e-Construction and Partnering: A Vision for the Future

Participant Workbook

Every Day Counts (EDC-4)
Regional In-person Summits

Fall 2016

every day counts
An Innovation Partnership with States

U.S. Department of Transportation
Federal Highway Administration

Session Agenda

Topic	Presenter/Facilitator
Welcome and Introductions	Facilitator
Introduction to e-Construction and Partnering: A Vision for the Future	FHWA Presenter
State DOT e-Construction and Partnering	State DOT #1
State DOT e-Construction and Partnering	State DOT #2
Presentation Q&A	All
e-Construction and Partnering Maturity Matrix	Facilitator
Roundtable Discussion on Implementation Activities	Facilitator

How to Use this Workbook

1. **Scan through the entire workbook** prior to session start.

2. **Take notes** in the open space during the presentations by answering the questions posed. Relate your answers to the presentation information given.

3. **Review the maturity matrix** for topics to focus on during the presentations. What areas are you most interested in learning about? What will help your agency the most?

4. Based on the maturity matrix topics review, **answer the discussion questions** with focus on what you need to advance e-Construction and Partnering in your State.

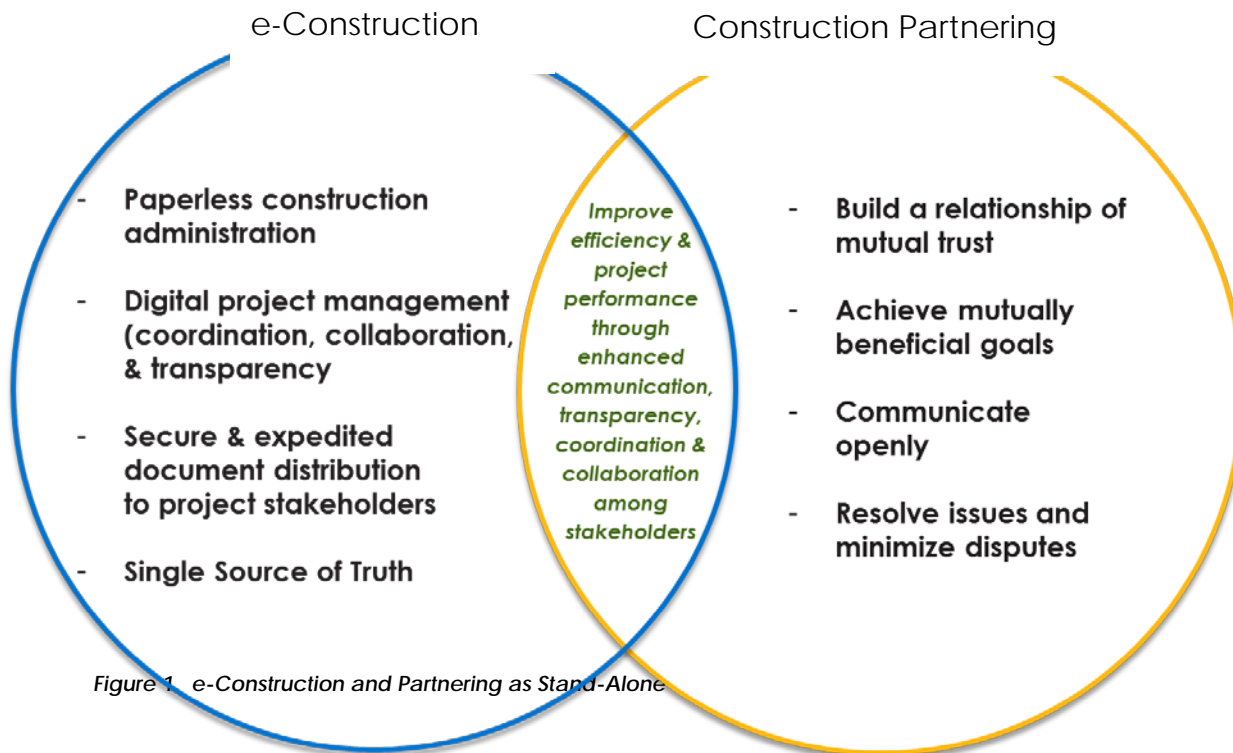5. **Scan the QR code** from your mobile device to access the presentations before or after the session. Or, go directly to the website: https://www.fhwa.dot.gov/construction/econstruction/overview.cfm.

Background on e-Construction and Partnering

The Federal Highway Administration (FHWA), in cooperation with the American Association of State Highway and Transportation Officials (AASHTO) is promoting the implementation of e-Construction and Partnering through the Every Day Counts (EDC) initiative. EDC is a state-based model to identify and rapidly deploy proven but underutilized innovations to shorten the project delivery process, enhance roadway safety, reduce congestion and improve environmental sustainability.

