2020

STATE OF OKLAHOMA | 5201 N.E. 122nd Street, Building 4011, Edmond, OK 73013-8306

QUALITY SYSTEM MANUAL

MICHAEL D. GROOM

Oklahoma Department of Transportation

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

Table of Contents

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

September 21, 2020

QUALITY POLICY STATEMENT

The mission of the Materials Division of the Oklahoma Department of Transportation (ODOT) is to assure that only quality products and construction methods are used on ODOT projects. To meet this mission, ODOT technicians will perform testing on products to be used on projects and on items constructed on site. ODOT technicians will perform testing utilizing the latest AASHTO, ASTM, ACI, and ODOT Standards and Specifications available. To maintain the high quality of testing expected, technicians are required to pass specific training modules at the ODOT Training Center or are trained by individuals who have a minimum of two years or more experience in the procedure. The Materials Division will participate in all AASHTO re:source and CCRL proficiency sample programs where applicable to ODOT requirements. The Materials Division will provide written responses to proficiency sample ratings of 2 or less for any AASHTO re:source and CCRL proficiency sample test results as required.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

September 21, 2020

FORWARD

The purpose of this manual is to establish policies, procedures, standards, methods, responsibilities and documentation that will insure that the laboratory services provided by the Materials Division, Central Laboratory for the Oklahoma Department of Transportation are adequate and are in compliance with all applicable requirements.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

5.2.2

September 21, 2020

PROCEDURE FOR ACCESSING THE MOST CURRENT COPIES OF TEST METHODS, PRACTICES, PROCEDURES AND SPECIFICATIONS

The most current copies of AASHTO and ASTM standards will be found through the Departments subscription service via the intranet.

Department test methods (OHD-L) and practices will be found via the Materials Division website.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

5.3.1

September 21, 2020

NAME AND ADDRESS

Oklahoma Department of Transportation
Materials Division
5201 NE 122nd Street, Building 4011
Oklahoma City, OK 73013-8306

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

5.4.4

September 21, 2020

QUALITY SYSTEM IMPLEMENTATION

Transportation Manager II, Michael Groom, Materials Division, will be the Quality Control Manager and shall be responsible for determining if quality implementation activities are being conducted in the manner specified in the quality system manual. In the event Mr. Groom is unavailable, Transportation Specialist V, Donald McCullough, Materials Division, will be the backup.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

5.5.1

September 21, 2020

TRAINING PROGRAM FOR TESTING TECHNICIANS

The laboratory supervisor is responsible for the training of testing technicians. All testing technicians shall be trained prior to performing procedures not previously performed. Training records shall be retained in the laboratory supervisor's office. A copy of training results shall be distributed to the Quality System Manager. The following training process shall be followed for each AASHTO, ASTM, or OHDL procedure.

1. The trainee shall obtain a copy of the applicable procedure and report form.

2. The trainee shall study the procedure and report forms to become familiar with the equipment, terminology, procedure, calculations, and reports.

3. A qualified technician shall demonstrate the procedure for the trainee.

4. The trainee shall repeatedly perform the procedure under the guidance of a qualified technician until proficiency is obtained.

5. The laboratory supervisor shall observe the trainee demonstrating the procedure and document the results in the testing technician's training record. If the observation was satisfactory, proceed to 6. If the observation was unsatisfactory, return to 4.

6. The technician may continue to perform the procedure, under the guidance of a qualified technician, for up to 3 months to further develop proficiency prior to competency review.

7. When the laboratory supervisor feels the trainee has obtained proficiency and is ready for a competency review, the laboratory supervisor will notify the Technical Support Staff.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

5.5.2

September 21, 2020

METHOD FOR REVIEWING TECHNICIAN COMPETENCY

The Technical Support Staff is responsible for evaluating technician competency. Technicians are required to demonstrate each AASHTO/ASTM procedure for which the technician has been trained. Competency evaluations shall be administered at least once within a 36-month period for the applicable procedure. The Quality Manager will determine when the competency evaluation(s) will be conducted within in that 36-month period. The competency evaluation interval may be increased to 48 months for technicians with two or more passing evaluations for the applicable procedure. If a technician does not routinely perform a procedure, the Branch Manager may determine that it is not necessary to evaluate the competency of that technician to perform the procedure during a regular schedule; however, the technician's competency shall be evaluated prior to performing the procedure.

