

eConstruction

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Definition from FHWA

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

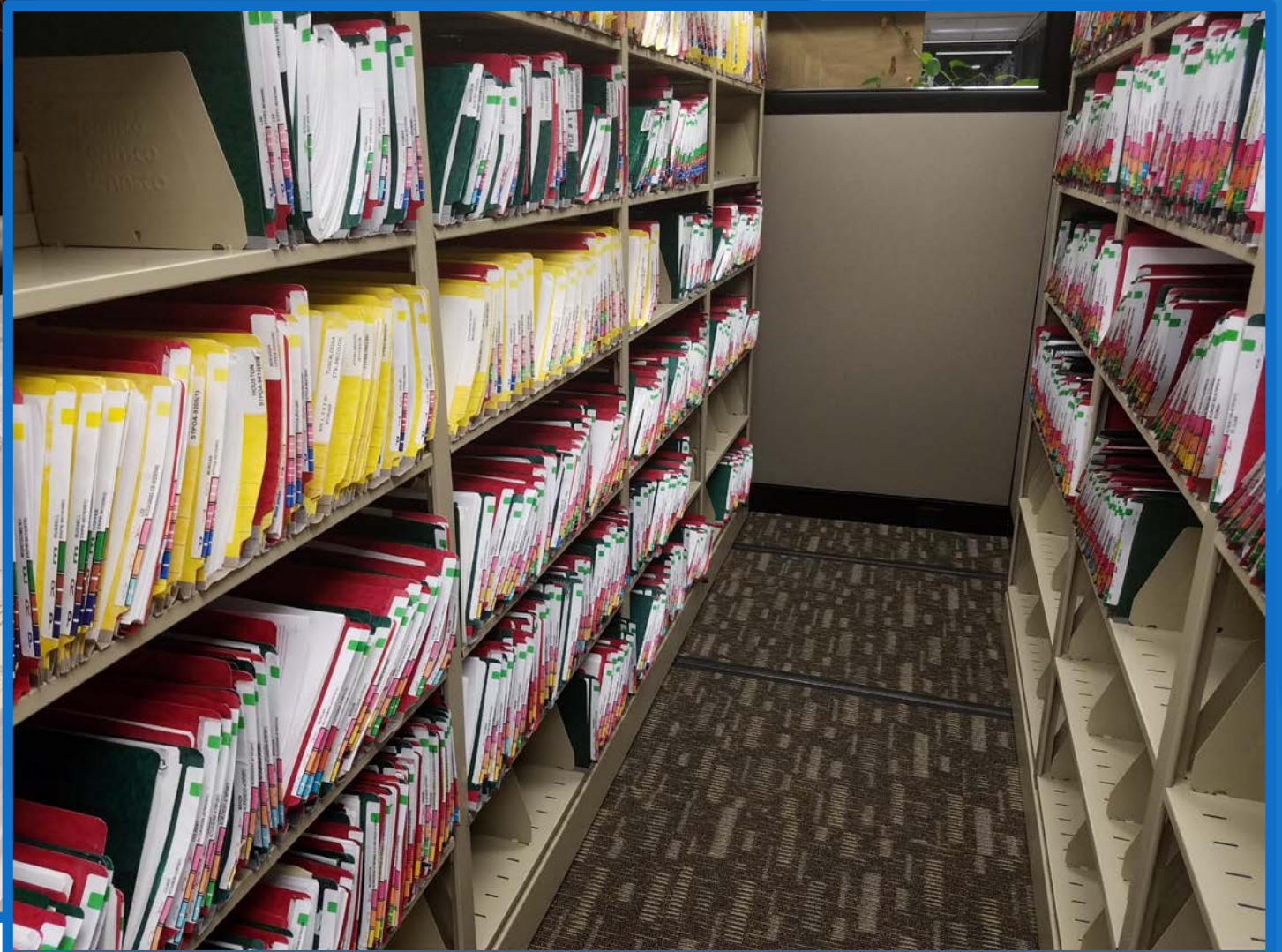
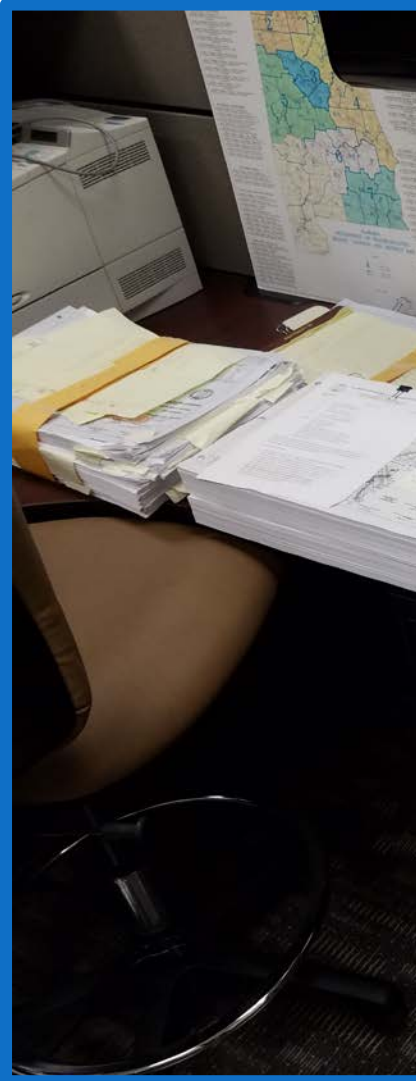
Traditional Process

