Quality Management Review



MoDOT

Dave Ahlvers P.E.

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Introduction to Quality Management Dave Ahlvers, P.E.

Review of Job Special Provision & Terms Dennis Brucks, P.E.

Forms, Checklists, ITP, Documentation, Sharepoint, Etc.

Josh Kincaid, P.E.

Session Format:

Complete three presentations from MoDOT

Field questions from attendees

DCEs will moderate questions from remote sites

Provide contact information for any follow-up questions

What is Quality Management?

- A process that gives the contractor the primary role and responsibility for incorporating QUALITY into the project.
- QUALITY is included in the planning and scheduling of all project activities.
- Contractor manages QUALITY with quality control testing and inspection.

Evolution from Method Specs to Quality Management



Evolution to Quality Management

- 2000 Implemented QC/QA for Asphalt
- 2002 Implemented QC/QA for PCCP
- 2004 Released "Performance" Spec Book
- 2007 Quality Management on Design-Build
- 2012 46 QM Pilot Projects (Design-Bid-Build)
- 2013 Full implementation

Design-Build Projects 2007-2012







BetterBridges

Design-Bid-Build Model

Contractor Role

Quality Control Testing

Inspection

Documentation

MoDOT Role

Quality Assurance Testing

Inspection Oversight

Documentation

Review of Job Special Revision & Terms



Dennis Brucks P.E.

Primary Components of Quality Management

- 1. Quality Manager (Contractor-employed)
- 2. Quality Management Plan
- 3. Quality Control staff (Certified technicians provided by contractor)
- 4. Quality Assurance staff (provided by MoDOT)

Quality Manager

- Contractor-employed or Third-Party
- Qualified, competent, knowledgeable, experienced
- Implements the QMP
- Directs all QC activities
- Is the point of contact for MoDOT
- Preferred to be "on-site" for larger projects
- Preferred to be separate from Production Manager

Quality Management Plan

- Contractor's Blueprint for Quality
- Approved QMP necessary prior to start of work
- Contractor submits draft for review (before pre-con)
- RE & Contractor meet to discuss details
- After agreement, both parties sign
- Contractual document
- "Living Document" Revise as necessary

Inspection and Test Plan (ITP)

- MoDOT provides a base ITP with minimum testing frequencies for QC and QA
- New base ITP posted on website
- Modify to fit your project (i.e. reduce as necessary)
- Contractor can <u>propose</u> changes to ITP testing frequencies (submit in writing)
- All proposed changes reviewed at the appropriate level (RE / District / Division)
- Issue a change order for any spec changes

Document Control Procedure

- Paperless method for storing/retrieving documents
- Preferred location: MoDOT's external Sharepoint
- MoDOT needs full access to documents
- Easy-to-follow folder structure and file naming convention
- Post documents 12 hrs. following shift, or as approved in QMP
- RE will move files to MoDOT V drive at closeout

Materials Sampling & Testing

- Contractor performs Quality Control testing
- MoDOT performs Quality Assurance testing
- QC/QA Testing frequency listed in ITP
- All testers must be certified
- Contractor testers listed in QMP
- Independent third party used for dispute resolution

<u>Inspection</u>

- Contractor provides basic inspection
- Inspectors need to be competent, but not certified
- Inspectors can perform dual role (i.e. foreman or worker), but this is not ideal
- Inspectors can use New MoDOT-provided checklists and reports or other approved documents
- General layout and surveying done by contractor
- MoDOT provides inspection oversight (QA)
- Off-site inspection provided by MoDOT

Materials Receiving

- Contractor collects acceptance documents for materials delivered to the site
- Standard materials receiving forms provided by MoDOT
- Contractor records basis for acceptance (MoDOT-OK stamp, PAL, certifications, etc.)
- Material acceptance documentation is required before work items are placed on pay estimate

Hold Points

- This is a check point
- Set at critical stages in the work to verify specific aspects (material, dimensions, specifications, etc.)
- QC provides completed Daily Inspection Reports, Checklists, and Material Test reports
- QA testing or inspection may be required
- QA approval is required before proceeding
- Hold Points established by QA, with QC input
- Intermediate (QC) Hold Points are optional

Hold Point Examples

- After BMPs installed, just prior to grading
- Prior to concrete or asphalt paving
- Prior to driving pile
- Prior to any substructure pour
- Prior major traffic switch
- Prior to deck pour

