Expansion Panama Canal
2007-2014

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1. Project Location

Existing locks officially opened in 1914

First plans for third set of locks in 1930s

Construction period canal extension project 2007-2014
2. History

The French started with the Connection in 1800 (Ferdinand de Lesseps)

Original approach:

a canal level with the sea

Big reception for de Lesseps during 2nd visit 1886
The American took over
- The locks ideas introduced
- Excavations using rail etc
- Malaria etc. dealt with
The Americans completed the Connection in 1914 (now a canal with locks)
3. Existing Panama Canal

Perfil del Canal de Panamá
Outline of the Panama Canal

Océano Atlántico
Atlantic Ocean

Esclusas de Gatún
Gatun Locks

Lago Gatún
Gatun Lake

Esclusas de Pedro Miguel
Pedro Miguel Locks

Esclusas de Miraflorres
Miraflorres Locks

Océano Pacífico
Pacific Ocean

TIEMPO DE TRÁNSITO
IN TRANSIT TIME

TIEMPO TOTAL EN AGUAS DEL CANAL
TOTAL TIME IN CANAL WATERS

24 HORAS PROMEDIO
24 HOURS AVERAGE
Panamax maximum for existing locks
4. Principle of how the locks works
5 Ports Connected Weekly Through the Panama Route
Types of cargo

Tonnage History of the Different Segments that the Panama Canal Serves

- Containers
- Liquid Bulk
- Dry Bulk
- Others
- Car Carrier
- Passenger
- General Cargo
- Refrigerated Cargo
Current capacity is limited

### Maximum Sustainable Capacity of the Canal

- **Historical**
- **Forecast**

#### Key Data Points:
- **280 - 290 million PCUMS per year (FY 2007 - 2008)**
- **330 - 340 million PCUMS per year (FY 2011 - 2012)**
- **508 million PCUMS per year**

#### Graph Legend:
- **Blue Line:** Maximum sustainable capacity
- **Green Area:** Manageable demand
- **Red Dotted Line:** Probable demand

#### Year Range:
- **95** to **25**
Capacity after expansion

Maximum Sustainable Capacity of the Canal Expanded with the Third Set of Locks

- Historical
- Forecast

Maximum capacity of the system with post-panamax locks: 600 million PCUMS per year

280 - 290 million PCUMS per year (FY 2008 - 2009)

Start of operations of the third set of locks

- Maximum sustainable capacity
- Demand
7. Post-Panamax design ship

Comparison between Panamax and Post-Panamax Container Vessels

- Length of Post-Panamax Vessel: 366m
  - Post-Panamax Draft: 15m
  - Beam: 49m

- Length of Panamax Vessel: 294m
  - Panamax Draft: 12m
  - Beam: 32m

<table>
<thead>
<tr>
<th></th>
<th>Panamax</th>
<th>Post-Panamax</th>
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<tbody>
<tr>
<td><strong>Capacity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Containers (TEUs)</td>
<td>4,500</td>
<td>12,000</td>
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<tr>
<td><strong>Dimensions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam</td>
<td>32m (106')</td>
<td>49m (160')</td>
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<tr>
<td>Length</td>
<td>294m (965')</td>
<td>366m (1,200')</td>
</tr>
<tr>
<td>Draft</td>
<td>12m (39.5')</td>
<td>15m (50')</td>
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8. Panama Canal expansion elements

- Deepening and Widening of the Atlantic Entrance
- Atlantic PostPanamax Locks Complex
- Widening of Channel Reaches and Turns in Gatun Lake
- Access Channel to the Pacific PostPanamax Locks
- Pacific PostPanamax Locks Complex
- Deepening and Widening of the Pacific Entrance
9. The new locks

- Lock width: 55 m
- Length between outer gates: 458m >> more than 1500 m of length of concrete structure
- Minimum depth over sill: 18.3m
- Minimum freeboard: 1.52m
Existing Locks Max Vessel: 4,400 TEU’s

New Locks Max Vessel: 12,000 TEU’s

Draft
12.04 m (39.5 ft)

Draft
15.2 m (50 ft)
Cross Section of the New Locks Complex

- Water saving basins
- Valve
- Culvert

49m (160')
Post-Panamax Vessel

55m (180')
Filling / emptying
Atlantic
Pacific locks
Conceptual Location of the New Pacific Locks

- Culebra Cut
- Pedro Miguel Locks
- Miraflores Lake
- Miraflores Locks
- New water saving basins
- New three-step Locks
- Corozal
- Current Channel
- New approach channel

N

DHN
Pačific
10. Large dredging works

- Atlantic entrance deepening and widening = 7 M m³
- Atlantic alignment channel = 7 M m³
- Cut deepening = 6 M m³
- Pacific north alignment channel = 4 M m³
- Pacific entrance deepening and widening = 6.5 M m³
- Gatun Lake widening and deepening = 17 M m³
- Pacific south alignment channel = 2.5 M m³

Total dredging volume = 50 M m³
- ACP = 27 M m³
- Contractors = 23 M m³
11. Some of the NL/BL parties that have been / are involved

- DHV in CH2M Hill consortium on Client’s side

- In contracts combination for the locks “Gruppo Unidos”: Heerema / IV-Consult

- Jan de Nul: dredging Atlantic entrance

- Deltares (Delft Hydraulics)

- Dutch Ministry of Public Works (RWS) on government level
Thank you !!