A Primer on the Effect of the Panama Canal Expansion on World Commerce

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CH2M HILL
## Areas to be Covered

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# Historical and Current Canal
Republic of Panama

75,512 sq km - smaller than South Carolina
1606 – 1738: Ferias de Portobelo
1855: Construction of the Trans-Panama Railroad

- John Lloyd Stephens
- William Aspinwall
- Henry Chauncey
1882 – 1889: French attempt a sea-level canal

• Approximately 22,000 deaths

• About 268,000,000 cubic yards were excavated
1904 – 1914: U.S. Construction

- Original canal cost $375,000,000
- 56,307 people worked on the construction of the canal
- 5,609 known deaths
- 238,845,587 cubic yards of material were excavated
Notable U.S. leaders

John F. Wallace, Chief Engineer, 1904-1905

John F. Stevens, Chief Engineer, 1905-1907

George W. Goethals, Chief Engineer, 1907-1914

Dr. William Gorgas, 1904 - 1920
John F. Stevens was a preeminent railroad builder.
Logistics of efficiently moving materials
August 15, 1914: First Official Transit - SS Ancon
Confluence of technologies

GE powered electric locomotives and gates
Emergence of the Panamax class vessel

965-ft LOA; 106-ft Beam; 4,500 TEU
Capital Investment

Dredging

Locomotives

Hydraulic Conversion

Technology

Track system

Tug Boats

15

1,329
The Panama Canal Today

• Average of 36 to 38 vessels pass through the canal each day; 13,000 to 14,000 per year.

• The highest toll paid to date: $274,590 by the Maersk Dellys

• The lowest toll paid to date: 36 cents by Richard Halliburton who swam the canal in 1928

• 943,042 vessels have used the canal since it opened in 1914 (as of FY2006)

• More than 73% of the world’s cargo ships are too large to pass through the current canal

• The ACP currently employs about 9,000 people
Canal market share N.E. Asia – U.S. East Coast route
Areas to be Covered

#1 Historical and Current Canal

#2 Expansion
The Panama Canal Expansion

- New Atlantic Locks and Access Channel
- Widening and Deepening of Atlantic Entrance
- Increasing Level of Gatun Lake
- New Pacific Locks and Access Channel
- Widening and Deepening of Pacific Entrance
- Widening and Deepening of Gatun Lake
- Gaillard Cut Deepening
- Widening and Deepening of Pacific Entrance
Third set of locks
Conceptual Design
Sustainable Lock Design

Post Panamax Lock

Culverts

Ocean

Lake

Chamber

Lock Cross Section

WSB 1

WSB 2

WSB 3

Width: 180 feet
Length: 1,400 feet
Depth: 60 feet
Project Schedule

- Ground breaking ceremony on Sept. 3, 2007 at Paraíso Hill
  - 30,000 pounds of explosives

- Scheduled completion date is Aug. 15, 2014
  - Date is 100th anniversary of the canal
CH2M HILL’s Role

*Program management function includes:*

- Assist ACP with management of all contracts and procurements
- Develop, install and maintain ACP Program Management Information System
- Interface with locks design/builder and with all other design and construction activities
- Provide ongoing construction oversight, including quality, safety, and operability
- Interface with local and international stakeholders
- Provide ongoing training and coaching to ACP staff
Areas to be Covered

#1 Historical and Current Canal

#2 Expansion

#3 Impact on World Commerce
The Effect of the Third Lane on the ACP

- Added Capacity is 12 post-Panamax vessels per day in addition to the current 38 Panamax per day
- New locks alone will have a capacity of over 300-million PCUMS tons per year
- Added Revenue for 10,000-TEU to 12,000-TEU Post-Panama vessels is estimated at $500,000 per transit

PCUMS = Panama Canal Universal Measurement System
In 2005, the maximum sustainable capacity was predicted to be reached between 2009 and 2012.
Variation between Real and Forecast PCUMS Tons

Average = 5.1%> Forecast

Capacity will be reached sooner than predicted based on the actual volumes.
The Third Lane revenue potential

