

OBS Research Initiatives



OBS Research Focus Areas

- Building Information Modeling (BIM) for Bridges and Structures, 3D, Visualization, and Virtual Reality (VR) Applications
- Ultra High Performance Concrete (UHPC)
- Accelerated Bridge Construction (ABC)
- Bridge Preservation Practices
- Structural Health Monitoring (SHM) and Load Testing
- Non Destructive Evaluation (NDE) Tools
- Design and Constructability Investigations

BIM, 3D, Visualization, and VR: To improve Constructability, Communication, and Asset Management.

- **3D Implementation:** Implementation of 3D in the design of bridges and structures. Current effort includes pilot projects.
- **BIM for Bridges and Structures:** Includes AASHTO COBS T-19 initiative to develop guidelines, work flows, and exchanges/processes from design to asset management based on IFC.
- **VR and Visualization:** Develop VR and visualization tools and applications.



UHPC: To extend the service life of bridges and structures

- **UHPC Deck Overlays:** Includes pilot projects and collaboration with researchers and industry.
- **UHPC in ABC Joints and Connections:** Continue to collaborate locally and nationally with researchers.
- **UHPC Design and Construction Guide Specifications:** To support FHWA initiative for developing AASHTO guide specifications for UHPC.

ABC: To improve safety during construction by reducing exposure to construction zone hazards, reduce public inconvenience, reduce impact on businesses.

- **Development of Prefabricated Bridge Railing:** Develop a crash tested prefabricated railing for ABC projects.
- **Improve and Evaluate Connection Details:** Continue to invest in funding local research projects.
- **National Collaboration:** Continue to collaborate with AASHTO T-4, TRB Joint Subcommittee on ABC, and the ABC-UTC.



SHM and Load Testing: To improve our ability to evaluate the performance of bridges and manage bridge assets.

- **Implementation of SHM:** Continue our implementation effort of SHM and develop a strategy on its use in bridge evaluation, rating, and asset management.
- **Use of Load Testing:** Continue to make use of load testing to improve/supplement capacity evaluation and in some cases remove load postings.



Bridge Preservation: To improve the durability of bridges

- Implementation of Service Life Design - SHRP2 R19A funded implementation projects:
 - Use of stainless steel reinforcing in bridge decks
 - Use of A1010 steel in bridge girders
 - Investigate the relationship between chloride ingress and the effectiveness of epoxy deck overlays.
- Epoxy Injection of Decks
- Thin Deck Overlays and Sealers
- Beam End Repairs
- HPC Deck Overlays Shrinkage Cracking
- Fiber Reinforced Concrete for Bridge Decks

NDE Tools: To improve accuracy and reliability of bridge evaluation

- **Impact Echo for deck evaluation:** SHRP2 R06A Round 4 grant funded the purchase of Impact Echo scanner.
- **Evaluation of 3D GPR:** SHRP2 R06A Round 7 grant funded the demonstration of 3D GPR on several decks.
- **Thermal Imaging:** SP&R funded the purchase of thermal imaging cameras for use on bridge decks and substructure.
- **Sonar Imaging:** SP&R funded the purchase of sonar imaging system for use on underwater inspections.
- **Phased Array UT:** SP&R funded the purchase of phased array UT system for crack detection.

Design and Constructability Investigations: To improve various design details and constructability

- Performance of Flooded Backfill and Improved Bridge Approaches
- Early Age Transverse Deck Cracking
- Elimination of Median Deck Joint
- Deck Negative Moment Reinforcing over Piers
- Exterior Beam Rotation during Deck Placement
- Shrinkage and Temperature in Frame Piers
- Loading on Sign Support Structures
- Mass Concrete
- Water Management at Bridge Ends and Use of Semi Integral Abutments
- Link Slabs
- Alternative Abutment Piling
- Partially Grouted Revetment
- Heated Concrete
- Self Cleaning Culverts
- Drilled Shafts Resistance Factors Calibration
- Pier Collision Detailing