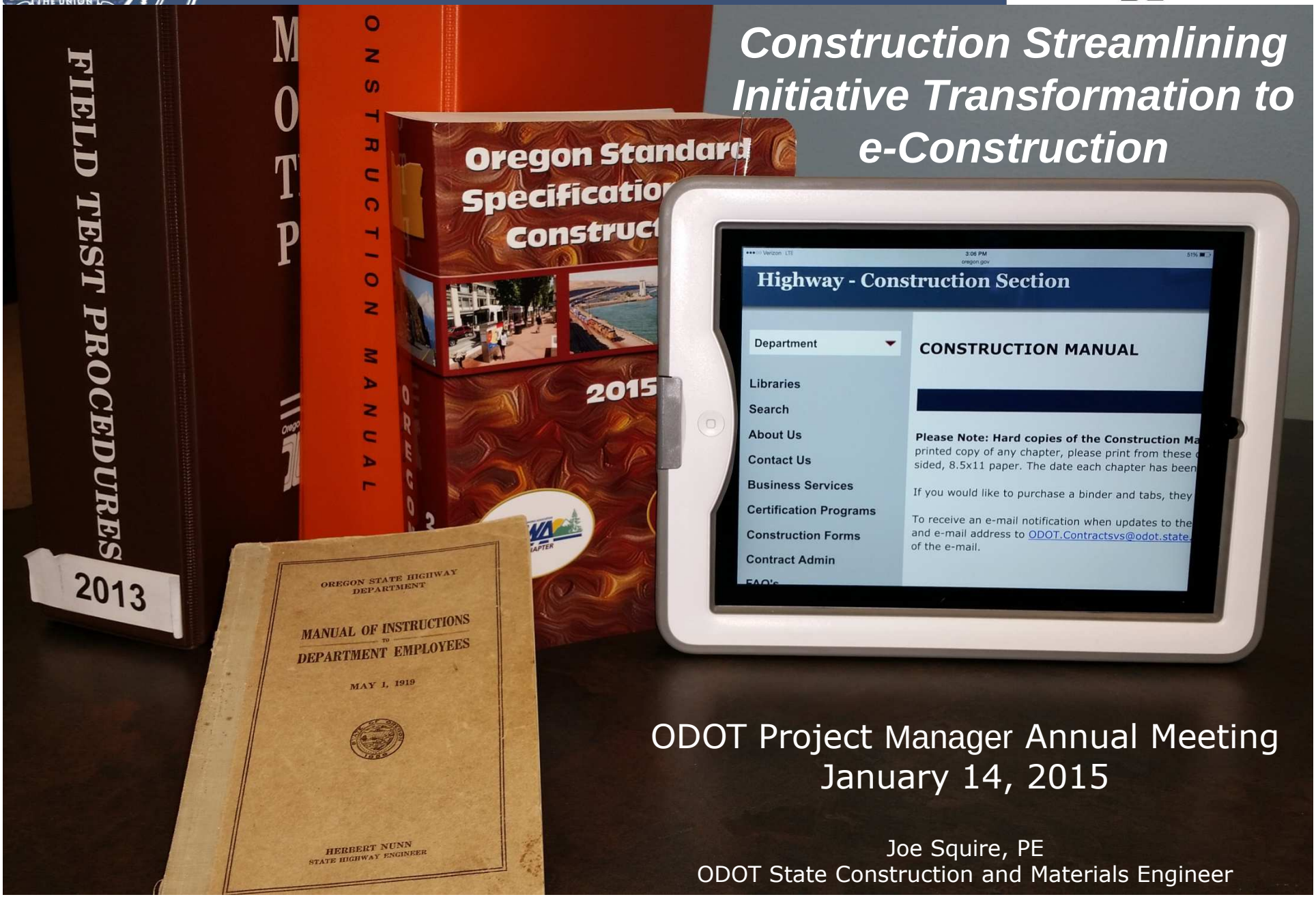
Oregon Department of Transportation

Construction Streamlining Initiative Transformation to e-Construction



ODOT Project Manager Annual Meeting
January 14, 2015

Joe Squire, PE
ODOT State Construction and Materials Engineer

Topics for today

- **CSI**
  - What is the issue?
  - Identifying Opportunities
  - Process Mapping
  - Actions to Date
- **Time to Pivot**
  - e-Construction
  - Digital Signature
  - ProjectWise
  - Expanded Pilot

What is the issue?

