Texas Department of Transportation
Corpus Christi District

Corpus Christi Harbor Bridge

Presented by
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For
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Corpus Christi Harbor Bridge Presentation Outline

- Introduction to the Harbor Bridge
- History of the Harbor Bridge
- Current State of the Harbor Bridge
- The Future of the Harbor Bridge
  - Near-Term Solutions
    - Repairs/Maintenance
  - Long-Term Solutions
    - Replacement of Structure
- Challenges
- Where are we at now?
Corpus Christi Harbor Bridge
Introduction to the Harbor Bridge - Project Location
Corpus Christi Harbor Bridge

Introduction to the Harbor Bridge - Project Location
Corpus Christi Harbor Bridge

History of the Harbor Bridge

According to this article in the August 1959 Issue of the Texas Highways Magazine

“The high-level bridge over the Corpus Christi Ship Channel was achieved at a cost of $9,053,523 and a series of five construction contracts.”

“The largest single project of the Texas Highway Department was designed by the Department’s own Bridge Division – headed by Randle B. Alexander.”
According to the 1959 Texas Highways Magazine article, "Skyway"

- "The high bridge is the result of more than ten years of city-county-state planning – with the first Highway Commission minute order for the replacement of the Bascule Bridge being issued August 23, 1950. The Commission had authorized studies for three types of crossings – tunnel, movable-span, and high-level bridge”

- "by 1954, the volume of waterborne tonnage using the ship channel, as well as the proposed widening of the channel to care for expanded navigation requirements, dictated the repeal of the 1950 minute order, and new consideration was given to the construction of a six-lane, high-level bridge.”
The main unit of the bridge is a three-span cantilever truss arrangement. The channel span is 620 feet in length and is flanked by 310 foot anchor spans.

The navigation requirements were to provide a vertical clearance of 140 feet above mean low tide.

The bridge was designed to withstand the wind pressures generated by hurricanes.

Light-weight concrete was used in the floor slab of the main unit.
This vintage drawing of the channel crossing prepared by Mr. Ocie Kluge, Bridge Division artist back in the 1950s depicted what the bridge would look like.

So, from artist rendering to . . . . .
Corpus Christi Harbor Bridge

History of the Harbor Bridge
Corpus Christi Harbor Bridge

History of the Harbor Bridge

Interesting Facts

– Construction of the bridge began in June 1956 and was completed three years and four months later.

– During the construction four men fell to their deaths.

– According to the Corpus Christi Caller-Times “Seven bands played, 16 speakers gave patriotic speeches, and more than 2,000 people turned out to open the highest bridge in Texas”

– The first person to drive across the Harbor Bridge was Eleanor Tarrant, a housewife, who drove her beige ’59 Buick across the high bridge. She was chosen for the honor from more than 2500 people who entered a bridge-naming contest.
Corpus Christi Harbor Bridge
Current State of the Harbor Bridge

• Safety:
  – Steep vertical grades/lack of shoulders
  – Sharp curves on bridge approaches
• Maintenance:
  – Steel structure over salt water
  – Built about 50 years ago
  – Experiencing high and increasing maintenance costs
• Navigation:
  – Need for higher/wider clearances for ships entering Port of Corpus Christi
• Mobility:
  – Need for better access to bridge by motor vehicles, pedestrians, bicyclists
  – Additional capacity
Corpus Christi Harbor Bridge
Current State of the Harbor Bridge - Safety

- May 14, 2004 Tanker Truck Accident resulting from sharp curvature at bridge approach shut down the highway and required evacuating the area
- Accident rate above the statewide average
Corpus Christi Harbor Bridge

Current State of the Harbor Bridge - Maintenance

Maintenance of the existing bridge structure is averaging about $2,000,000 to $3,000,000 per year and increasing as the structure ages.
The Harbor Bridge currently provides 138 feet of vertical clearance for moving vessels in and out of the Port of Corpus Christi.
Corpus Christi Harbor Bridge
Current State of the Harbor Bridge - Mobility

• There is a three-foot emergency sidewalk on the bridge with a 40 inch high rail.

• The existing bridge is not pedestrian or cyclist friendly.

• Use of the bridge for bicycling events requires traffic control and the closing of travel lanes to motorists.
Corpus Christi Harbor Bridge
The Future of the Harbor Bridge

- The existing Harbor Bridge will not last forever
- Traffic demand is increasing
- Port of Corpus Christi operations are changing
  - Strategic Military Port
  - Future Cruise Ship Terminal?
The existing Harbor Bridge will not last forever but continued maintenance and repairs will extend the life of the bridge

- **Near-Term Solutions** – As noted earlier in the presentation, maintenance costs average $2,000,000 to $3,000,000 per year. This average is based on going to contract with structural repair contracts about every 7 to 10 years and bridge painting contracts every 5 to 7 years.
- **Long-Term Solutions** – Replacement of the bridge
Corpus Christi Harbor Bridge
The Future of the Harbor Bridge – Near Term Solutions

Maintenance Strategies

- Prior to 1993, the Texas Department of Transportation had an in-house specialized crew whose primary job was sandblasting and painting the bridge on a continuing basis. Stories have it that painting the entire bridge was a six-year task. Then the crew would start over again.