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.

Traditional Process

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.

Traditional Process



Benefits of eConstruction

- ▶ Saves Time
- ▶ Saves Money
- ▶ Improves Communication
- ▶ Environmentally friendly

Time Savings

- ▶ Decrease work flow time
- ▶ Increase in productivity due to easily accessible documentation
- ▶ Decrease in communication delays

Cost Savings

▶ Hard Benefits

- ▶ Actual dollars saved by the department

▶ Soft Benefits

- ▶ Benefits not as easily measured
- ▶ Increase in quantity and quality of documentation

Hard Benefits

- ▶ Savings on printing costs
- ▶ Savings on document storage
- ▶ Reduction in photocopies
- ▶ Savings on shipping costs

Soft Benefits

- ▶ Increased efficiency
- ▶ Improved document security
- ▶ Disaster recovery
- ▶ Labor savings

ALDOT's eConstruction Initiatives

- ▶ Mobile Devices
- ▶ ePlans
- ▶ eForms
- ▶ Construction Manual
- ▶ Standard Specifications
- ▶ Integrating Contractors
- ▶ eSignatures
- ▶ Document Management
- ▶ Document Retention
- ▶ System Coordination
- ▶ eTickets
- ▶ Bar Codes / RFID
- ▶ 3D Modeling
- ▶ UAV usage for inspection

Current State of Practice

- ▶ Project Management through CAMMS
- ▶ Mobile Devices with Cellular
- ▶ Data hosting with CAMMS
- ▶ eForms
- ▶ Electronic Submittal Review

CAMMS

- SiteManager is an AASHTOWare client-server product, and was used to accommodate the construction and materials management functions of the department.
- SiteManager was licensed and implemented for ALDOT in 1999-2000.
- Because SiteManager was designed generically to work for all states, and due to high expenditures such as licensing fees, support fees, and cost of customizations, ALDOT administration made the decision in 2007 to begin efforts to replace SiteManager with an in-house developed system.

CAMMS

- Several attempts were made to initiate a project, under different titles, but due to lack of personnel resources and legacy system support commitments, the project never fully got off the ground.
- Late in 2011, ALDOT administration approved hiring additional resources, which was the catalyst needed to successfully start the CAMMS project in earnest. The hiring of additional programming staff began in 2012.
- The main purpose of the CAMMS project has been to deliver a modern web-based system that will lower operating costs by being solely owned and controlled by ALDOT, thus eliminating licensing fees and costly customization fees by completely replacing the SiteManager application.

CAMMS SCHEDULE

- ▶ We hope to complete the development the Materials and Tests functionality in CAMMS by the end of 2017 or early in 2018, and decommission SiteManager.
- ▶ Currently our prime directive is to decommission SiteManager ASAP, so some of the enhancements already identified that we need to develop for construction functionality will be delayed until SiteManager is gone.