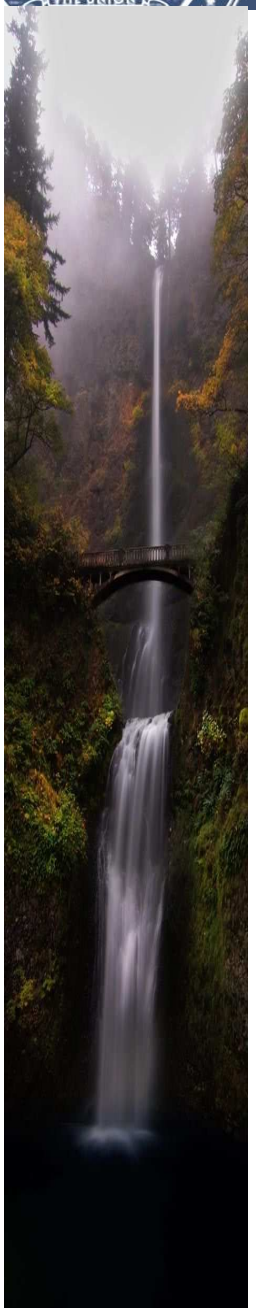
- Paperwork volumes and costs are growing
- Industry and PM's share similar concerns
- ODOT and Industry agreed - find a better way
- Internal team identified to work the issues
- Holli Pick (CAU), CSI Project Lead

Identifying the What?

- **Contract required Documents & Submittals**
  - Labor Reports, Q&Q, Pay note
  - FHWA Requirements
  - Environmental
  - Technical Specification Requirements & Submittals
- **Email communication**
  - General information, transmittal letters, communication letters, responses, etc…

Identifying issues

- **General Requirements**
  - Advertisement to Bid Day
  - Post Bid Day to Pre-con meeting
  - Traffic Control Plan
  - Notices
- **FHWA Requirements**
  - Buy America
  - Labor Compliance
  - Civil Rights

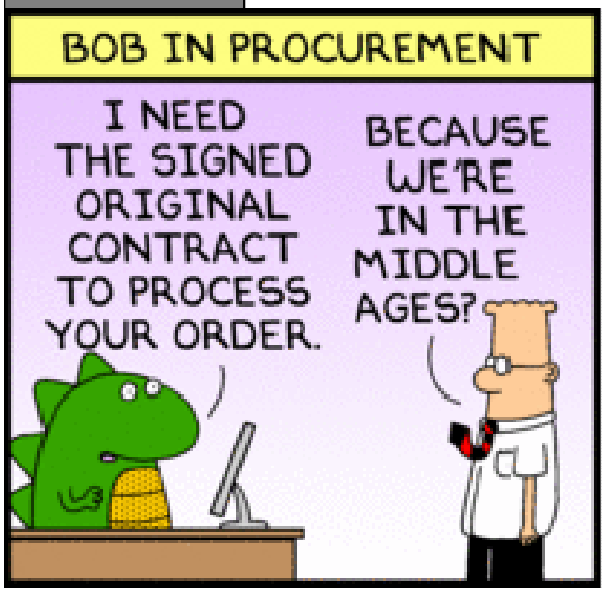


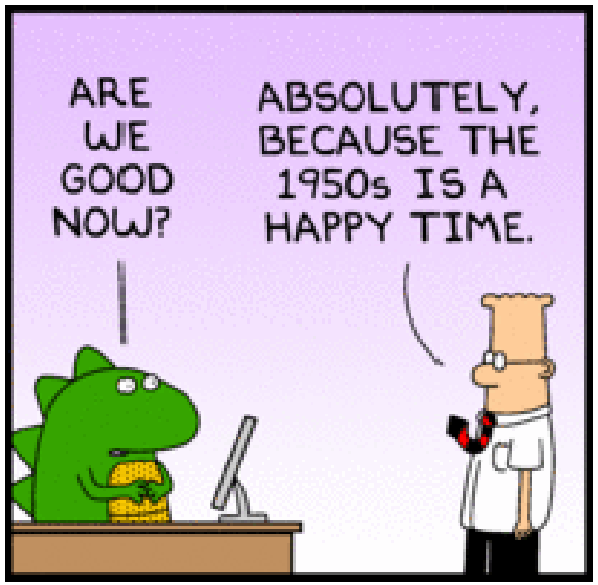
Identifying issues

- **Environmental**
  - Pollution Control Plan,
  - Hazardous Waste Documentation
  - Erosion Control Plan, EC Reports
- **Quality Documents**
  - Non-Field Tested Materials Documentation
  - Field Tested Materials Documentation
- **Value? If none then delete**

