T–19 Software and Technology
Scot Becker T–19 Chair
T–19 Fostering 3d Technologies

Scot Becker
Director – Bureau of Structures
State Bridge Engineer
Wisconsin DOT
Presentation Overview

- The Structure Life Cycle for the Owner
- Examples uses of 3d technologies in Wisconsin
- Obstacles
- T–19 Moving forward with 3d technologies
A Structure Life Cycle for the Owner – 3d Information

- Project Formulation and Identification
  - NEPA process
  - Public involvement
- Project Initiation
- Preliminary Design
- Final Design
- Construction
- Operation and Maintenance
- Demolition
Examples uses of 3d technologies in Wisconsin
Milwaukee – Mitchell IC Tunnels
3D–4D BIM – Mitchell IC Tunnels – Construction with Schedule
3D–4D BIM – Mitchell IC Tunnels – Construction with Schedule
Prairie Du Chien Arch Investigation
Project Outreach and Description

HOAN BRIDGE SCOPE OF WORK

I-794 (LAKE FREEWAY)
MILWAUKEE COUNTY, WI

QUANTITIES FOR MAJOR ITEMS OF WORK

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANTITY</th>
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<tbody>
<tr>
<td>CONCRETE DECK REPLACEMENT</td>
<td>34,000 CUBIC YARDS</td>
</tr>
<tr>
<td>PAINTING</td>
<td>3,000,000 SQUARE FEET</td>
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<tr>
<td>CONCRETE REINFORCING STEEL</td>
<td>9,000,000 POUNDS</td>
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Deck Removal and Construction Sequencing
Refined Complex Localized Models
LIDAR for Existing Component Locations
Visualization – Structure
Component Integration
Layout and Interdisciplinary Design
Structure components – Added to Global Model
Existing and Proposed
Obstacles to mainstream 3d

- Vendor supplied tools proprietary – fragmented, and single usage
- Little incentive to change
- Culture established in current work flow / 2D plans
- Many different stages re-create data
- Bridge community “slower to change”
- Tools need to clearly show efficiencies, and improvements
T–19 moving forward with 3d technologies

- Partner with other technical committees
- Shepherd SCOBS objective to move information modeling forward
- Opportunities – Fabrication
- Next Steps
Partner with other technical committees

- T – 5
  - Refined Analysis

- T – 10
  - Refined analysis, concrete bridge models, supporting expert task groups

- T – 14
  - Refined analysis, steel bridge models – supporting expert task groups

- T – 18
  - Refined analysis, rating models, NDT technologies, bridge management

- AASTHOWare Bridge
Prioritized Objective 7 in the Future Plan
  ◦ MODEL AND MANAGE INFORMATION INTELLIGENTLY

T – 19 will shepherd this objective working with all the technical sub committees and the full subcommittee
National Research Activities
Objective 7

- Critically assess these technologies to identify the approach forward
- Identify research needs to move these technologies into practice
- Develop tactics to address cultural and technological barriers to implementation
- Develop guidelines, guide specifications or specifications, as appropriate, to allow implementation
- Implement intelligent information modeling and management
Short term measures for Objective 7

Identify and assess information modeling and management techniques viable for highway bridge practice, develop tactics to overcome barriers to implementation, develop protocols for these techniques.
Opportunities – Fabrication
Computer Guided Model Cutting
CGC – Direct!
Next Steps

- T – 19 Member Comments and Suggestions
- General Audience Suggestions
Next Steps

- Continue to partnering and outreach
- Request Gregg for additional T-19 members to assist with effort
- Assign additional T-19 liaisons to new TRB research efforts resulting from new SCOBS strategic theme
- Propose a future AASHTO / FHWA summit to discuss National Standards and Implementation including all stakeholders
T-19 Business
Strategic Direction Discussion

- **Mission Statement**
  - Fostering an environment for advancing the use of software and technologies for bridges and structures

- **Actions/Activities supporting Mission**
  - **Web Portal**
    - Software Inventory  Marvin / Josh
    - Manage SCOBS Surveys  Josh
  - **Participate on National Initiatives and committees**
    - FHWA Interoperability – Josh and Scot
    - Participate in JTCEED – Scot, Eric
  - **Shepherd SCOBS objective 7 for information modeling**
  - **AASHTOWare Bridge Liaison Scot**
  - **Long Term Bridge –**
  - **Mid Year Webinar**
  - **Other technical Sub – Committee Liaisons**
    - NTD
    - Structural Health monitoring
    - Refined Analysis
    - Permitting
Technologies on the horizon 2012 / 2013

- 3d analysis
- 3d modeling and beyond
- Structural monitoring
- Model simulations
- Cloud computing
- Enhanced information collection
  - Lidar
  - Mobil apps and devices
- WIM technologies – VWIM – BWIM
- Health monitoring
- Data exchange – National Standard