Why **e-Construction** and **Partnering**? Both topics, which are complementary, have stand-alone benefits and support improved project delivery. e-Construction technologies provide transparency across agencies between the owner and construction delivery teams while enhancing Communication, Coordination, and Collaboration. Partnering, whether formal or informal, is an exercise in delivering shared project goals through building relationships of mutual trust. Renewed interest in Partnering among industry stakeholders is driven by the desire to realize quantifiable reduction in claims as well as the prevalence of delivering mega-projects through alternate delivery methods. Figure 1 shows the primary benefits of e-Construction, the primary benefits of Construction Partnering, and the synergies between the two topics.

e-Construction   Construction Partnering

e-Construction
- **Paperless construction administration**
- **Digital project management (coordination, collaboration, & transparency**
- **Secure & expedited document distribution to project stakeholders**
- **Single Source of Truth**

Improve efficiency & project performance through enhanced communication, transparency, coordination & collaboration among stakeholders

Construction Partnering
- **Build a relationship of mutual trust**
- **Achieve mutually beneficial goals**
- **Communicate openly**
- **Resolve issues and minimize disputes**

Figure 1. e-Construction and Partnering as Stand-Alone

States are realizing the benefits of paperless project delivery using e-Construction technologies. e-Construction includes electronic processing of all construction documentation by project stakeholders including electronic document routing/approvals (workflows and e-signatures); digital management of all construction documentation in a secure environment allowing data collection and distribution to all project stakeholders through mobile devices and web-based platforms. This approach enhances partnering among stakeholders on project teams, helping to build a relationship of mutual trust within agencies, across agencies, and with the private sector. The full value of e-Construction is only fully realized by the use and implementation of effective partnering. By its nature, collaboration through e-Construction technology is an exercise in partnering, elevating the basic principles of partnering to a standard practice, through actions such as:

- Alignment/Integration of project teams
- Agreed-upon and published roles of project team members

- Tools to promote accountability
- Issue resolution through early identification
- Pre-established workflow/approval processes

Great progress has been made in the implementation of e-Construction technologies as a result of the EDC-3 Implementation Plan developed by FHWA. However, there is more that can be done to meet the goal of 30 State DOT's institutionalizing e-Construction technology by adopting the innovation as a standard process or practice. Some of the EDC-3 activities that have assisted State agencies, FHWA, contractors, IT staff, consultants, and suppliers include:

- coordination of peer-to-peer exchange workshops
- regional e-Construction workshops
- nationwide webinars
- FHWA Division Office mobile device pilot (tablets)
- a return on investment study performed by FHWA

Nearly all States are exploring use of paperless project delivery.

The EDC-4 initiative will establish the following guidelines for **Innovation Implementation Stages:**

Not Implementing	The state is not pursuing the innovation.
Development	The state is collecting guidance and best practices, building support with partners and stakeholders, and developing an implementation process.
Demonstration	The state is testing and piloting the innovation.
Assessment	The state is assessing the performance of and process for carrying out the innovation and making adjustments to prepare for full deployment.

Institutionalized	The state has adopted the innovation as a standard process or practice and uses it regularly on projects.

Figure 2. e-Construction Lead States (August 2016)
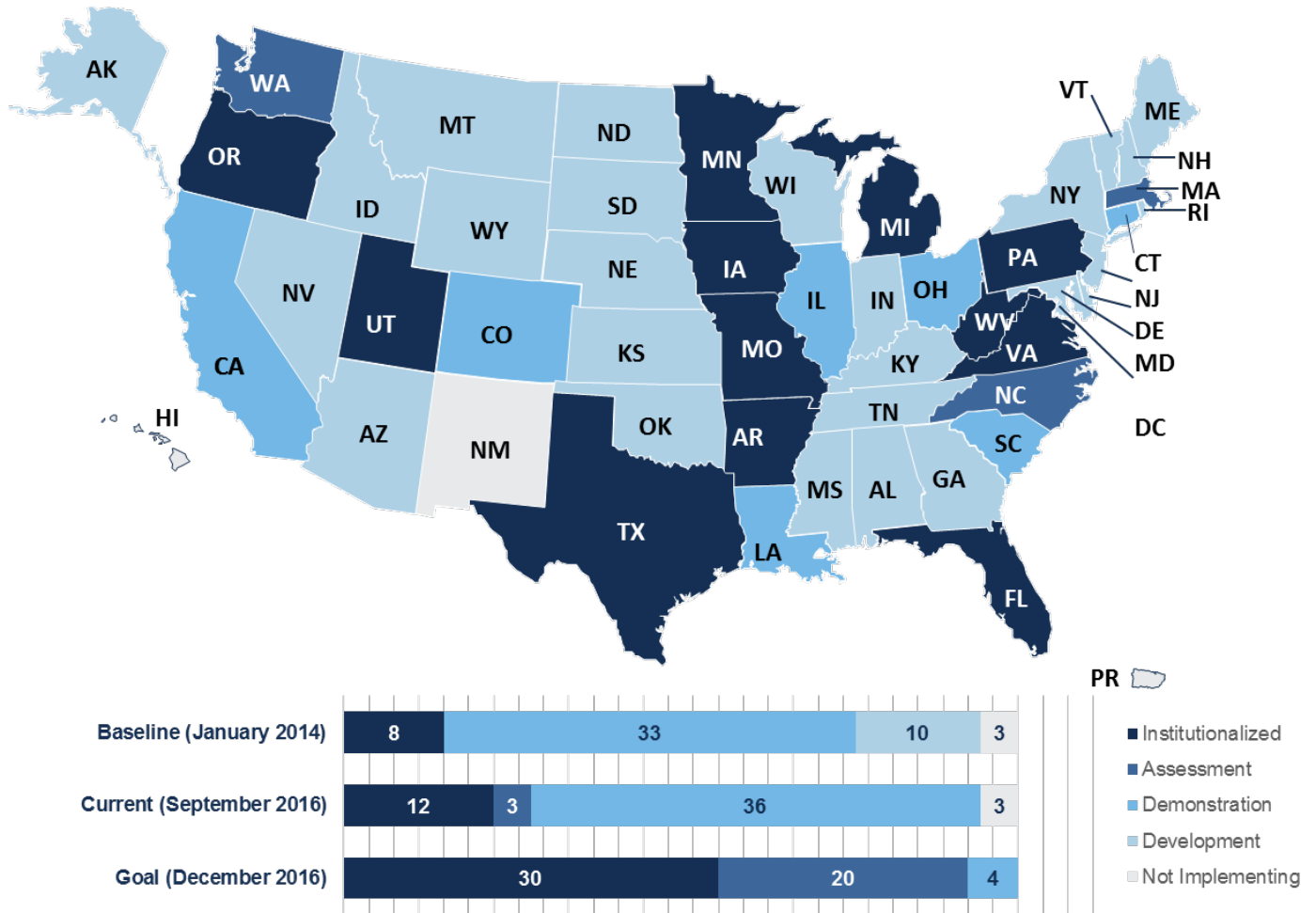
e-Construction and partnering have the potential to increase the quality, efficiency, communication, collaboration, environmental sustainability, and productivity of the construction industry at large while saving on printing costs, time, postage, and document storage while increasing transparency for all stakeholders. Substantial savings are realized in the construction process by avoiding delays, eliminating rework, and accelerating