Role of QA (MoDOT)

- Verify performance of QC
- Enter QC data and DWR Diary into SiteManager
- Perform QA testing and inspection
- Interpret plans and specifications
- Liaison to MoDOT Design for project issues
- Measure pay items or verify measurements
- Verify QC tests / inspection / materials receiving / documentation is complete prior to payment

Role of QA (MoDOT)

- Attend pre-activity meetings
- Present at Hold Points
- Present on job as much as possible (risk based)
- Perform 10% check on surveying
- QA on IRI Measurements
- Help train contractor staff on inspection and documentation procedures

Pay Items

- Contractor documents location and quantity of installed items on DIR
- DIR serves as the contractor's request for payment
- MoDOT measures and documents quantity for pay items that require measurement
- MoDOT verifies quantity, checklists, and materials acceptance before making payment

Work Planning & Scheduling

- Contractor is required to include Quality in all planning and scheduling
- Work plan should include QC testing/inspection, and hold points
- Pre-Activity Meetings held just prior to each <u>new</u> activity (QM and/or QC, QA, Production)
- Weekly Schedule (Two-week look ahead), including planned hold points
- Hold points can be rescheduled with 24 hour notice

Standard Forms & Checklists

- MoDOT provides Forms & Checklists (See new)
- Contractor forms OK if they have required information
- Daily Inspection Reports (Now on website)
- Contractor saves all documentation to Sharepoint
- Name of technician on testing reports
- Documents digitally signed, submitted timely
- Digital signature can be any contractor representative

Non-Conforming and Deficient Work

Non-Conforming work:

"Completed work that does not meet the contract requirements"

Deficient work:

"In-progress work that does not meet the contract requirements"

Non-Conformance Report

- Documents deficient or non-conforming work
- NCR is NOT an Order Record
- Example: MRB project has over 200 NCRs
- Either party can issue an NCR
- QC should issue the <u>majority</u> of NCRs
- New NCR form now available on website

Resolving a Non-Conformance Report

- NCR serves as documentation and tracking
- Contractor proposes resolution
- Three options: 1. Use "as is"
 - 2. Fix it
 - 3. Replace it
- MoDOT approves or disapproves
- MoDOT closes NCR once resolved
- No. of NCRs does not affect Contr. Perf. Rating

Corrective Action Request

- Issued for <u>recurring</u> non-conforming or deficient work
- Issued by QC (preferably) or QA
- Contractor must track corrective action until there is a solution
- Rare none were issued in 2012
- Do not affect Contractor Performance Rating unless accompanied by an Order Record

Forms, Checklists, ITP, Documentation, Sharepoint, Etc



Josh Kincaid P.E.

MoDOT & Contractor Training

Quality Management Training Overview

- * Quality Management Plan (QMP)
- Inspection and Test Plan (ITP)
- QC Inspection Checklists
- * QA Inspections
- * Daily Inspection Reports (DIR) vs. MoDOT DWR's
- Materials Inspection
- * Forms
- * SharePoint

Job Special Provisions Section 2.3

- * A) General Organizational Structure of Production and QC staff
- B) Name, qualifications and job duties of the Quality Manager and all QC inspectors
- * C) A procedure describing QC Inspections
- * D) A procedure describing QC Testing
- * E) A procedure describing Material Receiving
- * F) A Document Control Procedure
- G) A procedure for Non-Conforming and Deficient work, and Corrective Action Requests
- * H) A list of work items that will be sub-contracted and the QC personnel who will be responsible for inspection and testing sub-contracted work
- * I) A list of QA Hold Points and a procedure for addressing any issues found during the QA Hold Point Inspections

Job Special Provisions Section 2.3 Continued

- * J) A list of QC Hold Points and a procedure for addressing any issues found during the QC Hold Point Inspections
- K) A procedure for making revisions to the QMP
- * L) References to specific applicable QC Plans such as asphaltic concrete pavement or Portland cement concrete pavement
- * M) A proposed independent third party company name, address and phone number for dispute resolution
- * N) Any approved changes to the standard forms provided by MoDOT
- * O) Format for the Weekly Schedule and Work Plans
- * P) A procedure for project closeout, including Quality Documentation Audit that verifies all project documentation is accurate and complete