Identifying issues

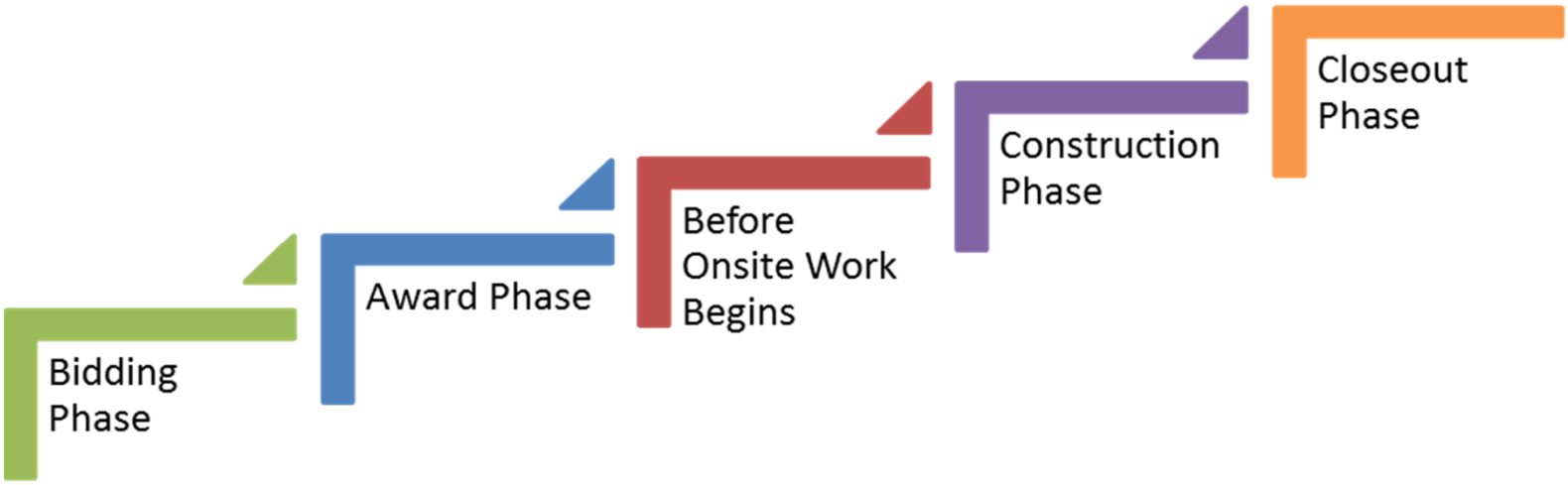
- **Emails & attachments**
- **Accepted universally**
  - File size, firewall, Contract, "in writing"
  - Create or receive it, print it, sign it, scan it, email it, print it, sign it, scan it, email it, **repeat again, and again, and again….**





Process Mapping – high level

ODOT Construction Process comprised of 5 phases



- **Map each phase to identify:**
  - Steps & hand-offs within ODOT
  - Requirements for each step and workflow
  - Partner issues and value of each process

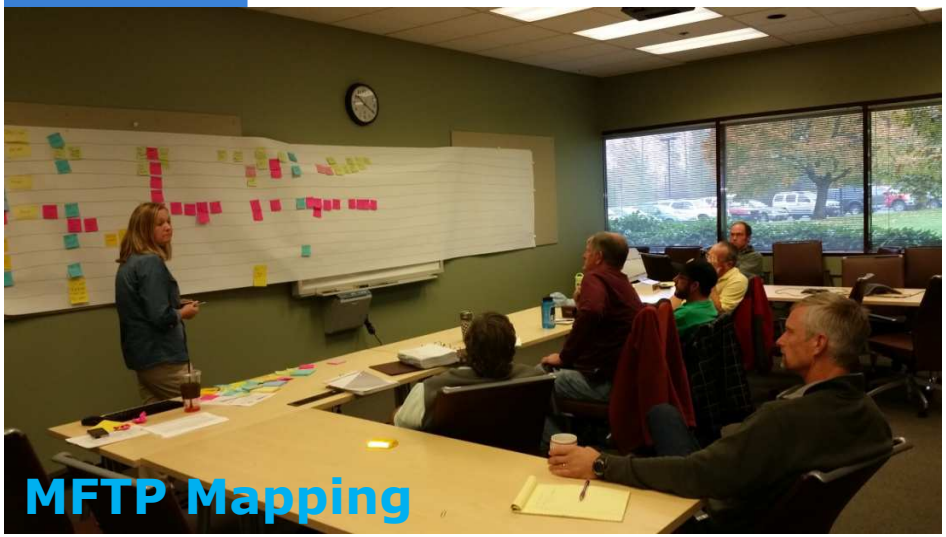
Voice of Industry

- **Extensive information gathered from Industry Partners through AGC collaboration**
  - Discussions between Industry and a significant ODOT business line roles cross section via open forums
  - Information has been analyzed and mapped in the context of the 5 phases of the Construction Process

Whiteboard Process Mapping

Where is the VALUE?

- Is the document required?
- Why is the document required?
- What is really required?
- Who requires the document
- Is this information duplicated elsewhere?



