Widening of the Huey P. Long Bridge

Tulane Engineering Forum - 2010
Introduction

• Background
• 4 Construction Contracts
  – Main Bridge – Substructure
  – Main Bridge – Superstructure Truss Widening
  – Railroad Modifications
  – Approaches and Main Bridge Deck Widening

• Project Status
  – Project Timeline
  – Construction Photographs
Location

- French Quarter
- New Orleans Metro Area
- Huey P. Long Bridge
Before the Bridge

Southern Pacific Barge crossing Mississippi River, largest barge in the world.

THE “MASTODON” SOUTHERN PACIFIC RAILWAY BARGE. THE LARGEST OF ITS CLASS IN THE WORLD.

CROSSING MISSISSIPPI RIVER AT AVONDALE, TEN MILES ABOVE NEW ORLEANS, LA.
Construction of The Existing Bridge
Construction of The Existing Bridge
Background – Huey P. Long Bridge

- Combined railroad – highway bridge
  - 2 tracks
  - 4 lanes – 9 ft. width
Background – Huey P. Long Bridge

- Very heavily built
- Carries largest modern RR load without distress
- Many years of service life remaining
Project Background

- By widening the existing structure rather than constructing a new river crossing:
  - Reduce environmental impact, property takings.
  - Reduce project cost.
  - Reuse existing right-of-way and traffic corridors.
Project Background

EXISTING

PROPOSED WIDENING
Huey P. Long Widening Project

START PROJECT
WEST BANK RR MOD
WEST BANK APPR.
MAIN BRIDGE PIER, TRUSS, AND DECK WIDENING
EAST BANK APPR.
EAST BANK RR MOD
END PROJECT
Main Bridge Pier Widening

START PROJECT

WEST BANK RR MOD

WEST BANK APPR.

EAST BANK APPR.

EAST BANK RR MOD

MAIN BRIDGE PIER, TRUSS, AND DECK WIDENING

END PROJECT
Main Bridge Pier Widening

EXISTING

PROPOSED WIDENING

Pier A
Piers I & II
Pier III
Pier IV
Widened Pier

Caisson

Steel Frame
Upper Encase
Lower Encase
Existing Pier Conditions

Pier I – North Face
Existing Pier Conditions

Pier II – West Nose
Main Bridge Truss Widening

START PROJECT

WEST BANK RR MOD

WEST BANK APPR.

MAIN BRIDGE PIER, TRUSS, AND DECK WIDENING

EAST BANK APPR.

EAST BANK RR MOD

END PROJECT
Main Bridge Truss Widening

- Cantilever Truss Span
- Simple Through Truss Span

EXISTING

PROPOSED WIDENING
Widened Main Bridge Features

- 2 new trusses added, parallel to existing trusses.
- Roadways widened from 18 ft. to 43 ft.
- Currently: 2 – 9 ft. lanes
  No offset
- Proposed: 3 – 11 ft. lanes
  8 ft. shoulder
  2 ft. offset
Construction and Erection

- Sequence of construction
  - Widening Truss
  - Imbalance
  - Widened Floor System
Maintenance of Traffic Through Construction

- Marine Traffic Maintained
  - same vertical and horizontal clearances

- Rail Traffic Maintained

- Vehicular Traffic Maintained
  - by use of staged construction
Main Bridge
Maintenance of Traffic

WORK PERFORMED IN TRUSS WIDENING CONTRACT
Railroad Modifications - Westbank

- START PROJECT
- WEST BANK RR MOD
- EAST BANK APPR.
- MAIN BRIDGE PIER, TRUSS, AND DECK WIDENING
- EAST BANK RR MOD
- END PROJECT
Railroad Modifications - Westbank

Project Site
Railroad
LA 18
Hwy. 90
EXISTING
Huey P. Long Widening Project
Westbank Railroad Railroad Modifications

Existing Site Conditions
Huey P. Long Widening Project
Westbank Railroad Modifications

Replacement Support

Final Site Conditions
Huey P. Long Widening Project
Westbank Railroad Modifications
Railroad Modifications - Eastbank

START PROJECT

WESTBANK RR MOD

WESTBANK APPR.

MAIN BRIDGE PIER, TRUSS, AND DECK WIDENING

EASTBANK APPR.

EASTBANK RR MOD

END PROJECT
Railroad Modifications - Eastbank

EXISTING

Project Site

Clearview Pkwy.