1. For each technician, a competency evaluation record shall be prepared by the Technical Support Staff. The record shall include the procedure demonstrated, date (MM/DD/YY) of demonstration, name of the evaluator, and any comments.

2. The Technical Support Staff will provide an evaluation report to the Lab Supervisor or Branch Manager. If any findings are noted, it is the responsibility of the Branch Manager or Lab Supervisor to review and correct the findings with the technician to verify that correct procedures are being followed in future testing.

3. The Quality System Manager shall maintain records of competency evaluations. A report of completed and due competency evaluations will be provided to the laboratory supervisor.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

5.1

September 21, 2020

INTERNAL AUDIT PROCEDURE

The Quality Manager and/or their designee will audit a representative sampling of each of the following policies, procedures, and records annually to ensure that established quality procedures are being followed:

- QMS policies and procedures, including document control
- Technician training records
- Technician competency evaluation records
- Previous internal findings and corrective actions
- Management review findings and corrective actions
- Customer complaints and corrective actions
- Records retention
- Equipment inventory list
- Equipment calibration, standardization, check, and maintenance records
- Test records and reports
- Proficiency Sample Reports

Quality management system policies and procedures, records, reports, interviews with staff, corrective actions, etc., will be reviewed for completeness and conformance to AASHTO R 18 and any other applicable QMS standards. This will ensure that established laboratory policies and procedures are being followed. Documentation will be checked to ensure at least 5 years of retention. Availability and access to current applicable standards (AASHTO, ASTM, OHDL, etc.) will be reviewed.

The results of the internal audit will be recorded on an Internal Audit Check Sheet with any additional pages needed to identify nonconformities and planned corrective actions attached. The Quality Manager will discuss any findings, improvement opportunities, and/or corrective actions with appropriate staff.

The Quality Manager will maintain a file containing all documents relating to internal audits in their office.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

5.1

September 21, 2020

MANAGEMENT REVIEW PROCEDURE

The Quality Control Manager will meet with the managers of the Materials Division, or their designees, annually. The purpose of this meeting is to ensure the conformance of all applicable standards, suitability, effectiveness and implementation of the QMS. The following information will be discussed with emphasis placed on ways to improve the system and correct any errors.

- Summary of follow-up actions from previous reviews
- Suitability of QMS policies and procedures
- Results of recent internal audits
- Results of external audits (AASHTO re: source, CCRL, etc.)
- Results of proficiency sample testing
- Status of any corrective actions
- Changes in the volume and/or type of work
- Feedback and complaints from employees and clients
- Staff training
- Changes in standards
- Improvement opportunities/recommendations

The findings of this review and any changes resulting from it will be recorded. A copy of will be placed in the Quality System Manual.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

5.8

September 21, 2020

Procedure for Implementing Corrective Action When Nonconforming Work or Departures form Policies and Procedures Have Been Discovered

The quality manager will review all discovered nonconformities and bring them to the attention of the appropriate branch manager. The branch manager is responsible for implementing and documenting the root cause and any corrective actions. In some cases it may be necessary for the quality manager to investigate the root cause, take corrective action and prepare documentation relative to specific differences.

Reports covering the results of proficiency sample testing, on-site assessments, quality management system evaluations, and reports summarizing investigations with any corrective action taken, will be maintained in the quality manager's office.

Procedures to follow whenever or however nonconformities are found:

Start with a root cause analysis. This may include:

- Investigate if the test results obtained were properly transferred to the data sheet and the results were input correctly in the database.
- Investigate if all calculations leading to the test results obtained were correct.
- Investigate if the equipment used meets specifications and has been calibrated.
- Investigate if the procedures used to perform the test were correct and followed.

