
PortMiami Wharves Strengthening Program
Backside of Precast Panel Details

Panels & Brackets
Rod & Section
Connecting Plate
PortMiami Wharves Strengthening Program

Cross Section View of Typical Precast Panel

Pin Connection
Threaded Rod Connection
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Precast Panel Seats
PortMiami Wharves Strengthening Program
Gap Between Precast Panel and Sheetpile
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Sheet pile Installation As-Built
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Steel Form to Close the Gap
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Precast Gap Filling
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Original Phasing

- PHASE I
- PHASE II - Section 1
- PHASE II - Section 2
- PHASE II - Section 3
- PHASE II - Section 4
- PHASE II - Section 5
- PHASE III
PortMiami Wharves Strengthening Program
Rolling Sections
Rolling Construction

Advantages

• Continues Construction of schedule critical activities “Production Line”
• Minimized impacts to the Port’s Cargo Operation
• Eliminated Learning Curve

Challenges

• Required close coordination between all construction trades
• Optimization of all construction activities and associated durations
• Failure of a single trade could potentially stop the “Production Line”
Construction Sequence
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Environment: 185 Coral were Surveyed and Successfully Relocated
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Major Activities

1. Fender and Bollard Demolition
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Major Activities  2. Sheet/King Pile Installation

Existing Sheet Pile

New Sheet Pile
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Major Activities  3. Temporary Tie Back Installation
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Major Activities

4. Back Fill with Granular #57 Stone
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Major Activities

5. Back Fill with Un-Reinforced Concrete
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Major Activities 6. Back Fill with Granular #57 Stone
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Major Activities   7. Back Fill with Un-Reinforced Concrete
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Major Activities

8. Soil Anchor Installation (20/30 Deg.)
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Major Activities  9. Demolition of Existing Cap Beam
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Major Activities  10. Install Fascia Rebar
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Major Activities  11. Install Precast Panels
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Major Activities  12. Concrete Pour on Fascia
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Major Activities 13. Install Cap Beam Rebar
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Major Activities  14. Concrete Placement for new Cap Beam
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Major Activities  15. Asphalt Paving
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Thank you