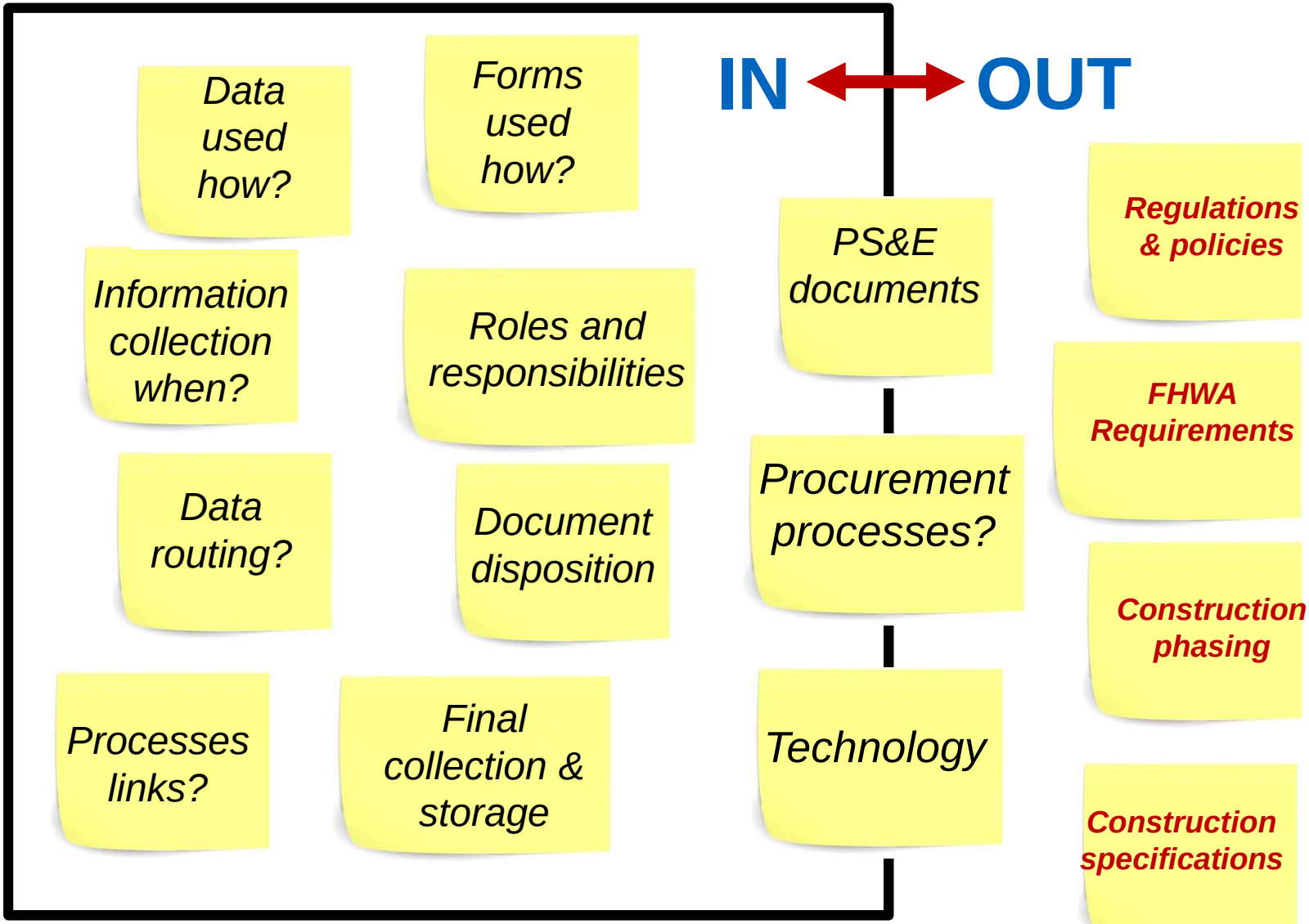
MFTP Mapping

Non-FT Mapping

Process Mapping Themes

102 years

***305+* forms**



Working the issues –examples

- **Bid Phase - *problem/opportunities***
  - New bid information not uniformly distributed
  - Clarification letters vs. addenda
  - Engineer's Estimate
  - Agency's project schedule
  - Postponement of projects
  - Wage zone interpretations

According to AGC members and ODOT PM offices, *a number of hours (even days) are spent figuring and calculating wage determinations, especially when there is a project that is multi-county or multi-region.*

Working the issues – examples

- **Bid Phase – *out of scope issues***

CSI #	Issue Raised	Response
004	Provide Project Schedule in bid Phase	Information shared with policy owner
006	Bid Postponement for minor issues	Research of postponement reasons does not support the assertion
007	Extending the availability of bid documents on eBids after award	ODOT will not leave the bid documents open longer. Bid sets are non-conforming

Working the issues – examples

- **Bid Phase – *issues acted upon***

CSI #	Issue Raised	Response
005	Response to bidders questions	Process for communication during bid in progress
008	Wage Rate information included in Bid documents	Quick Hit improvement acted upon, November 2014.
	Eliminate partnering form, Spec. 150.05	Quick Hit improvement acted upon, November 2014.