Jefferson Hwy
Huey P. Long Widening Project
Eastbank Railroad Modifications

Existing Site Conditions

Existing Superstructure and Towers to be Replaced
Huey P. Long Widening Project
Eastbank Railroad Modifications
Approaches & Deck Widening

- **START PROJECT**
- **WEST BANK RR MOD**
- **EAST BANK APPR.**
- **WEST BANK APPR.**
- **MAIN BRIDGE PIER, TRUSS, AND DECK WIDENING**
- **EAST BANK RR MOD**
- **END PROJECT**
Approaches & Deck Widening

Start Project

Bridge City Ave. Interchange

WEST BANK APPROACH

Conflict w/ Existing Rdwy
Main Bridge Deck Widening

WORK PERFORMED IN
APPROACH CONTRACT
Approaches & Deck Widening
Project Timeline

- **Work Completed**
  - Railroad Modifications
  - Main Bridge Pier Widening

- **Work Under Construction**
  - Main Bridge Truss Widening
  - West Bank Approach, Main Bridge Deck Widening, East Bank Approach
Project Status – Completed

Main Bridge Pier Widening

• Letting Date:
  – December 14, 2005

• Notice To Proceed Date:
  – April 10, 2006

• Construction Bid:
  – $ 98,826,907

• Contractor:
  – Massman Construction Co.
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening

09/23/2006
Main Bridge Pier Widening

09/26/2006
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening

G&G Steel

New Orleans
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Main Bridge Pier Widening
Project Status - Completed

Railroad Modifications

• Letting Date:
  – May 10, 2006

• Notice To Proceed Date:
  – August 28, 2006

• Construction Bid:
  – $13,782,713

• Contractor:
  – Boh Bros. Construction Co.
Railroad Modifications - Westbank

Project Site

Railroad

LA 18

Hwy. 90

EXISTING
Railroad Modifications - Westbank
Railroad Modifications - Westbank
Railroad Modifications - Westbank
Railroad Modifications - Westbank
Railroad Modifications - Westbank
Railroad Modifications - Westbank
Railroad Modifications - Westbank
Railroad Modifications - Westbank
Railroad Modifications - Eastbank
Railroad Modifications - Eastbank
Huey P. Long Widening Project
Eastbank Railroad Modifications
Railroad Modifications - Eastbank
Railroad Modifications - Eastbank
Railroad Modifications - Eastbank
Railroad Modifications - Eastbank
Railroad Modifications - Eastbank

State of Louisiana
Department of Transportation and Development
State Project No. 006-01-0022  Route U.S. 90
Huey P. Long Widening (Railroad Modifications)
Buh Bros LLC Completion Photo No: 3  26/11/2005
Main Bridge Truss Widening

- Letting Date:  March 28, 2007
- Notice to Proceed Date:  November 5, 2007
- Construction Bid:  $452,605,568
- Contractor:  Massman Construction Co., Traylor Brothers Inc., and IHI, Inc.
Main Bridge Truss Widening

Industrial Steel Construction
Gary, IN

American Bridge Manufacturing
Coraopolis, PA

New Orleans
Main Bridge Truss Widening

Truss Monitoring

STATIC MONITORING SYSTEM
- 433 Members (777 Vibrating Wire Strain Gages)
- 5 Piers (10 Vibrating Wire Tilt Meters)
- Wind Speed/Direction

DYNAMIC (LIVE LOAD) MONITORING SYSTEM
- 31 Members (50 Electrical Resistance Strain Gages)
Main Bridge Truss Widening
Work Platform
Main Bridge Truss Widening

Floorbeam Modifications

Template Fit Up Check
Main Bridge Truss Widening
Floorbeam Modifications

Installation of Wedge Fill
Main Bridge Truss Widening
Floorbeam Modifications

Installation of Wedge Fill
Main Bridge Truss Widening
Work on Existing Structure – Bottom Chord

07/30/2008
Main Bridge Truss Widening
Work on Existing Structure – Top Chord
Main Bridge Truss Widening
Widening Truss Bottom Laterals
Main Bridge Truss Widening
Remove Existing Sidewalk – Install Temporary Steel Barrier
Main Bridge Truss Widening

Main Bridge Erection - Methods

A = “Stick Build”  B = “Span by Span”
Main Bridge Truss Widening
Main Bridge Erection
Main Bridge Truss Widening

