Chichica Footbridge Team
iDesign: Panama 2011

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Michigan Technological University

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Outline

• Background
• Project Scope
• While We Were There
• Design Considerations
• Components
• Logistics
• What Happens Next
• Conclusion
Where We Were

http://www.justmaps.org/
Regions of Panama

Panama – 9 provinces & 3 Comarcas

http://www.lonelyplanet.com/maps/central-america/panama
Project Location

http://www.lonelyplanet.com/maps/central-america/panama
CHICHICA
- 1300 inhabitants
- Government Offices
- High school and University
- Road to Tole

TIJERA
- 700 inhabitants
- Elementary school
- Main trail from Tijera to Chichica

Crossing

Croquis Comunidad Tijera Sürü
People of Tijera and Chichica
Why a Bridge?

- Water level fluctuates
- Rainy season
- School
- Government offices
Project Goals

“... to design a sustainable and inexpensive footbridge for the communities of Chichica and Tijera.”
How We Lived
On Location
Data Collection
Design Process

Start

Site & River Conditions

Constraining Parameters

LRFD Guide Specifications for Design of Pedestrian Bridges

Component Design

Survey, Design and Construction of Trail Suspension Bridges for Remote Areas.

Finish
Site & River Conditions

UPSTREAM VIEW

DOWNSTREAM VIEW
Bridge Type

Suspension Bridge

Suspended Bridge
Hydrology

• High water level
• 4,093 cfs
  • 8.74 ft vs. 12.97 ft
Erosion
Constraining Parameters

- Anticipated loadings
- Soil capacity
Footbridge Components

- Cables
- Towers
- Foundations & Anchorages
- Suspenders & Walkway

Footbridge Components

Plan:
- Span: 186 ft
- Length: 4181 ft
- Elevation: 13.70' to 25.77'
- Profile:
  - Elevation: 978.52'

Quebrada Tinta

1 in : 25 ft
2 ft contour interval
Cables

- Main
- Spanning
- Fixation
- Handrail

Main Cable
Spanning Cable
Fixation Cable
Handrail Cable
Towers

- Steel Towers
- Height: 30.37ft
- Loading Cases
- Tower capacity

Survey, Design and Construction of Trail Suspension Bridges for Remote Areas.
Foundations & Anchorages

- Masonry and Concrete
- Block size
  - Safety against Sliding and Bearing failure

Size: 14.5’ x 16’ x 10’ (4’)

Size: 14’ x 18.5’ x 13’
Suspending & Walkway

- Steel and Timber
- Suspenders sized for cable shape
- Walkway decking check
Logistics

David

60 miles

Chichica

60 miles

Tole

60 miles

Santiago

http://maps.google.com
Construction Schedule

- 119 Days (20 weeks, 5 months)
Cost Estimate

- **Total Cost** -- $67,000
  - Material Cost
  - Labor
  - Equipment
- **With Donations** -- $43,000

### Overall Estimate

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<th>Item</th>
<th>Total Cost</th>
<th>Actual Cost (Donations Subtracted)</th>
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What Happens Next

- Report
- Construction Schedule
- Construction Reference Material
- Design Drawings
- Parts Lists

http://jr1212.wordpress.com/
“... to design a sustainable and inexpensive footbridge for the communities of Chichica and Tijera.”
ISD Advisors:
Dr. David Watkins
Michael T. Drewyor, PE, PS

Peace Corps Volunteers:
Jessica Rudder
Chris Kingsley

Others:
Dr. Stanley J. Vitton


LRFD Guide Specifications for Design of Pedestrian Bridges, American Association of State Highway and Transportation Officials, Washington, DC.


Questions???