construction through use of innovative technology and collaborative processes. Through enhanced awareness, promotion of benefits, and real-world examples of applications, the highway industry is ready to reap the benefits of implementation.

In order to assist States with implementation of e-Construction and partnering, FHWA and AASHTO sponsored this Regional Summit to share information about benefits, lessons learned, future enhancements, and how to find additional information and resources.

For more information, contact

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FHWA Presentation Notetaking

Consider the following questions as you document key points during the FHWA presentations.

How could your state benefit from a Peer Exchange?

Have you attended a regional e-Construction Workshop? How could you or your colleagues benefit from attending?

Where do you go to find resources for e-Construction?

Does your State have buy-in from upper management or executive leadership in moving forward with e-Construction technology?

How do you feel your State compares with others in use of e-Construction technology?

Does your State's partnering experience integrate e-Construction tools and technology?

State DOT Presentation Notetaking

Consider the following highlights from each presentation and answer the questions on the next page about your current practices as they relate.

Arkansas Highway and Transportation Department (AHTD)

AHTD is implementing the Interstate Rehabilitation Program, with nearly $1.2 billion in projects under construction or scheduled. The Connecting Arkansas Program has over $1.8 billion in projects under construction or scheduled. Arkansas has institutionalized:

- A collaboration tool for project document management (DocExpress) including workflow approvals and electronic signatures
- AASHTOWare Project Construction and Materials
- Internally developed custom reporting tools for querying SiteManager data and producing reports for contract management

California Department of Transportation (Caltrans)

Caltrans has about 18,000 employees split between project delivery and maintenance and is currently administering over 800 construction projects valued at $8.7 billion. Caltrans has a formal Construction Partnering program with a guidebook on partnering facilitation. Caltrans is piloting tablets devices in the field as a way to reduce support costs by having plans, cross-sections, and other documentation readily accessible. They are also piloting two daily report applications, including one department developed application.

Florida Department of Transportation (FDOT)

FDOT manages over 500 active construction contracts with total value of over $11B. For e-Construction, a project collaboration tool includes workflow processes with individual access for approvals. Project collections allow updates to projects that then update all users with access to that collection. FDOT has institutionalized:

- A customized software platform for project collaboration (ProjectSolve)

- iPads for field data collection, input through Citrix interface to SiteManager, and secure access for specific project stakeholders through BlueBeam software
- AASHTOWare products such as SiteManager with Citrix access from the field
- Formal partnering on a small number of contracts

Iowa Department of Transportation (IADOT)

IADOT has approximately 300 cross-trained inspectors within six districts and 14 resident engineer offices. IADOT recently performed a pilot project on e-Ticketing – a concept to digitize the materials ticket process and improve worker safety for inspectors that collect tickets. IADOT has institutionalized:

- Use of DocExpress as a document management system for construction and materials records
- Electronic Reference Library (ERL) for standard specifications, plans, manuals, and handbooks
- ProjectWise for design file management

Missouri Department of Transportation (MoDOT)

In FY 2015, MoDOT's construction program was valued at $720M, with $596M programmed for FY 2016. MoDOT has a total of 330 construction and materials inspectors and technicians. MoDOT has institutionalized:

- SiteManager for contract administration, materials management, pay estimates and quantities, and change orders
- iPads and Windows Tablets with hotspots
- BlueBeam Revu for digital signatures and final plans mark-ups

Ohio Department of Transportation (ODOT)

Ohio DOT is incrementally implementing the usage of mobile technology for reporting, inspecting, and documenting the progress of a project. ODOT has converted inspection forms to electronic format, distributed mobile devices to field staff, implemented Mobile Inspector app to replace daily work report entry, and is using digital signatures for change order documents.