- Revenue projections based on gradual ramp-up over time to 12-transits per day
- ACP estimated Canal revenues for first eleven-years with new locks will add $1.15-billion per year *
- 1-year revenue at $6-million/day is $2.19-billion

* Source: ACP Master Plan
Importance of project schedule

- Capacity versus demand gap = Lost ACP Revenue
- Early completion will greatly help ACP and world commerce
- Delay will have global economic impacts
The Canal's impact on global maritime trade

- The Canal transits around 3% of world maritime trade
- Seven of the largest shipping companies in the world have offices in Panama
- Sale of bunker fuel to transit ships is the largest in the region
- More than 200 cruise ships per year stop in Panama
- Over 26 legal offices provide maritime and other international legal services
- Canal is transforming Panama from a transportation hub into a center of logistics, commercial and maritime activity
Evolution of the world TEU capacity

- **1980**: 97.09% 2.91% 3.01% TEU
  - 97.09% Other
  - 2.91% TEU Panamax
  - 3.01% TEU Pospanamax

- **1990**: 81.15% 17.51% 1.34% TEU
  - 81.15% Other
  - 17.51% TEU Panamax
  - 1.34% TEU Pospanamax

- **1996**: 68.60% 26.35% 5.05% TEU
  - 68.60% Other
  - 26.35% TEU Panamax
  - 5.05% TEU Pospanamax

- **2006**: 33.49% 37.34% 29.17% TEU
  - 33.49% Other
  - 37.34% TEU Panamax
  - 29.17% TEU Pospanamax

- **2011 (includes new orders)**: 31.32% 40.50% 28.18% TEU
  - 31.32% Other
  - 40.50% TEU Panamax
  - 28.18% TEU Pospanamax

- **2011**: 12.1M TEU
  - 31.32% Other
  - 40.50% TEU Panamax
  - 28.18% TEU Pospanamax

- **2011 (includes new orders)**: 12.1M TEU
  - 31.32% Other
  - 40.50% TEU Panamax
  - 28.18% TEU Pospanamax
Asia-Pacific and the U.S. West Coast

- World maritime trade dependency on container shipping is monumental
- More than 150 Post-Panamax ships move cargo between Asia-Pacific and the West Coast of the United States and are transported by train to the East Coast and other regions
- Port facilities in the Los Angeles/Long Beach are being stretched to their limits
Growth of container traffic in the U.S.

- Container imports will double by 2020
- Rail freight tonnage will increase by 50% by 2020
- The majority of U.S. ports are not dredged to accept the 10,000 TEU now under construction

Legend:
- Volume 2004 (‘000 TEU)
- Volume 2020 (‘000 TEU)

Source: American Society of Civil Engineers (ASCE) – 2005 Report Card for America’s Infrastructure, U.S. DOT
Expanded Canal can transit 600 million PCUMS tons annually

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)
- 267
- 280
- 330
- 508

Start of operations of the third set of locks

Maximum sustainable capacity

Demand
Principle Logistics Centers
Principle Logistics Centers

- Singapore
- Dubai
- Algeciras
- Rotterdam
- Busan
- Shanghai
- Shenzhen
- Hong Kong
- Savannah
- Freeport
- Kingston
- Panamá
- Hamburg
- New York/New Jersey
- Savannah
- Hampton Roads

[Map showing logistics centers around the world]
World ports connected through the Panama Canal

Canal transits

Feeder services which do not transit the canal
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<th>World ports connected by liner services that transit the Canal or use Panamanian ports</th>
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<td>Algeciras, MEX</td>
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<td>Altamira, MEX</td>
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<td>Antofagasta, Chile</td>
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<td>Antwerp, Belgium</td>
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<td>Arica, Chile</td>
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<td>Auckland, New Zealand</td>
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<td>Balboa, Panama</td>
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<td>Cristobal, Panama</td>
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<td>Curacao, Netherlands Antilles</td>
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<td>Damietta, Egypt</td>
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<td>Dubai, Jebel Ali, UAE</td>
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<td>Dunkirk, France</td>
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<td>Ensenada, MEX</td>
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Thank you