Finish with follow up actions taken. This may include:

- Retraining of the technician
- Repairing, calibrating, and/or replacing equipment
- Prepare a record summarizing follow up action(s) taken.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

September 21, 2020

PROCEDURE FOR IMPLEMENTING CORRECTIVE ACTION WHEN NONCONFORMING TEST PROCEDURES ARE FOUND OR EQUIPMENT IS OUT OF CALIBRATION

The quality manager will review all discovered procedural nonconformities or equipment found to be out of calibration. Any work effected by the equipment and/or procedure shall be halted until a root cause investigation is conducted and corrective actions have been completed. The testing, affected by the nonconformity, shall be reviewed for all work performed between the time the equipment, procedure, or both was known to be in compliance and when the deficiency was noted. The reported results shall be evaluated for the significance of the nonconformity and, if necessary, notify clients of the possibility of nonconforming test results.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

September 21, 2020

PROCEDURE FOR THE MONITORING OF QSM ACTIVITIES

The Quality Control Manager will be responsible to perform a review of all Quality System Manual activities pertaining to on-site inspections, proficiency sample programs, and quality system evaluations and to give notice to the appropriate technical manager and/or laboratory supervisor of any deficiencies (apparatus, procedural, etc.) found. The technical manager and/or the laboratory supervisor will be responsible for ensuring that corrective action is taken and documented. In some cases it may be necessary for the QC Manager to investigate the root cause, take corrective action, ensure follow up and prepare documentation relative to specific differences. The QC Manager will be responsible for corrective actions and document preparation relative to quality system deficiencies. Reports covering the results of on-site inspections, proficiency sample testing, investigations and any corrective actions taken will be maintained by the QC Manager. Any information necessary will be transmitted to the appropriate accreditation body by the QC Manager.

The laboratory shall participate in the following on-site inspections (overlapping inspections may be performed by either agency):

AASHTO re:source

- Soil
- Aggregate
- Asphalt Binder; Emulsified Asphalt; Asphalt Mixtures
- Iron and Steel
- Quality System

CCRL (Cement and Concrete Reference Laboratory)

- Cement; Pozzolan
- Concrete
- Aggregate
- Steel Reinforcing Bar
- Quality System

The laboratory shall participate in the following proficiency sample programs:

AASHTO re:source

- Soil - Classification and Compaction; California Bearing Ratio
- Aggregate – Coarse; Fine
- Asphalt - Viscosity Graded; Performance Graded; Emulsified
- Asphalt Mixture - Solvent Extraction; Gyratory Design; Ignition Oven
  CCRL
- Cement – Portland; Blended
- Pozzolan
- Concrete
- Steel Reinforcing Bar

It is the responsibility of the technical manager and/or laboratory supervisor to assign a quality person to run the required procedures and insure that the equipment used has been calibrated.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

September 21, 2020

PROCEDURES RELATED TO CORRECTIVE ACTIONS

The Quality Control Manager will have the overall responsibility for all corrective actions related to internal audits, customer complaints, equipment (calibrations, standardizations, checks and maintenance), external assessments (AASHTO re:source and CCRL on-site inspections) and proficiency sample programs. The technical manager and/or laboratory supervisor will have the responsibility to investigate the root cause of any poor results, determine the appropriate actions necessary, and to implement and document the corrective action. The technical manager and/or laboratory supervisor will notify the QC Manager of the results of any corrective actions taken and provide a copy of the documentation for said action.

A poor on-site inspection result is any result that is classified as a deficiency. The procedure for evaluating poor results starts with a root cause analysis and finishes with follow up. An evaluation will be conducted as follows:

The procedure for apparatus deficiencies is as follows:

- Determine if the equipment meets specification requirements.
- If the equipment is found to be defective, take necessary steps to repair or replace it.
- Record the results of the investigation and any corrective action taken.

The procedure for procedural deficiencies is as follows

- Discuss each procedural deficiency with the testing technician and review the proper procedure.
- Observe the technician perform the test properly.
- Record the action taken.

The procedure for quality system deficiencies is as follows:

- The Quality Manager will review each deficiency cited by the evaluation with the responsible employee.
- Take appropriate action.
- Record the action taken.

The QC Manager will, within sixty (60) days of the issuance of the formal inspection report, provide AASHTO re: source with satisfactory evidence that all deficiencies noted were either corrected or that action has been taken to correct deficiencies. Evidence will consist of the memorandums of record and other records as necessary.

