

AFH10(1) Information Systems in Construction Management Joint Subcommittee of AFH10, ABJ50

Committee Officers

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Brief Report on Activities

Activities in the Past Year (February 2017-January 2018)

- The Subcommittee sponsored its 15th Annual Workshop during the 2018 TRB Annual Meeting
 - The title of the 3-hour workshop is: “Pain Points in the Use of Big Data Analytics for Transportation Project Delivery”
 - The workshop included six presentations, followed by a breakout session.
 - We used a more interactive style this year.
 - 5 speakers participated in the workshop:
 - Title: Innovations for Construction: Supporting Information Mobility, IoT, and BIM; Speaker: Ron Perkins, Jobsite Tech Group
 - Title: Data Dictionaries and Infrastructure Connected: Open BIM Policies as an Opportunity for the Construction Industry; Speaker: Chris Castaing
 - Title: Digital Deliverables for Bridge Design: Developing Standard Contract Language for DOTs; Speaker: Kelley Severns, WSP
 - Title: Challenges in Implementing 5-D Integrated Project Controls System; Speakers: Umesh Jois, JCMS, Inc.; Pei Tang, JCMS, Inc.
 - Title: Challenges and Opportunities in Data Integration, Interoperability, and Exchange of Information for Transportation and Civil Infrastructure Projects: Design–Construction, Maintenance–Operations, and Asset–Facilities Management; Speaker: Lance Parve, Wisconsin DOT
 - The workshop was well-attended (about 60-80 total attendees), and had strong participation from the audience during the breakout session part.
 - Some of the points/themes discussed included:
 - As BIM has become a language for communication between stakeholders and across different processes, from design to bidding, to construction and commissioning, there is a need for development of standards, governance, and specific contractual provisions in and around BIM.
 - As large quantities of distributed design and construction datasets are being captured, a systems engineering approach is necessary to manage the big data sets and develop knowledge from it.
 - Need for the development of a common data execution environment for project execution across disciplines. There is a need for adopting a project life cycle perspective.
 - Need to develop channels for effective communication to the field for creating the “Digital roundtrip”.
 - Need for communication of data and technologies to ALL, including field workers – “need for an easy app”.

- Involve contractors and subcontractors in ensuring that the tie between the 3D and the 4D and 5D models are real and based on realistic plans that can be used for project control.
 - Data ownership sometimes hinders true sharing of data across parties and phases.
 - Data standards, models, including industry foundation classes: learning from the building industry – from both the successes and mistakes.
 - Multiple data sources are capturing large datasets from many different sources – particularly IoT technologies, but integration and sense making of this data remains a challenge.
 - Next steps: Developing a white paper (see Future Activities section)
- The Subcommittee Sponsored its 3rd Webinar (2017)
 - Title of the webinar is: “Opportunities and Challenges of Digital Data Applications in Transportation Project Delivery and Management”.
 - Conducted as “TRB Straight to Recording for All”, as recommended by TRB. It is available on-demand at no cost: <http://www.trb.org/ElectronicSessions/Blurbs/176679.aspx>
 - Recorded in September 2017 (went live October 19).
 - The webinar received very positive feedback from TRB. It received 539 views in the first 3 weeks (from Oct 19 to Nov 10).
 - The webinar included 3 speakers:
 - Titles and speakers:
 - Title: Opportunities and Challenges of Digital Data Applications in Transportation Project Delivery and Management; Speakers: David Brown, Parsons; and Eric Kahlig, Ohio DOT
 - Title: Transparent Highway Agencies Using Digital Data; Speaker: Stan Burns, Integrated Inventory (former asset management director of Utah DOT)
 - Title: Making Big Transportation Data Useful; Speaker: Jesse Coleman, City of Toronto
 - Moderator: David Jeong, Iowa State University
- The Subcommittee worked on 9 Research Need Statements (RNSs) during the past two years.
 - Nine RNSs submitted since 2016
 - Two gained sponsorship from AASHTO SoC (RNS-1 and 2)
 - One more is a possibility for funding (RNS-3)
 - Other six are in different stages
 - The RNSs are:
 - RNS-1 Alternative Technologies for Mitigating the Risk of Accidents in the Work Zone
 - RNS-2 Framework for Designing and Managing Data and Information Workflows for Transportation Assets
 - RNS-3 A Guide to Automate Project Progress Control by Leveraging LiDAR and 3D/4D Information Models
 - RNS-4 How to Integrate and Enhance Existing Project Management Systems in Managing Construction Field Data for Different Project Delivery Methods
 - RNS-5 Material Tracking in the Transportation Construction Industry
 - RNS-6 Alignment and Cost Benefit Analysis of the Standardization of Data Interoperability
 - RNS-7 A Standardized Information Model to Accurately Represent the Majority of Construction Management Tasks
 - RNS-8 Big Data Analytics: How to Turn the Collected Data into Insights