ODOT has a formalized Construction Partnering Program, and an informal or formal partnering session is required on every project.

Oregon Department of Transportation (ODOT)

Oregon is in a test pilot phase of paperless construction using an Electronic Document Management System (EDMS) and electronic forms for inspection and payment documentation. ODOT has institutionalized:

- AASHTOWare Project Modules
- ProjectWise for design and construction documentation management, including workflows, materials certifications, and contract documents
- Use of Windows Tablets for field data collection and remote applications (using hotspots)

Pennsylvania Department of Transportation (PennDOT)

PennDOT is directly responsible for approximately 40,000 roadway miles and 25,000 bridges in Pennsylvania, maintaining a transportation network in strong partnership with federal and local governments, planning partners, and communities. PennDOT's implementation of e-Construction technology was a grass-roots effort, including development of tools technology in-house to best meet their needs. PennDOT has institutionalized:

- project collaboration portal sites on a SharePoint platform to manage submittals and provide collaboration resources
- automated field data collection system through an internally-developed program
- a web-based electronic construction and materials management system
- electronic document management system for records retention
- use of iPads for collection of construction data in the field

Consider the following questions as you document key points during the State DOT presentations.

Utah Department of Transportation (UDOT)

UDOT oversees construction for approximately 170 projects per year, covering a $700-$800 million program. UDOT's adoption of e-Construction technology included an analysis of their project management process,

including determination of the adequacy of legacy systems as compared to committing to new systems. UDOT has institutionalized:

- automated field data collection system through a proprietary program that was publicly-procured (MasterWorks by Aurigo)
- ProjectWise for document storage and archiving
- use of mobile devices for collection of construction data in the field, including various laptops, tablets, and smartphones, which are all compatible with their field data collection system

West Virginia Division of Highways (WVDOH)

WVDOH has an annual construction program of approximately $600M, with almost 900 active construction projects valued at more than $1B. In West Virginia, 93% of highways are State maintained and the roadway network is the 6th largest in the US. WVDOH has institutionalized:

- iPads and Windows Tablets for field use, including SiteManager approvals and change order approvals
- Use of ProjectWise for file storage and sharing
- Digital signatures through project collaboration software (DocExpress)

How are your e-Construction and Partnering practices similar to or different from the State DOT presentations you heard?

What e-Construction technologies is your state piloting in the next 12 months?

Which technologies do you see as providing the greatest benefit to your agency (mobile inspection software, as-built drawing generation tools, etc.)?

What plans do you have for using e-Construction data for advanced applications such as asset management or use on P3/Design-Build mega-projects?

What types of partnering practices are you most interested in from the presentations?

e-Construction and Partnering Maturity Matrix Tool

This maturity matrix tool is designed to allow users to assign ratings to an organization's current practices. The tool will help assess activities, identify actions and priority areas for improvement, establish a baseline, allow for monitoring of changes over time, and facilitate sharing of practices among transportation professionals.

Consider the elements of the assessment tool during the session and complete the handout worksheet; revisit your responses annually to monitor implementation of e-Construction and partnering. This tool can be shared with others within your organization or completed using a facilitated team meeting.

Scoring

Using the following scoring guidelines, score each question on a scale of 1 to 10, with a rating of 6 representing that the agency has implemented the item:

Phase	Rating and Characteristics
Initiation	***Agency has acknowledged the need for this item (scoring range: 1-2)*** • Does agency management acknowledge the need for a particular item? • Has exploratory research taken place to assess the benefits of this item? • Does management support further development of this item's requirements?
Development	***Agency has developed a plan or approach to address this item (scoring range: 3-4)*** • Has the agency developed a plan or approach to address the item's requirements? Has the agency started to investigate the feasibility of implementation? • Does the agency have standards and guidance to enable the item's implementation? • Does the agency have the approvals necessary for implementation? • Are resources in place to support the adoption of this item?

Plan Execution / Demonstration	**Agency is executing or has executed a plan or approach to address this item (scoring range: 5-6)** • Is the agency implementing/carrying out the requirements of this item? • Has the agency allocated financial or staff resources necessary for the item's execution? • Have appropriate personnel been trained to execute the item's requirements? • Has a process owner been established?
Assessment	**Agency has assessed this item's performance and its success in achieving agency goals and objectives (scoring range: 7-8)** • Has the agency assessed how well this item performs in reducing costs, time, and improving quality? • Has the agency assessed the process for carrying out this item? • Has the agency implemented appropriate changes to the requirements of this item based on performance assessments?
Adoption / Institutionalization	**Agency has institutionalized this item into its project execution process and culture (scoring range: 9-10)** • Has the agency integrated the requirements of this item into quality improvement processes? • Are the requirements of this item integrated into agency culture? • Are the requirements of this item included as part of the employee performance rating system?