ITP Example

QC Inspection Checklists

- Process for QC to provide a check on Quality of the work
- * Activity/Work Driven
- * Hold Points included in Checklists (Decide if QC, QA or both)
- * Hold Points may have separate form to fill out for documentation purposes.
- Flexibility to modify on projects as needed
- * Changes to Checklists can be made at RE Level
- * Need to develop Checklists for JSP items
- * Only QC has frequency in ITP for Checklists

BRIDGE DECK CHECKLIST

Project				
Route:				
Date:				
Contrac	etor:			
ltem:				
1072111				
Materi	als			
No.	ltems .	Yes	No	N/A
	All materials (reinforcing steel, bar splices, deck forms, ties, supports, curing			3
1	compound, concrete sealer, etc.) meet specifications?			
Formy	vork			
No.	ltems .	Yes	No	N/A
1	Forms mortar tight and sufficiently rigid to prevent excessive deflections?		-	(6)
2	Forms of adequate thickness and design to remain true to shape?			
3	Forms present a smooth surface and joints align properly?			
4	Inside of forms cleaned of dirt, mortar, and foreign materials?			
185	All materials (e.g. conduit, drains, blockouts, anchoring devices, etc.) to be			
5	embedded placed and adequately secured?			
6	Dirt, chips, sawdust, water, and other foreign material removed from within	3		3 3
7	Forms lubricated to ensure removal? Including overhang coil ties?			
	nent Steel Bridge Deck Forms			
No.	ltems .	Yes	No	N/A
1	Erection drawings provided?	3		8 3
2	Forms, materials, and installation in accordance with erection drawings?			6 .
3	Attachments made by approved methods?	1		
4	Contractor prevented welding arcs from contacting steel girder flanges?	\perp		
	nent Precast Concrete Deck Panels	I received		
No.	ltems	Yes	No	N/A
1	Panels checked for conformance?	1	-	
3	Erection of panels in accordance with working drawings?		8	35 - 5
4	Attachments made by approved methods?	1 3		3 3
	Butt joints between panels caulked to prevent grout leakage? rcing Steel	1		
No.	Items	Yes	No	N/A
1	Bars proper size, length, grade, and epoxy coated as required?	162	190	INIO
2	Proper number and spacing of bars?	3 3		3 3
3	Proper procedures followed for field bending or cutting of bars?	1	-	-
4	If cut, epoxy bar ends coated with approved material?	1	-	8 1
	Does reinforcement have required clearance or depth of cover from surface of	1	3	93 - 3
5	concrete?			
6	Mechanical bar splices appropriate length for size and type of bar?		3	300
7	Supports and ties plastic or epoxy coated as required?			9 3
8	Bars tied at intersections or as required?			
9	Upper mat of re-steel bars tied properly to lower mat?			
10	Chairs and slab bolsters at proper location and spacing?	-	3	50
11	Bar splices correctly staggered?	3		

	BRIDGE DECK CHECKLIST CON'T			
No.	Items	Yes	No	N/A
12	Bar placement, clearance, and tying checked?	8 8		
13	All bars clean and free of oil, dirt, and rust?			
	HOLD POINT			
Pre-Po	our Activity Meeting			
No.	ltems .	Yes	No	N/A
1	Trial run of finishing machine performed to test for deck thickness and grade?	9 8		
2	Procedures reviewed for placing concrete?	S 8		
3	Procedures reviewed for finishing and curing concrete?			
4	Emergency plan in place for header?	300 00		10 1
Concr	ete Placing and Curing			
No.	ltems	Yes	No	N/A
-1	Concrete mix design and class to be used are correct and approved for the			
2	Reinforcing steel checked and approved prior to concrete placement?	SS 88		9
3	Construction joints cleaned?	8 8		
4	Does ambient temperature for placing concrete meet specifications? Information on the concrete batch ticket indicates conformance with mix design	28 V.		
5	and specifications?	85 8		
6	Does concrete temperature at placement meet specifications?	20 20		is .
-	Designated pathway has been established for concrete crew to eliminate			
7	mud, debris, and other material to get tracked on deck? Formwork prewetted to surface saturated condition without free standing water	6 9		9 9
8	prior to concrete placement?			
9	Concrete placed continuously at minimum rate of pour?	65 5		
10	Concrete placed to avoid segregation?	2 8		
11	Vibrators providing adequate consolidation?	50 8		0 7
12	Concrete checked for thickness and level during pour?	0 0		8 - 0
13	Proper finishing methods performed?	(5)		
14	Finish true to design grade, camber, and cross-section?	22 - 23		100
15	Excess concrete is being removed from exposed barrier resteel?	S 8		i i
16	Proper curing method performed?	0 0		
17	Approved curing compound applied at proper rate?	(2)		
18	Curing compound applied just after texturing?	77 - 61		100
19	Burlap is presoaked?	9		6 9
20	Wet burlap applied right after cure has dried?	0 0		
21	Continued wet cured for 7 days and 3000 psi concrete obtained?	(2)		
22	Deck washed and concrete sealer applied after curing compound dissipated?	77		-
	Deck Summary	91 3		
No.	Items	Yes	No	N/A
1	Were the materials tested at the required frequency?	1.63	140	1911
2	Did this work meet the project specifications?	(C) (1)		2 2
	bia triis work meet trie project specifications:	S 19		
Comme	phe.			
Comme	HRS.			
				_
0				
OC Sic	nature:			
	recorded			