Time to Pivot – nagging thoughts

"Create it; print it, sign it, scan it, email it, print it, sign it, scan it, email it, ***repeat again, and again, and again!****"*

- **Value? If none then delete**
- **Re-thinking long-held paper systems**
- **Fractional efficiency gain vs. digital**
- **And then there is Michigan DOT**

Time to Pivot – Now!

- **Pivot = Change in Strategy not Vision**
- **Industry keeps most records in digitally**
- **PM's ⟺ Industry interaction via email**
- ***It's about the data, not the paper***

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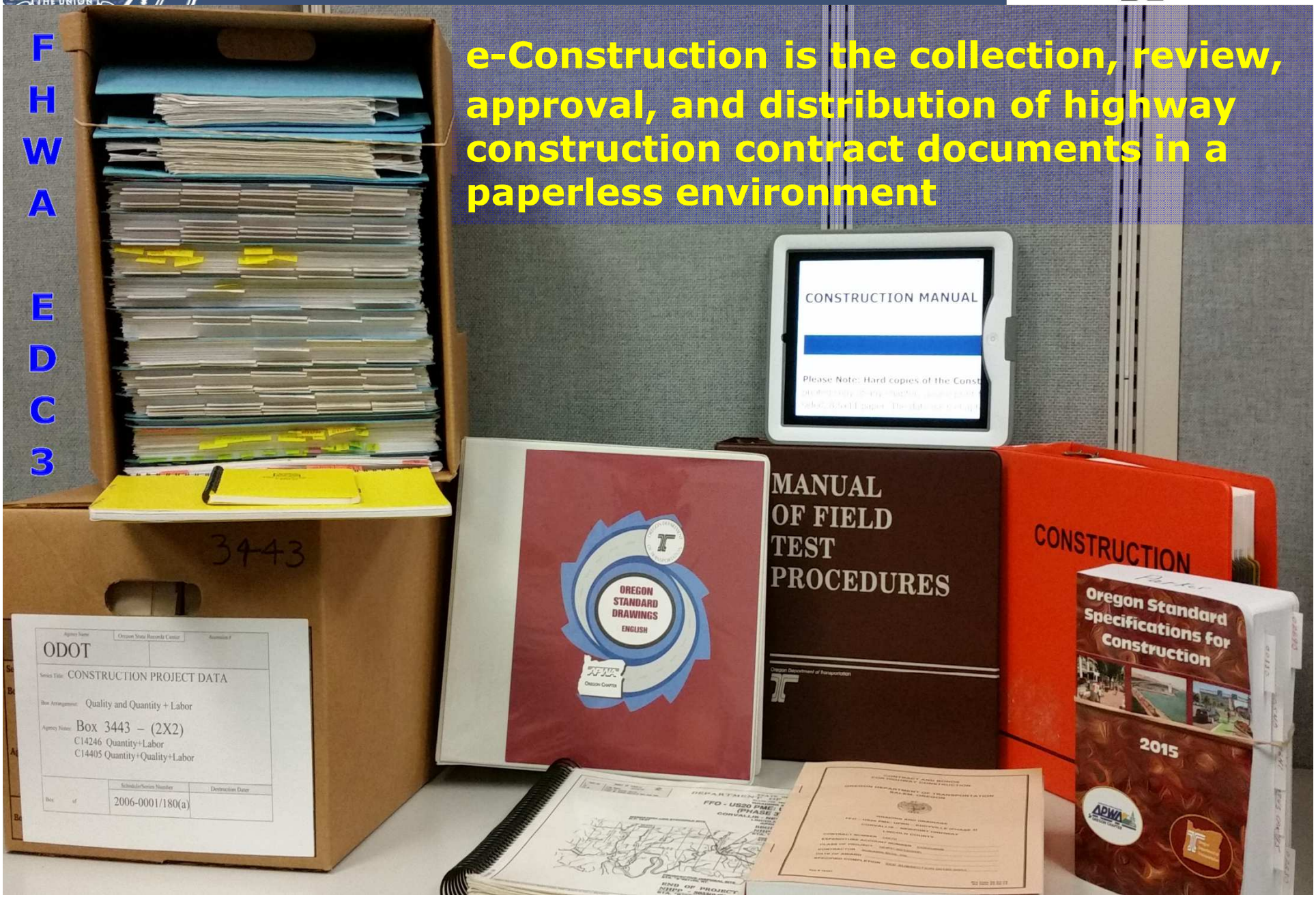
FHWA EDC 3

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



Digital Signatures – what is it?