Main Bridge Erection
Main Bridge Truss Widening

Main Bridge Erection
Main Bridge Truss Widening

Main Bridge Erection
Main Bridge Truss Widening

Main Bridge Erection
Main Bridge Truss Widening

Main Bridge Erection
Main Bridge Truss Widening
Main Bridge Erection
Main Bridge Truss Widening

Main Bridge Erection

December 2009
Main Bridge Truss Widening

Main Bridge Erection

December 2009
Main Bridge Truss Widening

Contractor’s Erection Scheme – “Span by Span” Erection

- East Anchor Arm
- Suspended Span
- Through Truss Span
Project Status – Under Construction

West Bank Approach, Main Bridge Deck Widening, East Bank Approach

• Letting Date:
  – March 19, 2008

• Notice to Proceed Date:
  – May 5, 2008

• Construction Bid:
  – $433,950,000

• Contractor:
  – Kiewit Massman Traylor Constructors
Approaches & Deck Widening

- **Start Project**
- **West Bank RR Mod**
- **West Bank Appr.**
- **East Bank Appr.**
- **Main Bridge Pier, Truss, and Deck Widening**
- **East Bank RR Mod**
- **End Project**
Approaches & Deck Widening

Box Culverts
Approaches & Deck Widening
At Grade Roadways – West Bank
Approaches & Deck Widening

Foundations - Westbank
Approaches & Deck Widening
Foundations - Westbank
Approaches & Deck Widening
Substructure - Westbank
Approaches & Deck Widening

Substructure - Westbank
Approaches & Deck Widening

Substructure - Westbank
Approaches & Deck Widening

Substructure - Westbank
Approaches & Deck Widening

Substructure - Westbank
Approaches & Deck Widening

Superstructure
- Westbank
Approaches & Deck Widening

Superstructure
- Westbank
Approaches & Deck Widening

Superstructure - Westbank
Approaches & Deck Widening

Superstructure - Westbank
Approaches & Deck Widening

Superstructure - Westbank
Approaches & Deck Widening

Superstructure - Westbank
Approaches & Deck Widening

Substructure – Pier IVA

Created using Google SketchUp

03/17/2009
Approaches & Deck Widening

Substructure – Pier IVA

09/04/2009
Approaches & Deck Widening

Substructure – Pier IVA
Approaches & Deck Widening

Substructure – Pier IVA
Approaches & Deck Widening

Substructure – Pier IVA
Acknowledgements

Ray Mumphrey
Project Manager, Bridge Engineer Manager

Jan Grenfell
Environmental Representative

Hossein Ghara
Bridge Engineer

Tony Ducote
Project Management Administrator
Acknowledgements

J. Bridger
General Manager

R. Kollmar
Chief Engineer

D. Sponsel
General Superintendant, Bridge

M. Dumas
Bridge Supervisor

A. Marinello
Chief Engineer (Ret.)
Acknowledgements

Juan Murillo
D. McDaniels
B. Frederick
T. Todd
W. Aymond
Design Team

EUSTIS ENGINEER (Geotechnical)
- Gwen Sanders
- William Gwyn

COASTAL ENVIRONMENTS (Environmental)
- Karen Wicker
- Ed Fike
- D.Kelley

Coco Architects (HAER / HABS)
- Wayne L. Coco, AIA

GCR & Associates (Real Estate)
- Gregory Rigamer
- Mona Nosari

Riverlands Surveying
- Stephen Flynn
Design Team – M & M

- W. B. Conway
- D. F. Sorgenfrei
- Z. Prucz
- N. Soong
- B. E. Peterson
- M. L. Sternitzke
- Y. Ouyang
- S. P. Carr
- D. A. Kanger
- C. J. Ledet
- G. P. Doyle
- G. P. Taravella
- T. A. Cole
- J. A. Martin
- J. J. Moore
- R. Mertz
- R. Jackson
- A. Temeles
- J. E. Schade
- B. T. Martin
- L. V. Borden
- G. L. Fasick

Denotes Tulane University Graduate
Design Team – M & M (cont)

Former Team Members

- M. Zeihl
- B. Y. Ikeda
- B. M. Hassett

- J. B. Johnson
- F. A. Aksin
- F. L. Suthon

Denotes Tulane University Graduate
Widening of the Huey P. Long Bridge

Tulane Engineering
Forum - 2010

MODJESKI and MASTERS
Experience great bridges.