Session 9

Mary Lou Ralls

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Graves Avenue Bridge over I-4: How-To Manual

Topic Description

Self-propelled modular transporters (SPMTs) are computer-controlled multi-axle platforms that have been used extensively to lift and move heavy equipment and structures for the petrochemical, offshore, power, and civil engineering industries. In 2004 an international scan team saw these amazing machines moving bridges in Europe. Now this technology is available in the U.S. to move bridges. These presentations discuss the 2006 Graves Avenue/I-4 bridge replacement project. This project is the first in the country to use SPMTs to quickly remove existing spans and install new spans that cross an Interstate highway, to significantly reduce traffic disruption and improve work-zone safety. The manual that's being developed to provide the details needed for the use of SPMTs on future bridge moves will also be discussed.

Speaker Biography

Mary Lou Ralls earned BSCE and MSE degrees from The University of Texas at Austin before joining the Texas Department of Transportation in 1984. At TxDOT she worked in various engineering positions before being appointed the State Bridge Engineer and Director of the Bridge Division in 1999. Mary Lou was chair of the AASHTO Technology Implementation Group's Implementation Panel on Prefabricated Bridge Elements and Systems from 2001 to 2004, and was the AASHTO Co-Chair on the 2004 FHWA/AASHTO/NCHRP international scan on prefabricated bridges. Mary Lou left TxDOT in September 2004 after 20 years of service and is now an engineering consultant and principal of Ralls Newman, LLC. She continues to work to implement scan findings and other accelerated bridge construction initiatives.

Graves Avenue Bridge over I-4

How-To Manual

Session 9/10
Structures General Session /
Construction Projects & Cost Topics

August 1, 2006

Manual on Use of Self-Propelled Modular Transporters to Move Bridges

2004 AASHTO / FHWA / NCHRP International Scan on Prefabricated Bridge Elements & Systems

- ⇨ Use of SPMTs for bridge moves was the top implementation recommendation
- ⇨ Scan Team Implementation Plan (STIP):

- Develop Project Planning Guide for owners including project selection criteria for use of SPMTs and emphasizing the necessity for early project planning, and adequate Right-of-Way needs for construction.
- Prepare draft specifications based on sample project specifications provided to the Scanning Team for states to consider in their projects. The intent is to detail the required qualifications for lifting contractors and reasonable tolerances for placement and distortions of the structure being moved.

Ref.: Prefab Scan STIP

Manual on Use of Self-Propelled Modular Transporters to Move Bridges

William Nickas, Dan Dorgan & Ben Tang requested "how-to" manual for bridge owners per Scan Technology Implementation Plan:

- To document the critical components required to effectively use SPMTs to remove & install bridges
- To include draft specifications for owners to consider for their projects
- To be written in conjunction with FDOT's I-4 / Graves Avenue bridge installation

Manual on Use of SPMTs to Move Bridges

Content

- Introduction
  - Project Selection Criteria / FHWA Decision-making Framework
  - Description of Equipment
- Benefits & Costs
- Planning
  - Traffic Considerations
  - Site Requirements
  - Efficient Use of SPMTs
  - Project Staffing Requirements

Manual on Use of SPMTs to Move Bridges

Content, continued

- Design
  - Possible Design Efficiencies
  - Single-span versus Multi-span Movements
  - Design Assumptions
  - Allowable Temporary Stresses and Deflections
  - Tolerances for Lifting and Positioning
  - Ground Pressure Distribution
  - Allowance for Placement / Fit-up
  - Decks

Manual on Use of SPMTs to Move Bridges

Content, continued

- Contracting Issues
  - Construction Scheme
  - On-site / Near-site Staging Area
  - Traffic Control Plans
  - SPMT Equipment Payment Strategies
  - Contracting Methods
  - Incentives / Disincentives
  - Qualifications of SPMT Subcontractor
  - Performance/ Delineation of Responsibilities

Manual on Use of SPMTs to Move Bridges

Content, continued

- Specifications
  - Temporary Shoring Requirements
  - Moving Equipment Requirements
  - Geotechnical Assessment
  - Geometrical Controls during Move
  - Motion Diagram
  - Construction Tolerances
  - Staffing Requirements
  - Submittal Requirements
  - Example Specifications

Manual on Use of SPMTs to Move Bridges

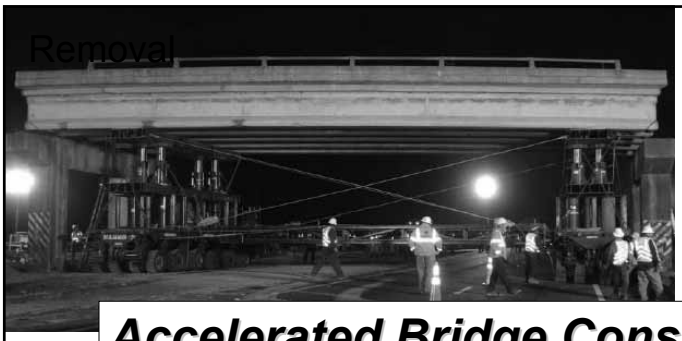
Content, continued

- Lessons Learned
- Case Studies
  - I-4 / Graves Avenue, FDOT
  - I-10 / LA 35, LaDOTD
  - Others …

Draft Manual will be submitted for review this month.

SPMT Availability

- Mammoet – 2004 Prefab Scan Host
  - 1,100 axle lines of SPMTs
- Sarens – 2004 Prefab Scan Host
  - 500 axle lines of SPMTs
- Barnhart Crane & Rigging
  - 108 new axle lines of SPMTs
- Bigge Crane & Rigging (?)
- Fagioli Group
- Jim Parkinson Ltd.
- Abnormal Load Engineering Limited (ALE)



Thank You

Accelerated Bridge Construction