Cost Savings - Hard Benefits

Projected 15 Year CAMMS Application Lifecycle from 2012 - 2027

ITEMS	BENEFITS	TOTALS
Four Primary Contractors for SiteManager Support	Cost Reduction	\$2,677,878
SM License Fees Saved	Enhanced Revenues	\$2,215,146
Service Units Saved	Labor Reduction	\$12,472,144
Eight Contractors Reduced	Labor Reduction	\$9,923,400
Enhancements and Bugs for SM	Enhanced Revenues	\$2,400,000
TOTAL HARD BENEFITS		\$29,688,568

Cost Savings - Hard Benefits

Projected 15 Year CAMMS Application Lifecycle from 2012 - 2027		
ITEMS	COSTS	TOTALS
Merit Employees	Personnel Costs	\$5,488,608
Contract Employees	Professional Services	\$7,217,040
Software Purchases	Developer Tools	\$191,808
Computer Purchases	Current Technology	\$175,445
Mobile Device Purchases	Current Technology	\$450,000
TOTAL COSTS		\$13,522,901

CAMMS

Revenue saved by Department over 15 years:

\$29.6 Mil - 13.5 Mil \approx 16.1 Mil

Over 1 Million per year savings

CAMMS - Soft Benefits

- WEB application, which opens up vast possibilities to integrate mobile devices.
- Eliminates the need to distribute code changes out to hundreds of computers.
- Modifications occur more frequently, often we do weekly releases to CAMMS.
- Provides increased data integrity and improved security.
- The Construction module of CAMMS has been developed and released to production with a small staff, relatively quickly when compared to other developed systems.

Data Hosting with CAMMS

- ▶ Data hosting is being accomplished through CAMMS for construction reports
- ▶ CAMMS is the sole source of record for Construction Documents
- ▶ Have the ability to store all document types such as pictures, video, audio, excel, pdf, word, etc...
- ▶ Storage of plans, contracts, submittals and other documentation is being developed and ready to be deployed when documents become available

Mobile Devices

- ▶ 3 Pilot Projects
 - ▶ Volkert is running a pilot on CBD Phase II
 - ▶ Tablets, CAMMS Web, ePlans, eForms, electronic Standard Specifications and Special Provisions, eSignatures, and Document Management
 - ▶ Montgomery Area
 - ▶ Tablets, CAMMS Web, ePlans, eForms, and app testing.
 - ▶ Pavia Systems - Headlight App
 - ▶ Providing Tablets with proprietary app installed that works with CAMMS, even if no signal.

Advantages of Mobile Devices

- ▶ Quality of Work due to real time access and entry
 - ▶ More accurate information
 - ▶ More complete information
 - ▶ Reduction in time searching for information
- ▶ Cost savings
 - ▶ Reduction in Travel to and from project office
 - ▶ Reduction in printed materials

ePlans

- ▶ The introduction of mobile devices in the field brings about the need for digital plan sets
- ▶ .pdf files printed from Microstation through Bentley driver as opposed to scanned sets
 - ▶ Searchable
 - ▶ Smaller file size
 - ▶ More zoom capabilities

Advantages of ePlans

- ▶ Find information quicker
- ▶ Ability to add mark-ups
- ▶ Better as built plans
- ▶ Easily reference sheets for questions
- ▶ Quick turn around on reviews
- ▶ Paper savings

eForms

- ▶ Many Construction forms have been created within the CAMMS system
 - ▶ Uniformity
 - ▶ Storage
 - ▶ Accessibility
- ▶ Other Construction forms have been digitized and can be filled out in the field on Mobile Device
- ▶ Document review coming with Document Management System

eSignatures

- ▶ The Uniform Electronic Transactions Act (UETA) was introduced in 1999 and was adopted by the State of Alabama in 2006.
- ▶ UETA provides that when a law requires either a writing or a signature, an electronic record or an electronic signature can satisfy that requirement when the parties to the transaction have agreed to proceed electronically.
- ▶ The ESIGN Act is a federal law passed in 2000. It grants legal recognition to electronic signatures and records if all parties to a contract choose to use electronic documents and to sign them electronically.

eSignatures

- ▶ Exploring options for eSignatures including:
 - ▶ DocuSign
 - ▶ AdobeSign
 - ▶ Others meeting Class 3 requirements
- ▶ Goal to fully integrate with CAMMS and other systems

Submittal Exchange

- ▶ Volkert running Pilot on CBD Phase II
 - ▶ Recently purchased by Oracle
 - ▶ Over 4700 documents loaded into SE
 - ▶ Savings of over 275k printed pages to date

Next Steps

- ▶ ePlans
- ▶ Document Management
- ▶ Long Term Document Retention
- ▶ eSignatures and Digital Signatures
- ▶ System Coordination
- ▶ eTickets

Questions?