e-Construction

e-Construction is a paperless construction administration delivery process that includes electronic submission of all construction documentation by all stakeholders, electronic document routing/approvals (e-signature), and digital management of all construction documentation in a secure environment allowing distribution to all project stakeholders through mobile devices.

The administration of highway projects requires a significant amount of documentation. This has traditionally been accomplished through extensive, paper-based documentation systems involving conventional postal delivery, project journals, note taking, stamped plan sets, design and construction submittals, and physical signatures on multiple copies of many documents.

e-Construction is the collection, review, approval and distribution of highway construction contract documents in a paperless environment.

A paper-based system requires significant time and money to create, process and store documentation. In an era of instant communication, on-the-fly information access, and a tech-savvy workforce, this state of affairs is fast becoming obsolete.

This initiative aims to employ established technologies that are readily available to the transportation community, such as digital electronic signatures, electronic communication, secure file sharing, version control, mobile devices, and web-hosted data archival and retrieval systems to improve construction documentation management.

The e-Construction system has the potential to increase the quality, efficiency, environmental sustainability and productivity of the construction industry at large, while at the same time saving on printing costs, time, postage and document storage and adding communication efficiencies.

BENEFITS

▸ **Saves Time and Money.** This initiative will modernize construction document management through elimination of the cumbersome paper-based approach. In addition to saving money by decreasing paper use, printing, and document storage costs, this initiative also saves time by decreasing communication delays and transmittal time.

▸ **Improves Communication.** The e-Construction process allows faster approvals, increased accuracy and enhanced document tracking, all while increasing transparency. The improvement to communication and the transparency of the process has virtually eliminated all questions, claims and disputes as to when (or if) a document was submitted. Additionally, all stakeholders can see the name of the document approver along with the exact timing of each step recorded. The process provides a better foundation to help improve communications and partnering.

CURRENT STATE OF THE PRACTICE

Many State Departments of Transportation (DOTs) and industry practitioners are already using or testing some aspects of e-Construction. Some are even in the process of mainstreaming many e-Construction system practices.

The proposed e-Construction system is supported by many tools and practices that currently exist to improve communication and make construction management practices more efficient. Examples include:

▸ Transfer of electronic plans (supported under EDC-2: 3D Engineered Models for Construction) and electronic contract specifications and special provisions.
▸ Mobile devices, software and applications for field inspection and data collection.
▸ Data hosting services (data clouds, share sites, virtual review rooms).
▸ Electronic review and approval processes (digital signatures/reviews).
▸ Communications tools (e-mail, text, social media, smart phones).
▸ Radio frequency identification (RFID) tags for resource tracking.
▸ Asset management, electronic as-built drawings and quality assurance records.

The Michigan DOT has applied e-Construction routinely to design-bid-build projects, while the DOTs in Iowa, Minnesota, Florida, Utah, Texas, Pennsylvania and North Carolina have applied this technology to large design-build projects. The Wisconsin DOT has allied e-Construction to a large design-bid-build project.

The Michigan DOT, a leader in e-Construction, estimates that the agency saves approximately $12 million in added efficiencies and 6,000,000 pieces of paper annually by using electronic document storage for its $1 billion construction program, while reducing its average contract modification processing time from 30 days to three days.

To date, e-Construction has been proven by several agencies. Through enhanced awareness and promotion of benefits and examples of its application, the highway industry is ready to reap the benefits of program-level implementation.

SUPPORT AND AVAILABLE TOOLS

▸ EDC-3 e-Construction Web page: *http://www.fhwa.dot.gov/innovation/everydaycounts/edc-3/econstruction.cfm*

EDC-3 e-Construction technology is also an American Association of State Highway and Transportation Officials (AASHTO) Innovation Initiative focus technology.

http://aii.transportation.org/Pages/e-Construction.aspx

U.S. Department of Transportation
Federal Highway Administration

Every Day Counts (EDC), a State-based initiative of FHWA's Center for Accelerating Innovation, works with State, local and private sector partners to encourage the adoption of proven technologies and innovations aimed at shortening and enhancing project delivery

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