	SECTION 613 PAVEMENT REPAIR CHECKLIST			
7: -				
Project: Route:				
Coule.				
Contract	JI			
tem:				
Materia	Is			
No.	Items	Yes	No	N/A
	Do all materials meet specification and is proper documentation			
1	supplied to MoDOT?			
ull De	pth Pavement Repair			
No.	Items	Yes	No	N/A
	Was all material taken out of the repaired area recycled or			
1	disposed of in accordance with this section? This may require			
	Was subgrade and aggregate base replaced and/or compacted to			
2	the satisfaction of the Engineer?			
3	Were all tie bars and dowel bars installed properly?			
*	HOLD POINT	97.		
4	Was a MoDOT approved "pavement repair" mix used, and did test results yield specification compliant concrete?			
5	Was the pavement repair concrete in accordance with Sections 501 and 502 ?			
6	Did the repaired area meet smoothness and surface variation requirements?			
ull Dept	th Pavement Repair Summary			41
No.	Items	Yes	No	N/A
1	Were the materials tested at the required frequency?			2
2	Did this work meet the project specifications?			
Commer	nts:			
į.				
QC Sign:	ature:			

SECTION 616 TEMPORARY TRAFFIC CONTROL CHECKLIST

Project:	Standard Plans: 616.1	UX 9U3	03X	
Route:	Standard Flans. 010.1	OA, 303.	.oox	
Date:	*			
Contractor:				
Item:				
nem.	<u>*************************************</u>			
Materials				
No.	Items	Yes	No	N/A
1	Do all materials meet specification and is proper documentation supplied to MoDOT?			2. 201
	y Traffic Control Devices and Flaggers		20 0	2
No.	Items	Yes	No	N/A
INO.	Do all devices meet requirements for location, reflectivity, sight distance,	res	140	N/A
1	plumbness & splicing?			
2	Are flaggers certified and wearing proper safety apparel?			
3	Was traffic control checked twice daily?			
Work Zon	e Lighting			
No.	Items	Yes	No	N/A
1	Do all construction related vehicles and equipment have USDOT approved warning lights?			
2	Does work area lighting provide adequate illumination and proper positioning?			
Changeat	ole Message Signs			
No.	Items	Yes	No	N/A
1	Is the CMS in the appropriate location and displaying the correct message?			
Work Zon	e Traffic Signals			
No.	Items	Yes	No	N/A
22	Are the temporary work zone traffic signals in the proper locations and		3	
1	functioning properly?			
Comments				
5				
÷				
÷				
-				
OC Divital	Cionatura:			
QC Digital	oignature:			

QA Inspections

- Process for QA to audit/monitor QC Inspections
- * QA does not have a required "Inspection" frequency in the ITP
- * QA inspections should be a minimum of 10% of QC's Inspections
- Types of Possible QA Inspections
 - QA can do an audit of a QC Checklist
 - This can be done daily at random and is intended to be while QC is filling it out
 - * This is a check for QA to make sure the work is inspected and not just checked off of a list
 - QA should initial and date the QC Checklist next to items audited
 - QA can also fill out an independent Checklist if desired