Using the following table, score each statement based on the above rating guidelines and record the score in the box to the right of each question. For example, if the agency has implemented digital signatures but is not yet evaluating the process to generate ideas for improvement, consider assigning a rating of 5. A rating of 6 or above means that the agency has implemented the item in the statement.

e-Construction and Partnering Maturity Matrix

Organization: _____

Name/Title/email: _____

Please complete the loose page version of this maturity matrix and turn it in to the session facilitator, and keep the workbook version for future use.

e-Construction Statements My Agency…	Rating (1-10)
1. **has DOT or State agency IT staff members that are directly involved and actively participating in e-Construction deployment**	
2. **has adopted electronic or digital signatures (has done away with wet signatures)**	
3. **digitally seals design documents and/or plans for bidding and contracts**	
4. **uses a formal document management system for document transmission and managing correspondence on construction projects**	
5. **uses electronic bidding which requires contractors to submit all bids through e-mail, a website, or portal. Documents are at least emailed with no discs, hard copy mailings, postage, or in-person delivery.**	
6. **uses an electronic construction management system to store and manage construction data (ex: inspection reports, materials, labor compliance, etc.)**	
7. **uses mobile devices to capture data for inspection reports and to perform quality assurance on construction projects**	
8. **uses project collaboration tools for electronic approvals within project management workflows, including approvals from outside entities.**	
9. **has electronic tools to gather material data delivered to the project site (ex: RFID tags, bar or QR codes, e-ticketing)**	
10. **has electronic tools to gather material test results for data storage and analysis**	
11. **has electronic tools to receive and analyze labor compliance information (ex: AASHTOWare Civil Rights and Labor, eMars, LCP Tracker)**	
12. **has electronic tools to document as-built conditions (ex: BlueBeam drawings)**	

Partnering Statements My Agency…	Rating (1-10)
1. has a formal Partnering program	
2. has established Partnering tools (ex: Partnering Manual, training, standard specifications, special provisions, etc.)	
3. has a process to track and evaluate Partnering Performance Measures for schedule impacts, change orders, cost growth, disputes / claims, etc.	
4. analyzes Partnering metrics to determine project performance in terms of cost and schedule	
5. analyzes Partnering metrics to determine project performance in terms of safety and quality	
6. applies Partnering concepts to oversight of local agency projects	
7. uses informal partnering concepts in day-to-day project administration to resolve project issues and disputes	
8. uses information technology (ex: e-Construction, 3D-4D modeling) as a tool to facilitate project Partnering	
9. uses formalized Partnering on traditional Design-Bid-Build projects	
10. uses formalized Partnering on projects using alternative delivery methods (ex: Design/Build, CMGC, P3)	

e-Construction and Partnering Roundtable Discussion

During the roundtable discussion, the facilitator will pose the following questions for input from participants. Consider these questions before the session begins and document the primary needs of your organization in further implementation of the concepts presented.

e-Construction

What are your observations/suggestions regarding EDC-3 activities?

What barriers exist to your agency's implementation?

FHWA implementation plan: What can we do to further advance the deployment of e-Construction?

Construction Partnering

How does your agency use/view construction partnering and what benefits have you experienced?

What are some of the barriers?

FHWA implementation plan: What can we do to further advance the renewal of Partnering?

e-Construction/Partnering Synergies

What are the synergies for your agency that you see in the implementation of the e-Construction and partnering principles presented?

How might the current partnering practices of your agency accelerate or enhance the implementation and benefits derived from e-Construction?

e-Construction and Partnering Resource Links

FHWA Every Day Counts website
https://www.fhwa.dot.gov/innovation/everydaycounts/

FHWA e-Construction website
https://www.fhwa.dot.gov/construction/econstruction/

FHWA Construction Partnering website
https://www.fhwa.dot.gov/construction/partnering/

Florida DOT e-Construction How-To Guide
https://www.fhwa.dot.gov/construction/econstruction/florida/howto.pdf

Michigan DOT e-Construction Wiki website
http://mdotwiki.state.mi.us/construction/index.php/E-Construction

Article on Iowa DOT e-Ticketing pilot project
http://www.transportationmatters.iowadot.gov/2015/12/eticketing-show-promise-of-speeding-process-and-improving-accuracy-at-asphalt-job-sites.html

Field Guide to Partnering on Caltrans Construction Projects
http://www.dot.ca.gov/hq/construc/partnering/documents/Field_Guide_to_Partnering_on_Caltrans_Construction_Projects_final.pdf

QR Code Link
https://www.fhwa.dot.gov/construction/econstruction/overview.cfm

Glossary of e-Construction and Partnering Terms

Alternative Dispute Resolution (ADR) – Utilizing a method of mediation or arbitration as a means to resolve disputes as opposed to litigation.

As-Built Drawings – Record drawings of completed construction projects or project elements.

Authentication – To establish the authorship or origin of conclusively or unquestionably; the use of digital certificates to establish validity and uniqueness.

Automated Forms – Electronic versions of forms that automatically populate or prompt users to enter data, and merges information into a completed version of the form.

Business Process – A collection of linked tasks which find their end in the delivery of a service or product to a client; a set of activities and tasks that, once completed, will accomplish an organizational goal.

Claim – A demand or assertion by one party seeking payment of money or other compensation with respect to the terms of the Contract, or a dispute in question between Owner and Contractor in reference to the contract.

Collaboration – The action of working with someone to produce something, with the goal of a successful delivery of a highway construction project.

