Project Description

- 89’-5” deck width
- 20’-6” girder spacing
- 10” two course deck

Unit 2
391’-515’-391’
= 1297’
Staging Area
Barge Work
Steel Storage

Haunched Section Storage
Preliminary Type Study

Options Investigated (July 2008)

1. Haunched Plate Girder
2. Haunched Plate Girder w/ Substringers
3. Truss
4. Steel Box
5. Concrete Segmental
Preliminary Type Study

Steel Plate Girder Options

- Multi-girder vs. Substringer
- Weights based on prelim design and experience
- Fabricator discussions
- Review of existing structures

**ADVANTAGE:**

Substringer System

Multi-girder Section

Substringer Section
Preliminary Type Study

Life Cycle Costs

- Painting
  - Truss
  - Plate girder – fascia girder only

- Similar Costs
  - Annual maintenance
  - Inspection
  - Overlay
  - Deck replacement
### Preliminary Type Study

#### Life Cycle Costs

<table>
<thead>
<tr>
<th></th>
<th>Unit Rate for Structural Steel - Erected</th>
<th>Structural Steel - Erected Cost</th>
<th>Relative Grade Reduction Cost</th>
<th>Future Painting Cost</th>
<th>Comparative Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel Plate Girder</td>
<td>$2.35 / Lb.</td>
<td>$26.1 Mil</td>
<td>$0</td>
<td>$0.56 Mil</td>
<td>$26.66 MIL</td>
</tr>
<tr>
<td>Steel Truss</td>
<td>$2.47 / Lb.</td>
<td>$25.9 Mil</td>
<td>-$0.5 Mil</td>
<td>$1.45 Mil</td>
<td>$26.85 MIL</td>
</tr>
</tbody>
</table>

**SLIGHT ADVANTAGE:** Girder System
### Preliminary Type Study

**Other Considerations:**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Plate Girder</th>
<th>Truss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel below deck</td>
<td>➢ Fewer erection pieces</td>
<td>➢ Cantilever construction</td>
</tr>
<tr>
<td></td>
<td>➢ No fracture critical</td>
<td>➢ Lighter pieces</td>
</tr>
<tr>
<td></td>
<td></td>
<td>➢ Shipping (no barges)</td>
</tr>
</tbody>
</table>

**Preferred Alternative:** Substringer System
Fabrication

Veritas Steel
- Palatka, FL
Barge shipment
Field Sections
- 135’ long
- 24’ deep
- 150 Ton pieces
Fabrication

Laser scanning
CNC equipment
- Field splices
- Crossframe connections
Shipping

**Challenges**

- 24’ deep girders
- Height restrictions
- Deck v. hopper barges
Shipping Route

Routed through
- Intracoastal Waterway
- Gulf of Mexico
- Mississippi/Missouri River

Project Location

Fabrication Shop
Gavins Point Dam – $Q = 150,000$ cfs
Shipping

Additional Challenges

- 2012 drought v. 2011 floods
- Stranded barges?
- Maritime Law = Arrested Girders
Construction / Erection

Low Bid

- $61.3 Million ($209 / SF)

Fabricated Steel

- $1.76 / Lb.
Acknowledgements

Owners
Iowa Dept. of Transportation
Nebraska Dept. of Roads

Contractor
Jensen Construction Co.

Fabricator
Veritas Steel

Designer
Phil Rossbach
Dusten Olds