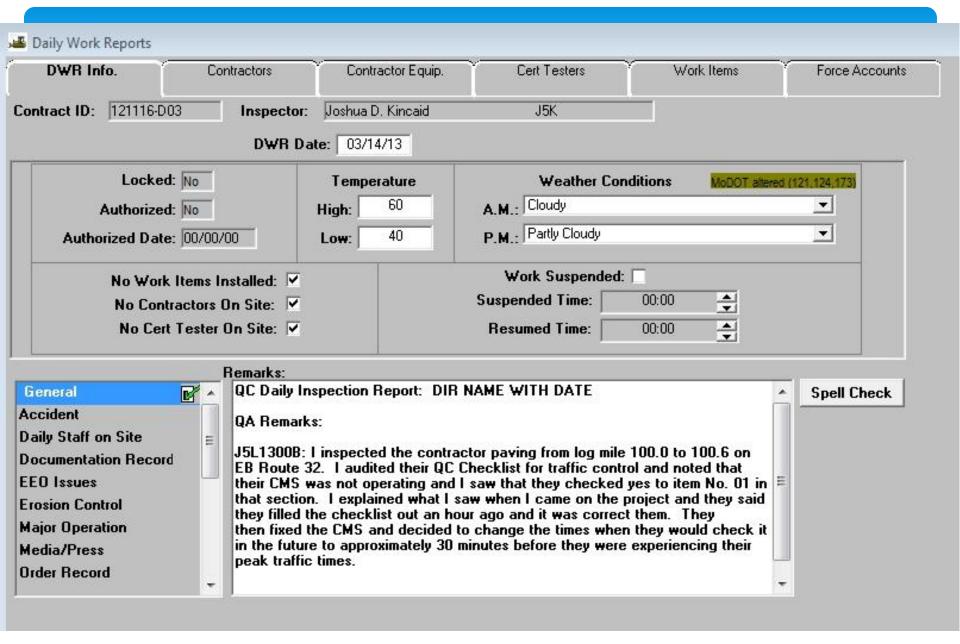
QC Daily Inspection Reports (DIR)

- Documents daily contractor activities
- Separate DIR's or separate documentation of installed quantities per project
- Subcontractor information should be included or have separate DIR
- * MODOT will provide generic form for use
- * Contractor can use their own form but it should have MODOT generic form information at a minimum
- Basic Information Needed
 - Project Conditions (weather, temperature, etc.)
 - General Remarks of the work taking place, where and by whom
 - Contractor personnel and equipment
 - Testers and tests performed
 - Installed work listed like the pay items with details and location descriptions as described in 2B Sheets and Contract Plans

QC DIR Form Example

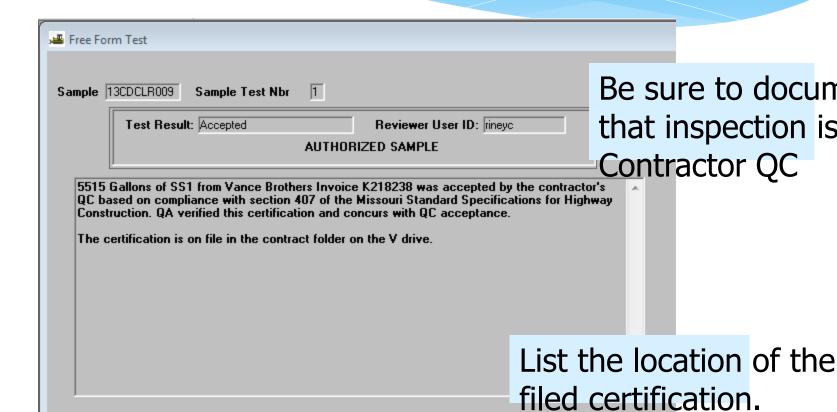
MODOT DWR's

- * QA should still enter a daily DWR in SiteManager
- * DWR's should reference not restate the remarks in the Contractors DIR
- The remarks should indicate QA inspection information separate from QC DIR Information
- * Remarks about any QC documents should include a reference to that specific document
- * QA is only required to measure items for pay that are required to be measured per specifications.
- * The following DWR Tabs should be copied from the QC DIR:
 - Contractors (Personnel for Payroll Reports)
 - Contractor Equip (This is optional)
 - Cert Testers (QC and QA testers for that day)
 - Work Items (This produces details for payment documentation)