- A digital signature is to an electronic document as a handwritten signature is to paper and more.
- Digital signatures = signer & document authentication, encryption, and efficiency.
- Digital signatures assure the recipient of a digital document of identity of the sender and integrity of the document.
- An electronic signature is not a digital signature
- Oregon and Federal Law allow

Digital Signatures – what's needed

- **Specification change or addition**
- **Software – ODOT already owns**

cosign by arx

- **Signing Certificate - ODOT proof of concept complete**
- **Optionally:**
  - A piece of hardware to provide further security with a signer's private key.
  - The services of a Certificate Authority

Digital Signatures – in the works

Modeled after MDOT's success

Piloted on 5 MDOT projects with a value >$160M

MDOT is Michigan DOT

- **Proposed Digital Signature Specification**
  - SP00170.07(f) Digital Signatures
  - SP00170.07(g) Digital Electronic Document Management
- **Proposed specification provides:**
  - Digital Signatures and format
  - Contractor access to the Agency's Electronic Document Management System
  - Document Format and naming conventions
  - Document Workflows
  - File/Document Retention

ProjectWise

- **Electronic Data Management System**
- **Allows use of existing internal and external digital technologies**
- **Works for design & construction**
- **ProjectWise enables:**
  - Document access via internet connection
  - Project collaboration & notices
  - Project security & audit trails
  - Project organization
  - Version control
  - Tablet access

ProjectWise - workflows

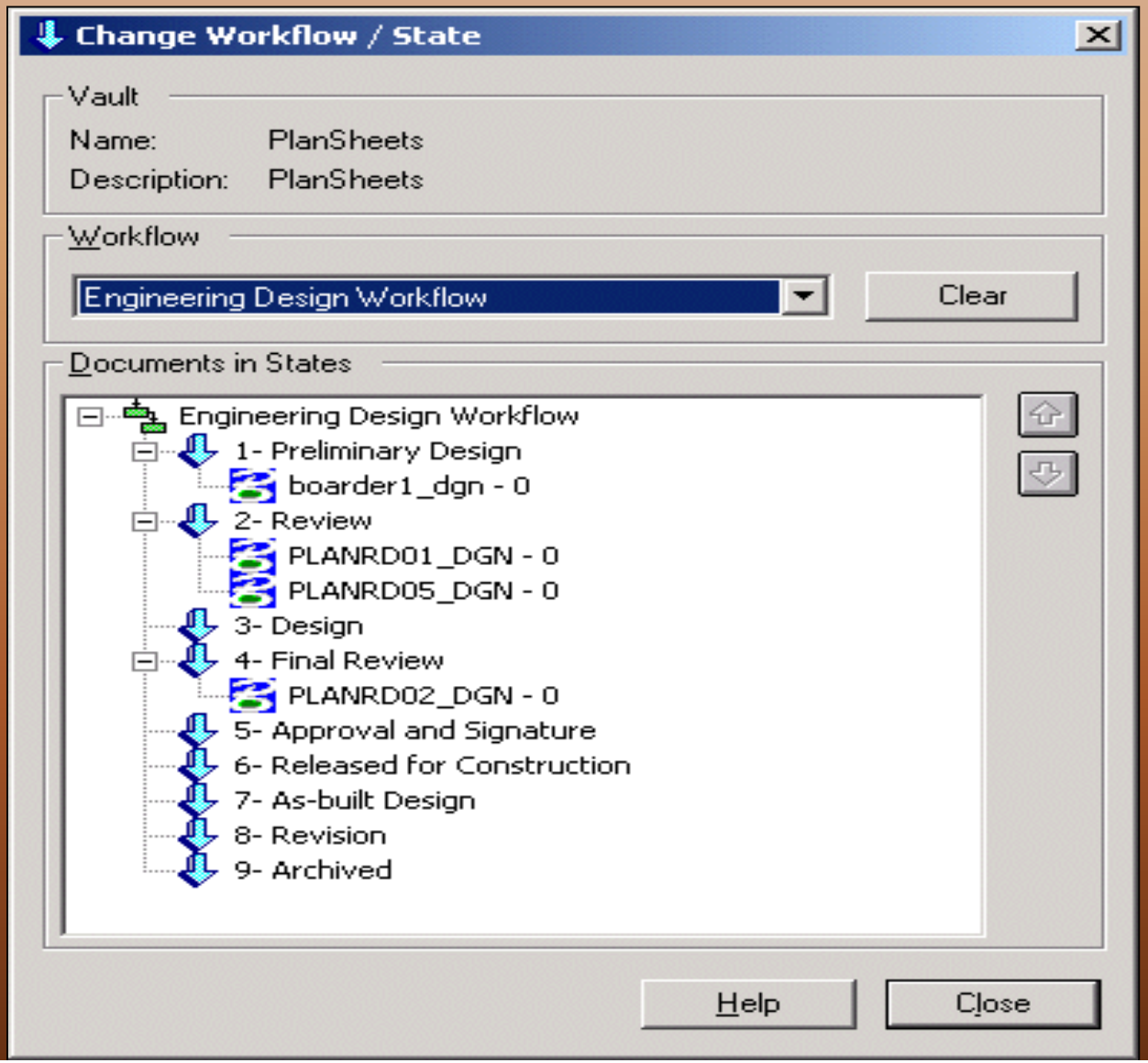
- **CSI Process Mapping = PW Workflows**
- **Process Mapping defines a simple linear workflow for document lifecycle**
- **Organizes the design/review/approval**
- **Allows automatic actions to occur at state changes**
- **Most powerful when integrated with Access Control**