- RNS-9 Decision Support System to Prioritize Investments for Effective CIM Implementation
- The Subcommittee presented these statements to the AASHTO SOC to gauge their interest, and received feedback.
- See Appendix A for the authors and status of the RNSs
- The subcommittee conducted a mid-year subcommittee meeting (for the second time)
 - Meeting in Seattle, June 2017: Sunday, June 25, 2017, 3:45 PM – 4:45 PM, Cedarbrook Lodge, Seattle, WA
 - Followed on subcommittee activities (workshop, webinar, RNSs)
 - Leads provided updates on status
 - Identified more volunteers for activities
 - Discussed next steps
 - High attendance: over 50 in person, plus several online

Planned Activities This Upcoming Year (February 2018-January 2019)

- The Subcommittee is planning to sponsor its 16th Annual Workshop during the 2019 TRB Annual Meeting.
 - Tentative title of the workshop: “eConstruction (eProject Delivery): Analyzing Graphical and Non-graphical Construction Data” (David Jeong, David Brown, Nora El-Gohary)
- The Subcommittee is planning to sponsor its 4th Webinar
 - Tentative title of the webinar: “Pain Points in the Use of Big Data Analytics for Transportation Project Delivery”
 - The plan is to invite 2 or 3 speakers who presented at this year’s Annual Workshop
- The Subcommittee is planning to sponsor a second workshop/webinar
 - Tentative title: “Leveraging the Construction Workforce through Technology and Digital Project Delivery” (Francesca Maier and Chris Harper)
- The Subcommittee is planning to work on 9 Research Need Statements (RNSs) [7 from last year, plus 2 new RNSs that were identified during the 2018 Subcommittee Meeting]:
 - RNS-3 A Guide to Automate Project Progress Control by Leveraging LiDAR and 3D/4D Information Models
 - RNS-4 How to Integrate and Enhance Existing Project Management Systems in Managing Construction Field Data for Different Project Delivery Methods
 - RNS-5 Material Tracking in the Transportation Construction Industry
 - RNS-6 Alignment and Cost Benefit Analysis of the Standardization of Data Interoperability
 - RNS-7 A Standardized Information Model to Accurately Represent the Majority of Construction Management Tasks
 - RNS-8 Big Data Analytics: How to Turn the Collected Data into Insights
 - RNS-9 Decision Support System to Prioritize Investments for Effective CIM Implementation
 - RNS-10 Creating Collaboration between Public and Private Sectors on Requirements for Digital Project Delivery Products (Ron Perkins and David Unkefer)

- RNS-11 Preparing our roads for the future (impacts of connected and autonomous vehicles on highway and street design and construction) (Murali Rao and Nora El-Gohary)