Reporting of QC & QA Materials Testing

- * QA will report all QC and QA tests
- * QA will enter one report to satisfy the QC & QA test requirement in the ITP for items accepted on certification, PAL and items like tack.
- * QA will supply templates and forms for QC to fill out
- * QA needs to make a distinction in remarks as to whether the test is QC's or QA's and list the tester
- * Examples can be provided for setting up contracts in SiteManager



QC Daily Responsibilities

- * Fill out and submit DIR's
- Check all materials received for quality and quantity
- * Provide Materials Receiving Reports, Invoices & Certifications
- Do applicable testing based on ITP
- Provide test information based on MoDOT provided templates/forms
- * Fill out checklists
- Provide detailed measurements in installed work portion of DIR
- * Develop weekly/2 week schedules
- Hold Pre-activity meetings
- * Communicate with QA regarding documentation, testing & Hold Points

QA Daily Responsibilities

- * Enter DWR's
- * Audit QC Documents in SharePoint prior to entering pay items
- Audit QC Checklists or fill out QA checklists
- Evaluate Hold Points when applicable
- Measure quantities for pay (that need to be)
- Do applicable testing based on ITP
- * Check materials invoices, documentation and communicate with District Materials
- * Enter Materials Reports (QC & QA)
- Communicate with QC regarding documentation, testing & Hold Points

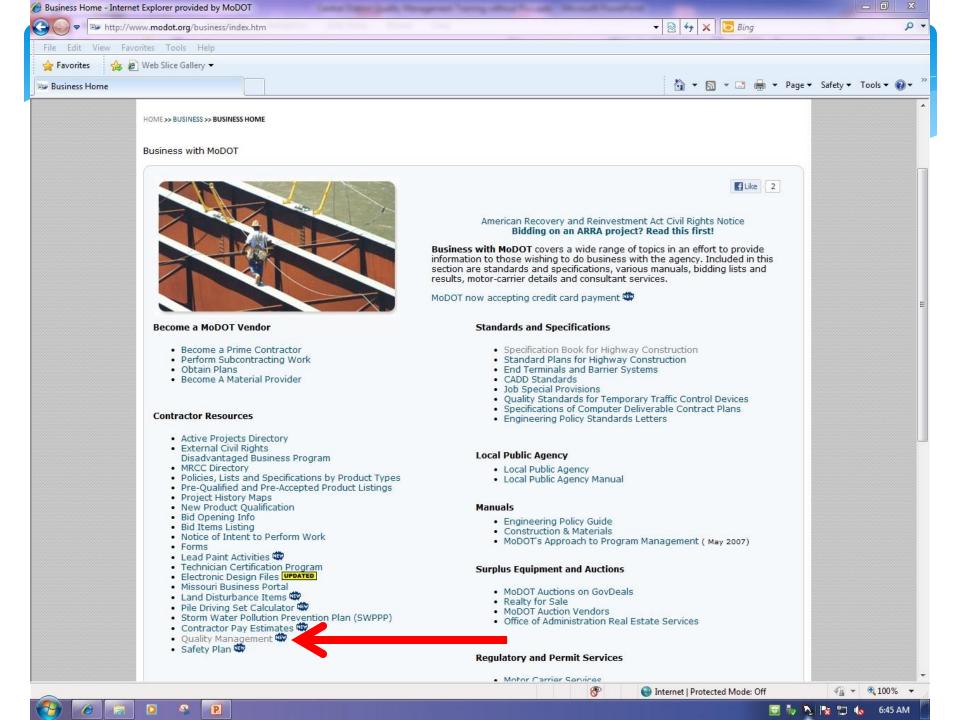
Central District Inspection Guide

For MoDOT personnel it is located on the Central District Construction and Materials SharePoint Site.

Contractors will be provided a copy for use upon their request.