ProjectWise – example PW State

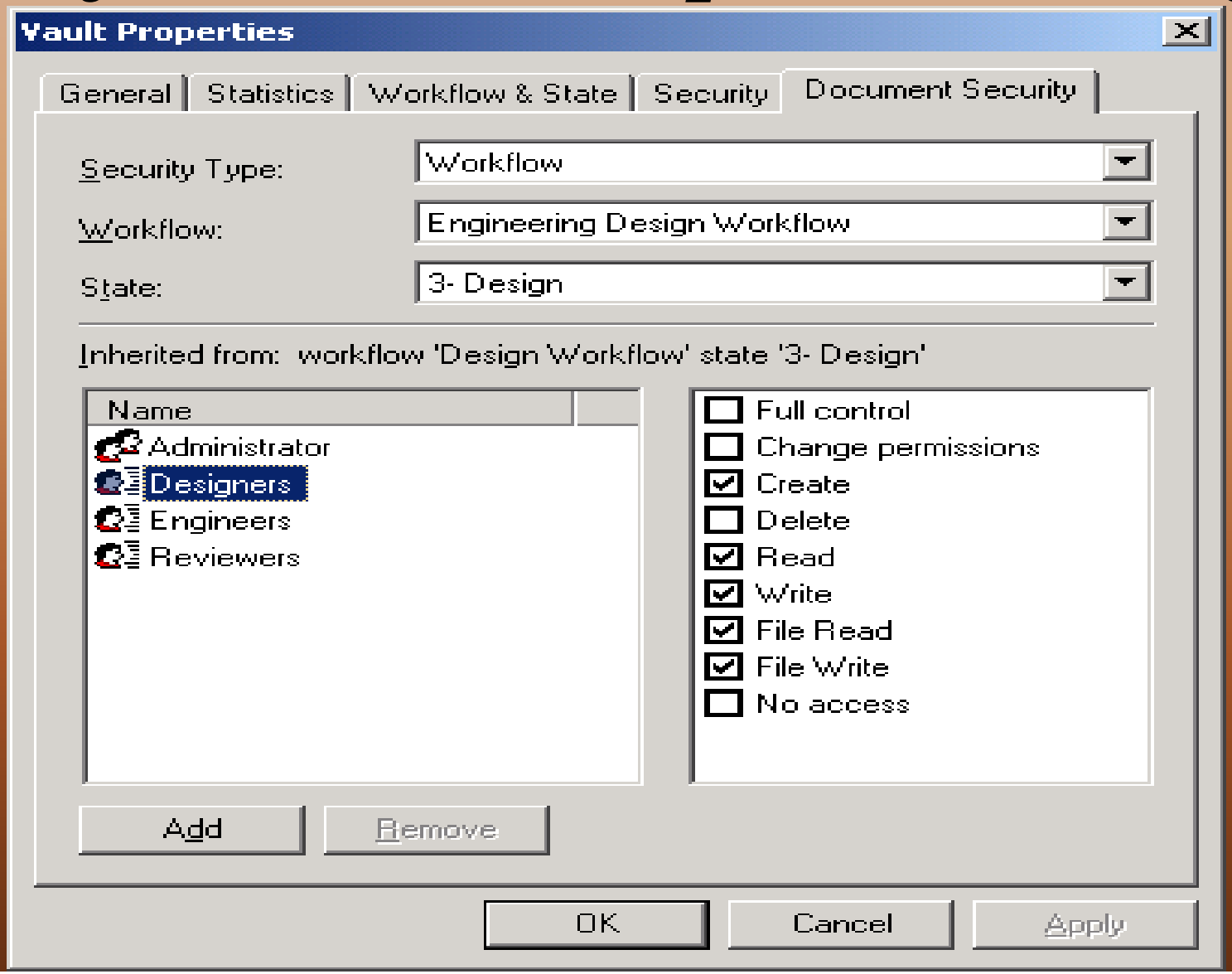
Workflow - Workflow

Name	Description	State	File Name	File Updated
BikeFrame.dgn	BikeFrame	Released	BikeFrame.dgn	2002-04-29 09:36:40.260
ColorTbl&Wt.dgn	ColorTbl&Wt	Released	ColorTbl&Wt.dgn	2002-04-29 09:36:39.527
Constraints.dgn	Constraints	Released	Constraints.dgn	2002-04-29 09:36:40.430
FlangedValve.dgn	FlangedValve	Review	FlangedValve.dgn	2002-04-29 09:36:40.600
FlowTags.dgn	FlowTags	Review	FlowTags.dgn	2002-04-29 09:36:40.770
hvacfloor2.dgn	hvacfloor2	Draft State	hvacfloor2.dgn	2002-04-29 09:41:17.877
hvacfloor3.dgn	hvacfloor3	Draft State	hvacfloor3.dgn	2002-04-29 09:41:18.040
hvacrisers.dgn	hvacrisers	Draft State	hvacrisers.dgn	2002-04-29 09:41:18.190
hvacroof.dgn	hvacroof	Draft State	hvacroof.dgn	2002-04-29 09:41:18.360
MechComposit.dgn	MechComposit	Draft State	MechComposit.dgn	2002-04-29 09:41:18.510

ProjectWise – example PW workflow



ProjectWise – example PW security



e-Construction Roll out 2016?