Common Goals – Goals established for the benefit of more than one party that have a defined end result that is mutually beneficial.

Construction Administration Delivery Process – The established process by which the oversight of construction activities is monitored, recorded, and tracked, including filing procedures, the tracking/logging of submittals, and the hierarchy of review.

Data Hosting – The activity or business of providing storage space and access for websites or file sharing applications.

Decryption – The process of converting encrypted data back into its original form, so it can be understood or read.

Design-Bid-Build – A project delivery method through which a project is designed first by an entity, then bid and constructed by a second entity.

Design-Build – A project delivery method through which a single contract is awarded to one entity to deliver both design and construction of a project.

Digital Signature – An electronic signature that can be encrypted, certified, and used on electronic forms and documents.

Dispute - Disagreement over the existence of a legal duty or right, or over the extent and kind of compensation that may be claimed by a party for a breach of such duty or right.

Dispute Resolution (or Review) Board (DRB) – A group of neutral individuals selected by parties to provide review of project documents and provide advisory recommendations to assist in resolving disputes.

Dispute Resolution Plan (DRP) – A written plan governing the settlement of disputes between parties through a set of rules and processes.

Electronic Approvals – Approval and signing process enabling individuals and organizations to quickly authorize and sign and approve documents and transactions in an electronic or on-line forum.

Electronic Document Routing – A business process where a document is passed from one user to the other, often via a project collaboration site, using email notifications and task assignments. Each user(s) in the path of the defined workflow will be able to perform a variety of tasks such as review a document, edit attached documents, add attachments, fill forms and much more before passing the batch to the next person or persons in the path.

Encryption – The conversion of data into a format that cannot be easily understood by unauthorized people.

Firewall – An application that monitors traffic between an internal network and the internet and regulates the type of network traffic that can pass through it.

Formal Partnering – An official, specific commitment between parties involved in delivering a construction project, including the owner, consultants, contractors, and other key stakeholders to deliver the project with goals and communication.

HTTP (Hypertext Transfer Protocol) – A system used to retrieve hypertext files from remote hosts. A HTTP server (HTTPD) is a server that employs HTTP to transfer data. Hypertext transport protocol secure (HTTPS) is a protocol for accessing a secure web server.

Informal Partnering – An unofficial, non-facilitated commitment and understanding between construction project Owner, Consultants, Contractors, and other key stakeholders to share project goals.

Issue Resolution/Escalation Process – the process by which entities evaluate disagreements in order to resolve them at the lowest level possible without disrupting the project and while preserving business relationships.

Mobile Devices – A portable computing device, such as laptop, tablet computer, smartphone, that allows for connectivity to electronic media through networks or file-sharing systems.

Paperless – An environment in which the use of paper is greatly reduced, diminished, or eliminated, as filing systems are maintained through electronic means.

Partnering – a formal or informal business practice designed to assist the project team with setting goals, resolving disputes, and improving outcomes.

Project Charter – A description of the commitment made by all stakeholders that includes a delineation of roles and responsibilities for a project, how it will be performed, and the goals of the project team.

Project Collaboration Software – e-Construction software system developed and implemented to allow for electronic collaboration among project team members.

Proxy – To transfer data processing tasks to another program or device.

Radio Frequency Identification (RFID) Tags – The wireless use of electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information.

Risk-Based Partnering – All project partners working together to identify the risks to project execution, prioritizing the levels of risk, and develop a risk mitigation strategy.

Secure File Sharing – The public or private sharing of computer data or space in a network with various levels of access privilege.

Server – A computer or computer program that manages access to a centralized resource or service in a network.

SSL (Secure Sockets Layer) Encryption – A security technology for establishing an encrypted link between a server and a client.

System Integration – The process of bringing together the component subsystems into one system and ensuring that the subsystems function together as a system.

Transparency – A situation in which business activities are done in an open way with open access to all parties.

Version Control – A system that records changes to a file or set of files over time so that you can recall specific versions later and track authorship and time/date of revisions

Workflow – The sequence of processes through which a piece of work passes from initiation to completion

Speaker Biographies

Benjamin Browning

Ben Browning is the Director of Design Build for the Arkansas State Highway and Transportation Department. Browning began his career with the Department in 2003 working as a Field Engineer in several Resident Engineer offices before moving to the Construction Administration office in Little Rock in 2008. While working in the Construction Division, he held several titles including that of Systems Administrator. In 2014 Browning transferred to the Program Management Division where he held the titles of Assistant Division Head and Division Head before assuming the responsibilities of his current position. Browning has a bachelor's degree in Engineering with an emphasis in Civil Engineering from Arkansas State University and is a Registered Professional Engineer. Ben currently resides in Little Rock with his wife and two young daughters with whom he tries to spend as much time as possible.

Matt DiGiovanni

Matt currently holds the position of Field Operations Engineer in the FHWA Vermont Division office. He is the Division lead for the risk-based stewardship and oversight program of all Federal-aid projects in Vermont. He also serves on the Vermont Agency of Transportation Construction Technology and Innovation steering committee where he promotes the use of new technology and partnering strategies throughout the state. Prior to his move to Vermont, he spent time in FHWA's Maryland Division, Eastern Federal Lands Highway Division and Western Federal Lands Highway Division. Matt holds a B.S. in Civil Engineering from Clemson University.