Where to find MoDOT provided ITP, Checklists & Forms





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Quality Management

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Quality Managment Documents

MoDOT ITP Plan (03-18-2013) Excel Format
Sample Quality Management Plan Word Format

Checklists

ADA Checklist

ITS Checklist

MOT Lane Closure Checklist

OA Hold Points

Section 200 Checklist

Section 300 Checklist

Section 400 Checklist

Section 500 Checklist

Section 600 Checklist

Section 700 Checklist

Section 800 Checklist

Section 900 Checklist

Traffic Control Checklist

Forms

Absorption Worksheet 🗬

Compaction Test C709ND 🕸

Concrete Pour Card

Consensus Test 🐡

Daily Inspection Report

DCP Test

Embankment Monitoring

Gradation Worksheet

Land Disturbance Inspection Record

Materials Receiving Inspection Report

Materials Request for Transfer

Misc Concrete Placement Test Record

MoDOT Provided SharePoint

* To add a new Contract and Contractor Personnel to SharePoint QA will send an e-mail to Mike Meyerhoff with the Contract ID, names of contractor personnel and their respective e-mail addresses.



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Quality Managment Documents

MoDOT ITP Plan (03-18-2013) Excel Format
Sample Quality Management Plan Word Format

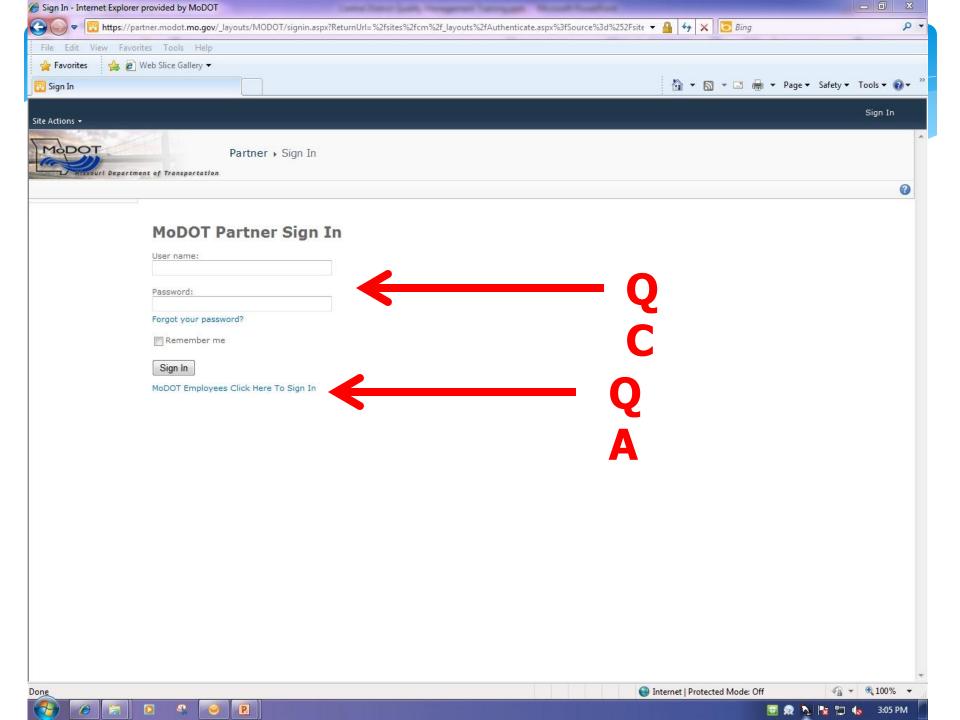
Checklists

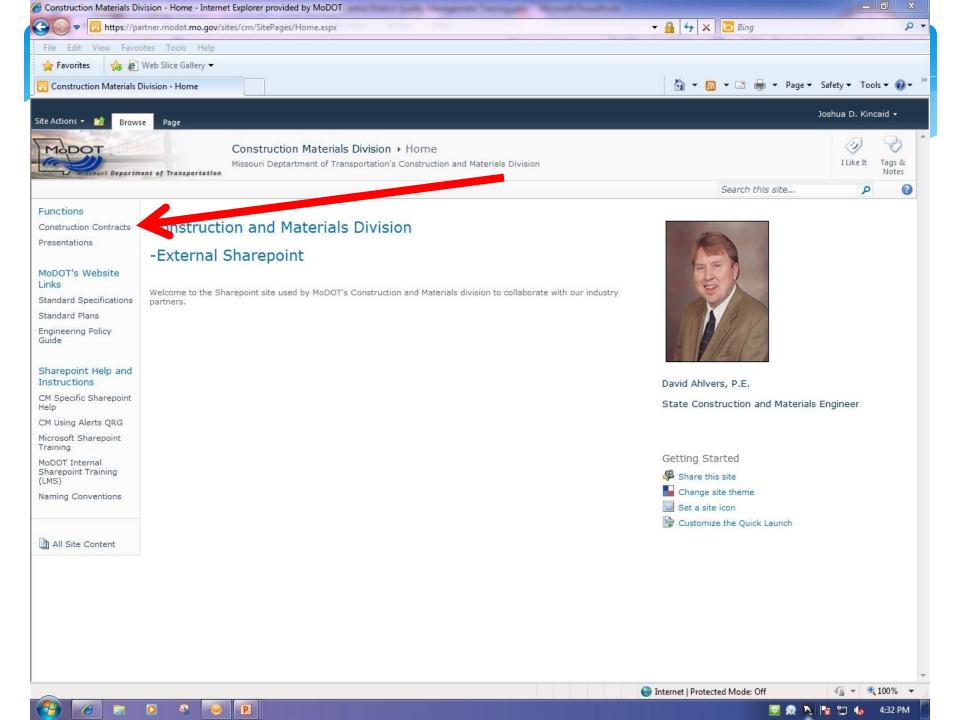
ADA Checklist
ITS Checklist
MOT Lane Closure Checklist
QA Hold Points
Section 200 Checklist
Section 300 Checklist
Section 400 Checklist
Section 500 Checklist
Section 600 Checklist
Section 700 Checklist
Section 700 Checklist

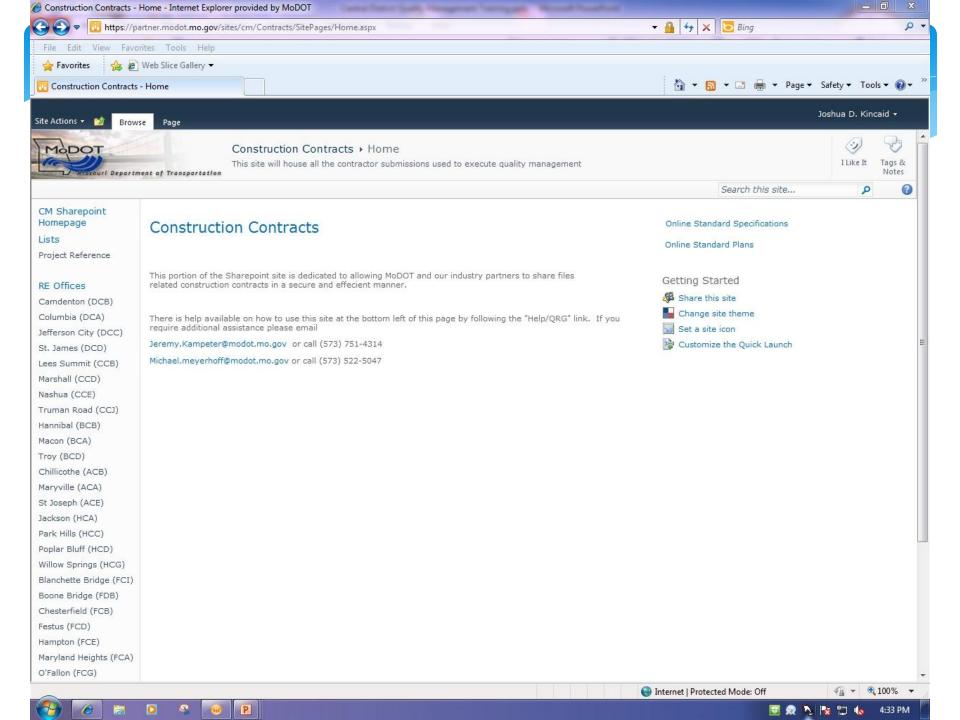
Section 900 Checklist Traffic Control Checklist

Forms

Absorption Worksheet
Compaction Test C709ND
Concrete Pour Card
Consensus Test
Daily Inspection Report
DCP Test
Embankment Monitoring
Gradation Worksheet
Land Disturbance Inspection Record
Materials Receiving Inspection Report
Materials Request for Transfer
Misc Concrete Placement Test Record







Questions?

Email questions to: Christina.Teter@modot.mo.gov

Quality Management Documents: www.modot.org/quality