See Appendix A for the authors and status of the RNSs

- The Subcommittee is planning to work on a synthesis statement and white paper on “Pain Points in the Use of Big Data Analytics for Transportation Project Delivery”
 - The plan is to document the results of the workshop in the form of white paper, build on it further in the next few months (with the help of the workshop speakers), and tie to the below effort on the “survey of pain points” – and eventually develop a journal publication and related RNSs.
 - We also plan to submit a synthesis statement about this in Feb 2018.
- The Subcommittee is planning to start working on a new “survey of pain points”
 - The plan is to conduct a survey of DOTs, identify the top grand challenges and pain points, and then develop a report/publication and move some of the ideas to new RNSs.
 - This will also be tied to the aforementioned white paper.
 - This will also serve as a follow-up on the survey the subcommittee conducted 5 years ago.
- The Subcommittee is planning to hold a mid-year subcommittee meeting in April, in New Orleans [on the side of the Construction Research Congress (CRC)].
- The Subcommittee is planning to continue working on improving its communication (through the website, GoogleGroup, LinkedIn Group, etc.) and collaborations with other committees and subcommittees.

Appendix*

RNS No.	Year	Title	Authors	Status
1	2016	Alternative Technologies for Mitigating the Risk of Accidents in the Work Zone	Behzad Esmaeili (GMU)	Gained sponsor from AASHTO SoC for an NCHRP 20-7 Project. Will be a funded NCHRP 20-7 project for 2018.
2	2016	Framework for Designing and Managing Data and Information Workflows for Transportation Assets	David Jeong (ISU) Dan Tran (KU)	Gained sponsor from AASHTO SoC for an NCHRP Report Project. Will be funded as NCHRP 08-115 for FY 2018.
3	2016	A Guide to Automate Project Progress Control by Leveraging LiDAR and 3D/4D Information Models	Yelda Turkan (OSU) Yongwei Shan (OSU)	It may be possible for the AASHTO Subcommittee on Design to co-sponsor this project. Keith Platte will pursue this. Richard Duval (FHWA) agreed to help with this one. Potentially submitting as NCHRP 20-7 or NCHRP 20-44.
4	2016	How to Integrate and Enhance Existing Project Management Systems in Managing Construction Field Data for Different Project Delivery Methods	Asregedew Woldeesenbet (UNL)	Presented this to the Integrated Construction and Technology section of AASHTO SoC in August 2017. Did not gain much traction, need to review this RNS and look at other possible opportunities.
5	2016	Material Tracking in the Transportation Construction Industry	Deepak Sharma (CSU Fullerton) Katherine Holtz (TxDOT)	Will TxDOT champion this RNS? Other committees/DOTs to consider? May look to NCHRP 20-44 for funding.
6	2017	Current Title: Alignment and Cost Benefit Analysis of the Standardization of Data Interoperability Original title from discussion at TRB 2017: Alignment of Efforts to Standardize Data Interoperability	Aaron Costin (UF) Dan Tran (KU)	Presented at AASHTO SoC 2017, but did not receive much attention. Needs to be developed further. Title is a bit different from what was discussed on this RNS at TRB 2017.
7	2017	A Standardized Information Model to Accurately Represent the Majority of Construction Management Tasks	Aaron Costin (UF) Amlan Mukherjee (MTU) Danny Kahler	First draft developed. Currently the draft is too high level and needs to be revised more.
8	2017	Big Data Analytics: How to Turn the Collected Data into Insights	Nora El-Gohary (UIUC) Dan Tran (KU) Amlan Mukherjee (MTU)	Not sent to Chris Harper yet.
9	2017	Current Title: Decision Support System to Prioritize Investments for Effective CIM Implementation Original title from discussion at TRB 2017: A Centralized Repository for Benchmarking the Use of Data Models in Transportation Construction	Jiansong Zhang (Purdue) Chuck Jahren (ISU)	Presented at AASHTO SoC 2017. Possible that other similar projects are already out there. Need to speak with FHWA (Rich Duval, David Unkefer) to find out. Title is different from what was discussed on this RNS at TRB 2017. Need to see what the changes are in the RNS.
10	2018	Creating Collaboration between Public and Private Sectors on Requirements for Digital Project Delivery Products	Ron Perkins (Jobsite Tech Group) David Unkefer (FHWA)	New.
11	2018	Preparing Our Roads for the Future (Impacts of Connected and Autonomous Vehicles on Highway and Street Design and Construction)	Murali Rao (VDOT) Nora El-Gohary (UIUC)	New.