Rachel Falsetti

Rachel Falsetti has been with the Caltrans for 30 years, serving in various management positions. She has held positions in Finance, Design, Construction, Traffic Operations, Local Assistance, and Planning during her career. She is currently the California Department of Transportation Division Chief of Construction. The Division is responsible for assisting the Department in delivering construction projects by providing uniform policies and guidance, improving and adding new specifications, delivering training courses, and providing contract administration expertise and resolving arbitrations. The Department currently has over 750 contracts in construction valued at over $8.8 billion. Ms. Falsetti's responsibility includes administration of the Alternative Dispute Resolution process that is comprised of the Partnering Program and the Dispute Resolution Board Program. In addition, Ms. Falsetti chairs the Caltrans

Construction Partnering Steering Committee. Ms. Falsetti is also on the board of advisors for the International Partnering Institute and co-chairs the horizontal committee for IPI.

Ms. Falsetti graduated with a Bachelors Degree in Civil Engineering from Cal Poly San Luis Obispo.

James Foringer

Jim has been PennDOT's District 11 Assistant District Executive (ADE) for Construction since 2007. As ADE for Construction, Jim plays an integral part in delivering key infrastructure improvements for the Western Pennsylvania region, including directing numerous high profile projects for PennDOT. For the past three years he has been the statewide champion for e-Construction in Pennsylvania, spearheading the development of Mobile Construction, PennDOT Project Collaboration System and updates to the Construction Documentation System. Jim is a 1985 graduate from the University of Pittsburgh with a B.S. degree in civil engineering.

John Haynes

John works nationally as an e-Construction and Partnering Technical Deployment Team member for the Every Day Counts 4 Initiative (EDC). John has also worked in partnership with UDOT to help fund the deployment of an eConstruction application that will automate contractor registration, disadvantaged business enterprises (DBE) certification, and pre-qualification. He also serves as the agency-wide expert and Technical Team Leader for Construction Manager / General Contractor (CM/GC) contracting method under EDC. John has delivered multiple CM/GC training sessions to state DOTs and more recently the Japan Ministry of Land, Infrastructure, Transport and Tourism (MLIT). During his 30 year career John has also worked for the Eastern Federal Lands Highway Division, National Park Service, Office of the Architect of the Capitol, and as a private industry consultant. John is a Registered Landscape Architect with a Bachelor of Science degree from the University of California at Davis.

Sandra Keller

Sandi Keller has been with the West Virginia Department of Transportation for the past 18 years working for the Information Services Division. She is currently the Manager of the Engineering and Specialty Applications group which oversees implementation of AASHTOWare, Bentley Engineering products and Content Management Systems. For the last 5 year she has enjoyed working with Construction Division to focus their initiatives with e-Construction. Having worked with Information Technology and State Government for over 22 years, it has been very rewarding to see the DOH workers embrace the technology and reap direct benefits.

Sarah Kleinschmit

Sarah is currently a Field Materials Engineer in the Construction and Materials Division at Missouri Department of Transportation (MoDOT). Sarah has been with MoDOT over 16 years and her experiences include highway design, standards, construction inspection, material approvals, and pavement design. Sarah represents the Construction and Materials Division on many interdisciplinary teams within MoDOT, she is also responsible for maintaining and reporting recycled materials in construction projects, and she is the Construction and Materials Division's lead on eConstruction. Sarah graduated from South Dakota School of Mines and Technology in 2000 with a Bachelor's of Science degree in Civil Engineering and is a registered Professional Engineer in the state of Missouri.

Bernie Kuta

Bernie currently serves as FHWA Resource Center Construction and Contract Administration Team Leader. He leads a group of engineers whose focus is on technical assistance with Federal-Aid program administration. His experiences include advising specification development and refinement, pavement and materials quality assurance, and project inspection. He has been active throughout his career in several FHWA Division Offices and the field offices of the Resource Center to provide practical applications that advance the implementation of Federal rules and regulations. He has 28 years with FHWA and is a licensed Professional Engineer in Utah.

Greg Mulder

Greg Mulder has held many positions with the Iowa Department of Transportation over the past 20 years, most recently serving as the Director of the Construction and Materials office. Greg holds a BS in Civil Engineering from Iowa State University and is a registered Professional Engineer in Iowa. He has specialized in construction process improvements and innovations throughout his career and recently has helped the Iowa DOT become a national leader in e-Construction. Greg and his wife, Kerrie, along with their two sons reside in Huxley, Iowa. They enjoy being involved in the Ballard community, watching the Cyclones and riding motorcycles across this great nation.

Christopher J. Schneider

Chris Schneider serves as Construction Management Engineer in the FHWA's Office of Asset Management, Pavement and Construction in Washington, D.C. As a member of the Construction Management Team since 2006, he is responsible for program areas involved with improving construction quality and management. Chris' program areas include Accelerated Highway Construction, Innovations and New Technology in Construction, and Construction Project Management. Chris previously worked with the FHWA's Eastern Federal Lands Highway Division for 18 years, where he spent over 10 years in the EFLHD Construction office having served as Project Engineer, Construction Quality Assurance Engineer, and Construction Operations Engineer.