- Several repair projects such as re-decking the bridge and structural repairs have gone to contract since then to keep the bridge in good repair.
Corpus Christi Harbor Bridge
The Future of the Harbor Bridge – Near Term Solutions

- Lane Closures and Traffic Delays can be expected every time bridge maintenance is performed
- Contracted maintenance and repairs over the past 20 years
  - 1987 Bridge deck replacement
  - 1988 Clean & paint steel truss
  - 1993 Clean & paint bridge
  - 1994 Paint bridge
  - 2002-2005 Structural repairs and paint bridge (~ $17 million cost)
Corpus Christi Harbor Bridge
The Future of the Harbor Bridge – Near Term Solutions

- Recently completed structural maintenance in April 2009 performed by TxDOT bridge maintenance personnel

- Project planned for additional structural maintenance, cleaning and painting scheduled for bids in December 2009/January 2010. This project is a joint effort between TxDOT Bridge Division and Corpus Christi district personnel for project inspection and project administration
Corpus Christi Harbor Bridge
The Future of the Harbor Bridge – Long Term Solutions

However, no matter how good the maintenance, the existing bridge will not last forever and a long term solution is needed

• **Maintenance:**
  – Steel structure over salt water
  – Built about 50 years ago
  – Experiencing high and increasing maintenance costs

• **Safety:**
  – Steep vertical grades/lack of shoulders
  – Sharp curves on bridge approaches

• **Navigation:**
  – Need for higher/wider clearances for ships entering Port of Corpus Christi

• **Mobility:**
  – Need for better access to bridge by motor vehicles, pedestrians, bicyclists
  – Additional capacity
The Future of the Harbor Bridge – Long Term Solutions

- The Process has begun to look at the possible replacement of the Harbor Bridge
- Feasibility Study was initiated in 2001 and completed in 2003
  - Included several public involvement opportunities
  - Developed traffic forecasts
  - Included a ship or vessel survey
  - Developed four corridor alternatives
Corpus Christi Harbor Bridge
The Future of the Harbor Bridge – Long Term Solutions

Harbor Bridge Corridor Alternatives from the Feasibility Study
• RED
• ORANGE
• GREEN
• BLUE
• The Feasibility Study recommended the red alternative corridor to replace the bridge
• The next step taken in the planning for the possible replacement of the Harbor Bridge was initiating the formal environmental process including the preparation of an Environmental Impact Statement
  – Develop preliminary design including right-of-way needs and construction cost
  – Evaluate environmental impacts
  – Conduct public outreach and involvement throughout the process
The existing Harbor Bridge, sometimes referred to as “Napoleon's Hat,” is an iconic structure for the City of Corpus Christi and helps define its skyline. A replacement structure would also need to be of a similar iconic or signature nature.

So what might a new structure look like??
The recommended red corridor alternative spans the wider part of the channel at an angle which would mean a bridge span in the order of 1600 feet.

A couple of the evaluated corridor alternatives span the narrower part of the channel which would mean a bridge span more in the order of 900 feet.
Corpus Christi Harbor Bridge

The Future of the Harbor Bridge – Long Term Solutions

**Bridge Type vs. Span Length**

- **Suspension**: 1,500 - 1,600 feet
- **Cable Stayed**: 600 - 1,600 feet
- **Arch**: 500 - 1,200 feet
- **Truss**: 500 - 1,200 feet
- **Segmental Truss**: 200 - 600 feet
- **Steel Box**: 200 - 600 feet

Source: FHWA
Corpus Christi Harbor Bridge

The Future of the Harbor Bridge – Long Term Solutions

- New Tacoma Narrows Bridge, WA
- Kap Shui Mun Bridge, Hong Kong
- Freemont Bridge, Portland, OR
- Alex Fraser Bridge, Vancouver, Canada
Corpus Christi Harbor Bridge
The Future of the Harbor Bridge – Challenges

Challenges

• Dedication of sufficient funding to schedule and perform the necessary routine maintenance and repairs on the existing bridge until a new bridge is constructed
• Development of a comprehensive financial plan to fund the replacement bridge structure
Summary of Project Phases

• Phase I  Feasibility Study
  Completed in June 2003

• Phase II  Schematic and Environmental Impact Statement (EIS) preparation in the process of being resumed.
  Estimated completion: 2013

• Phase III  Right-of-way (ROW) map preparation and acquisition for the preferred alternative
  Estimated completion: 2018

• Phase IV  Secure funding and construct project
## Summary of Estimated Funding Needed to Construct a Replacement Structure

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>II</td>
<td>Complete Environmental Study</td>
<td>$5,500,000</td>
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<tr>
<td>III</td>
<td>Buy Right-of-Way, Adjust Utilities and Prepare Plans</td>
<td>$65,000,000</td>
</tr>
<tr>
<td>IV</td>
<td>Estimated Construction Cost</td>
<td>$800,000,000</td>
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**Total Funding Needed Estimated at** $870,500,000
What If?