Construction Inspection for Digital Project Delivery

Alexa Mitchell, PE – Project Manager and Principal Investigator, WSP
Richard Duval, PE – Contract Officer Representative, FHWA
Research Objectives

...to document effective practices and management of digital data used during construction inspection to develop guidance for managing, disseminating, and integrating inspector’s digital data.
The Research Team

Thank you to the agencies who have participated in interviews and have submitted case study candidates for consideration.

PRINCIPAL IN CHARGE
Dr. Jagannath Mallela

PROJECT MANAGER
Alexa Mitchell, PE

COR
Richard Duval, PE

BUSINESS PROCESSES AND GUIDANCE
Keyur Shah | Business Process Analytics Expert
Jonathan Gustafson, PLS, GISP | Survey and GIS Expert
Doris Lee | Research Assistant

PRACTICAL APPLICATIONS
Stacy Kubit, PE | Construction Inspection
Randy Ivory | Document Management
David McPherson | Application Development
Darren Hardy | Construction Surveying
Background and Previous Efforts

Addressing Challenges in Automation in Highway Construction, Part II
Effective Use of Geospatial Tools in Highway Construction
Utilizing 3D Digital Data in Highway Construction
Addressing Challenges and ROI for e-Construction
Determination of Improved Pavement Smoothness when Utilizing 3D Modeling and AMG

Construction Inspection for Digital Project Delivery

EDC-2: 3D Engineered Models for Construction
EDC-3: 3D Engineered Models: Schedule, Cost, and Post-Construction
EDC-3: e-Construction
EDC-4: e-Construction and Partnering
Focus of the Research

- Tools used by inspector
- Source of data
- Data management
- Policies to enable digital project delivery
- Technical support and training available to inspector
Research Update to-Date

Phase I
- Literature Search
- Select Agency Interviews
- Interim Report
- Literature Synthesis Report
- Interview Notes
- Case Study Selection Criteria

Phase II
- Case Studies Solicitation
- Screening and Prioritization
- Site Visits and Documentation
- Process Analysis and Workflow Mapping
- Develop Guidance
- Draft Final Report, and TechBrief
- Conduct Webinar

Project Management

States Interviewed
- Arizona
- Connecticut
- Missouri
- Montana
- Nevada
- Iowa
- Oregon
- Pennsylvania
- Texas
Research Update to-Date

- Vision for Digital Data
- 3D Modeling for CE&I
- Standard Equipment
- e-Construction Practices
- Close-out and Asset Commissioning
- Workforce Development, and Policy
Case Studies
<table>
<thead>
<tr>
<th>Equipment and sensors</th>
<th>Systems and practices</th>
<th>Approach for training</th>
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<tbody>
<tr>
<td>• Tablets and/or laptops</td>
<td>• CMS/DMS</td>
<td>• Peer to peer</td>
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<tr>
<td>• GNSS rovers for CE&amp;I</td>
<td>• Digital daily reports</td>
<td>• Formal training</td>
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<tr>
<td>• Low accuracy GPS units for locating features</td>
<td>• Digital as-builts</td>
<td>• Online/on-demand</td>
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<td></td>
<td>• Digital tracking</td>
<td>• On-demand technical support</td>
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<td>• Material sources</td>
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<td>• Punch lists</td>
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<td></td>
<td>• Warranty items</td>
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<td>• Force accounts</td>
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</tbody>
</table>
Second Set of Case Studies

— Remote project inspection
  — High mast cameras
  — UAS

— Document
  — Who is currently using these technologies?
  — How and why are they being used?
  — How are legal and regulatory issues being addressed?
Laptops or mobile devices
Construction management systems and e-daily reports
Digital material sources, punch lists, warranty items or force accounts
GNSS rovers for CE&I
Remote imagery (UAS)
Digital 3 as-builts (CADD or GIS)
Legend:
- Laptops or mobile devices
- Construction management systems and e-daily reports
- Digital material sources, punch lists, warranty items or force accounts
- GNSS rovers for CE&I
- Remote imagery (UAS)
- Digital 3 as-builts (CADD or GIS)

States participating in first round of case studies.

Site visit: Aug 22–24
Tentative site visit: Oct.
Site visit not scheduled yet

Tentative site visit: Nov.
Site visit not scheduled yet
Candidates for second round of case studies
Next Steps

August 2017

- Select first round of case studies
- Finalize schedules for site visits

February 2017

- Complete all site visits
- Organize notes

May 2018

- Analyze results
- Develop guidance

Nov. 2018

- Final report
- TechBrief
- Webinar