Joe Squire

Joe Squire P.E. joined ODOT in 2002. Joe is an Oregon licensed Professional Civil Engineer; who earned a Bachelor's degree in Geology and a Master's degree in Hydrogeology from the University of Nevada, Las Vegas. Joe started his career in the gold mining industry where he was responsible for heavy earth moving operations and production. He later joined a major Nevada electric utility as an environmental manager where he provided permitting for Title V Air Quality facilities, industrial waste water ponds, and ESA compliance. Subsequent to the power industry, Joe joined a national geotechnical engineering enterprise to lead the firm's Idaho operations.

Since joining ODOT, Joe has held positions as a Geo-Hydro Manager, Technical Center Manager, Project Manager, and District Maintenance Manager. Joe currently serves as the ODOT State Construction and Materials Engineer, which provides State-wide support and guidance for ODOT's Construction Contract Administration, Quality Assurance, Structural Services, Pavement Services, and Laboratory Services.

Quinton Tillman

Quinton Tillman has worked for 26 years at the Florida Department of Transportation (FDOT), where he currently works in the Construction Systems Support Office as a Construction Systems Engineer. He is the initiator, and one of the primary facilitators of digital signature and Digital Delivery methods at FDOT.

Amy Tootle

Ms. Tootle, a registered professional engineer, began her career in transportation hydraulics, after graduating from the University of Florida in 1999. A majority of her career has been spent in the private sector before joining the Florida Department of Transportation in the Fall of 2010, where she started in the State Hydraulics Office in Tallahassee. Ms. Tootle is now the State Construction Engineer where she oversees the construction specialty engineers and the development of policy and procedures for construction. For the past 3 years she has been setting the stage for construction to go paperless within FDOT.

Janet Treadway

Janet Treadway is a 15 year veteran with the Ohio Department of Transportation working in the areas of Highway Maintenance, Public Information and last 10 years in Construction. She has overseen the implementation of multiple construction management systems, from document management to overall project administration and management systems. Currently, she is the data systems manager for the Department's use of the current construction project management software, SiteManager. She is an AASHTOWare's Project Task Force member overseeing the development of new software, enhancement and maintenance of the AASHTOWare Project suite of products. She is also leading the Ohio Department of Transportation's e-Construction initiative.

Thomas R. Warne

Tom Warne is a professional engineer who has over 37 years of experience in the transportation industry. He holds a Bachelor of Science in Civil Engineering from Brigham Young University and a Master of Science in Engineering from Arizona State University. Tom had a long career with the Arizona Department of Transportation as their State Construction Engineer and Deputy Director and then Utah Department of Transportation having served as their Executive Director for six years. It was during his tenure at UDOT that Tom oversaw the $1.3 billion design build I-15 Reconstruction Project which has served as a prototype for DOT's throughout the country for mega-project delivery. 26 years ago, while at ADOT, Tom was one of the national pioneers of the partnering process and since then he has provided partnering services on billions of dollars of projects throughout the US and Canada. In 2001 he founded Tom Warne and Associates which is a consulting firm focused on public policy, market analysis, finance, project delivery, partnering and program management. Tom is a nationally recognized leader in transportation and he is the recipient of numerous awards and honors for his contributions to advancing transportation in the United States.

Kathryn (Kat) Weisner

Kathryn is a Construction & Contract Administration Engineer for the FHWA's Resource Center focusing on innovation deployment, claims analysis and avoidance, PS&E development, bid package preparation, bid analysis, change orders, work zone traffic control, construction site safety, and construction inspection, management, and oversight.   Kat is responsible for the development and delivery of training in Federal-aid Contract Administration, Construction Inspection, 3D Modeling, and e-Construction. She is a frequent organizer and speaker at industry Construction Career Day events nationwide helping attract, develop and train a qualified work force.

Robert Wight
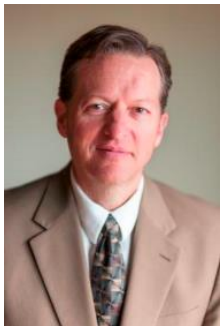
Rob is the Director of Construction and Materials at the Utah Dept. of Transportation. Rob earned a bachelor's degree in Civil Engineering in 1993 and a master's degree in Engineering Management in 1994 from Brigham Young University. Most of his 20 years at UDOT has been in the construction management and maintenance areas, and is currently leading the implementation of UDOT's e-Construction initiative. He has been a member of the AASHTO Subcommittee on Construction since 2011 and currently serves as the chair of the Safety Environmental and Workforce Development Section. He is a licensed Professional and Structural Engineer in the State of Utah.

Tom Zagorski

Tom has more than 30 years of experience in the construction management discipline, 29 of which has been with Michael Baker International. He is currently Senior Vice President, National Director, Construction Services and is the technical services manager for Construction Services, with a focus on improving and sharing industry knowledge, fostering innovation in project delivery, and continual improvement of quality management. Mr. Zagorski is currently Lead Subject Matter Expert consultant for FHWA's EDC-3 and EDC-4 e-Construction initiatives, facilitating an e-Construction implementation plan and peer exchanges among state DOTs.

Technical Working Group Members

We would like to acknowledge the input and participation from the following Technical Working Group members and subject matter experts in e-Construction and Partnering:

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