ALAMILLO BRIDGE
Seville, Spain
by Santiago Calatrava
SPECIFICATIONS

- **Structural Type**: Asymmetrical Cable-stayed Bridge
- **Function**: Motor and pedestrian bridge
- **Location**: Sevilla, Andalucia, Spain
- **Crosses**: Guadalquivir River
- **Duration**: 1987-1992

- **Materials**:  
  - Cables: Steel  
  - Pylon: Reinforced Concrete  
  - Deck: Reinforced Concrete

- **Dimensions & Quantities**:  
  - Main span: 250 m  
  - Pylon height: 162 m  
  - Pylon angle: 58°
BACKGROUND

- Commissioned for the World Fair, Expo '92, to serve as its main entrance.
- This static concept can be traced back to the 1986 sculpture by Calatrava entitled 'Running Torso', in which inclined stacked marble cubes are balanced by a tensioned wire.
- The core of the tower contains a service stair to the top.
BACKGROUND

- Originally consisted of two mirrored bridges to create symmetry.
- For political reasons, an asymmetrical solution was decided upon.
- This is the only cable-supported bridge that is not back-anchored.
- The bridge is balanced solely through added weight of inclined pylon.
STRUCTURAL ANALYSIS

• DISTRIBUTED LOAD OF ROAD DECK

• CABLE STAYS IN TENSION CONNECT ROAD DECK TO PYLON

• DISTRIBUTED LOAD OF ANGLED PYLON

• REACTIONS
• Hexagonal box beam
• Lightweight crossbeams
- Thirteen pairs of cables
- Compression wedge connections
• Rigid connection
• Gusset plates
• Loads transmitted through drilled piers to soil.
PYLON

- Concrete filled steel pylon
- Central service core
- 58 degree inclination
• Compression wedge connections
• Equal tension in all cables
• Installed prior to concrete fill
ADDITIONAL DESIGN CONSIDERATIONS

• TYPICAL NEED FOR BACK SUPPORTS IN ASYMMETRIC BRIDGES

• WIND LOADS AND SEISMIC LOAD CONSIDERATIONS

• UPLIFT MAY CAUSE POTENTIAL INSTABILITIES

Figure 5.16 Typical cable-stayed structures.

Figure 5.15 Forces in the tie-backs of a simple cable-stayed building structure.
"It is phallic, but I was mainly concerned with the lightness of traversing the river,"
~ Santiago Calatrava


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