Expanded Pilot Summer 2015

Final Steps to Achieve Digital Documentation

Digital Signatures

Mobile Field Devices

Digital Docs w/Ex. Access

Policy and Training

Contract & Specs

3D Digital Plans

Electronic Bidding eBids

Construction Software

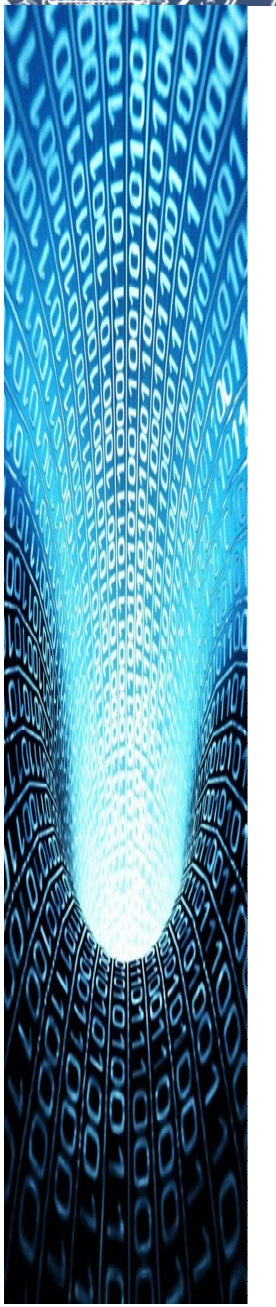
Expanded Pilot – Summer 2015

- **Request for Pioneers - completed**
- **Must be a one-season & limited items**
- **Must be a PM project**
- **Multi-element proof of concept test**
- **PM will engage with the Construction Section to:**
  - Develop procedures, policy, & guidance
  - Overcome barriers
  - Test hardware, software, and communication
  - Complete typical paperwork in digital form

Expanded Pilot

Expanded Pilot – CS purchases

- **Hardware**
  - ***Field***
    - iPad2 Air, Surface Pro 3 or similar, features i.e. Wi-Fi, Cell, dual camera, smart Pen, GPS
  - ***HQ ProjectWise Server***
    - Firewall or not to Firewall
    - Spec, standards & forms
    - State Archivist archiving
  - ***Office***
    - Existing builds



Expanded Pilot – CS purchases

- **Software**
  - ***Field***
    - MS Office Suite & Adobe Acrobat Pro
    - e-Plans in PDF format, loaded and on-line
    - e-Standards and e-Specifications on-line
    - ODOT e-forms, PDF fillable format, digital signature ready
    - Facetime or Skype
    - Project Wise App, plus other apps TBD
  - ***Office***
    - Existing build plus Adobe Acrobat Pro

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MDOT Michigan Department of Transportation

And then there's Michigan DOT

- **MDOT, e-Construction National Leader**
  - *Avoiding technology is not going to make it go away; avoiding technology just puts you behind*
  - *If it is created on a computer, it stays on a computer*
  - *One source of truth*

And then there's Michigan DOT

- **e-Construction on >$160M in projects**
  - ProjectWise construction document management
  - Digitally encrypted electronic signatures
  - Mobile devices in the field
  - Innovative training/manuals/instructions
  - Electronic data gathering
  - Significant process improvement

- **MDOT trunk-line projects will use e-Construction in 2015**

Oregon Department of Transportation

And then there's Michigan DOT

ODOT & MDOT's e-Construction Team

- ODOT will likely mirror many of the MDOT actions
- Planning a FHWA sponsored peer exchange
  - Mid-March 2015 anticipated
  - Cross-section of ODOT Construction and CLT
- MDOT sharing experiences with ODOT
  - Workflows, basic concepts, firewall issues, economics, hardware, software, etc…
- ODOT sharing 3D and AMG experiences MDOT

What do MDOT Inspectors think?

Closing thoughts

- This presentation and several e-Construction references will be made available on CS's website, share with your crews
- Let's seize the fantastic game-changing opportunity before us!
- Engage CS and CLT members
- Encourage your management team
- We are one ODOT, please do not go solo
- Thank you, Questions, Comments?

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MDOT
Michigan Department of Transportation

I LOVE THIS THING!