A poor proficiency sample program result is any result that is beyond two standard deviations from the average value (a rating of two or less). The procedure for evaluating poor results starts with a root cause analysis and finishes with follow up. An evaluation will be conducted as follows:

- Determine if the test results obtained were properly transferred to the data sheet and the data was correctly entered into the database.
- Determine if all calculations leading to the test results obtained were correct.
- Determine if the equipment used to perform the test meets specification requirements and was calibrated or verified.
- Determine if the procedures followed were from the correct specification and that the test was from the correct specification requirements.
- Take corrective action to repair or replace defective equipment or instruct the technician of the correct procedure to follow.
- Record the results of the investigation, identifying the cause of the poor results, if determined, and describing any corrective action taken.

The QC Manager will, within sixty (60) days of the issuance of the proficiency sample program report to provide AASHTO re: source a copy of the memorandum summarizing the results of the investigation.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

September 21, 2020

PROCEDURE FOR MAINTAINING THE QUALITY SYSTEM

Technical Managers will be as follows:

Branch Manager - Geotechnical Branch
Branch Manager - Structural Branch
Branch Manager - Bituminous Branch
Branch Manager - Chemical Branch
Branch Manager - Aggregates Branch

Procedure for Technical Revisions to the Quality System

The Technical Manager has overall responsibility for maintaining the Quality System for his/her area. He / She shall routinely monitor, document, collect and communicate information relative to the Quality System.

The Quality Control Manager shall review the Quality System at least every twelve (12) months. He / She shall document the review and report his/her findings to the Materials Engineer.

Revisions shall be issued to all holders of the Quality System Manual by the Quality Control Manager who is responsible for maintaining the master copy of the QSM for the laboratory.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

5.8.2

September 21, 2020

PROCEDURE FOR HANDLING CUSTOMER COMPLAINTS

Upon receipt of a customer complaint, the following actions will be taken:

- The supervisor or lead technician of the laboratory will be notified.
- Complaint will be brought to the attention of the Technical Manager of the lab in question.
- Supervisor or lead technician will contact the complainee to verify all aspects of the complaint and establish resolution date (if necessary).
- All reports, records and pertinent data will be reviewed; and all calculations will be checked for accuracy.
- The technician(s) performing the test will be consulted by the supervisor or lead technician to determine any unusual problems or circumstances involved.
- Supervisor or lead technician will report all information gathered to the Technical Manager.
- The Technical Manager shall formulate an appropriate reply and issue same to the complainee.
- A copy of the reply will be given to the QC manager for review and retention.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

5.9

September 21, 2020

RECORDS RETENTION, STORAGE, & DISPOSAL

Records pertaining to:

- External Assessments
- Internal Audits
- Management Reviews
- Proficiency Samples
- Technician Training and Evaluations
- Personnel
- Test Data
- Test Reports
- Equipment Calibration
- Standardization Checks
- Maintenance Activities
- Customer Complaints
- Corrective Actions

Will be stored and retained by the Quality Manager for a minimum of five (5) years.

When appropriate to dispose of records, they will be deleted from the database or shredded if in hard copy.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

6.1

September 21, 2020

INVENTORY

The Technical Support Staff will maintain an inventory of all major sampling, testing, calibration and verification equipment covered by the Quality System Manual. The inventory shall include the name, date received, date in service, manufacturer, model number, serial number and condition when received for each piece of major equipment. A copy of the inventory list shall be provided to the Quality System Manager when updated or at least annually. The Laboratory Supervisor/Senior Technician shall maintain a file for manufacturer's instruction manual for each piece of major equipment.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

6.2.1

September 21, 2020

EQUIPMENT CALIBRATION, VERIFICATION AND MAINTENANCE POLICIES AND PROCEDURES

GENERAL POLICIES:

- Required equipment will be calibrated, verified, or maintained at intervals following the general procedures indicated below.
- Newly acquired equipment without manufacturer's certification and equipment that has not been calibrated or verified because it has been removed from service or moved to new locaton will be calibrated or verified before being placed in service.
- When any test equipment is giving results that are suspect, overloaded, mishandled, or is not meeting specification tolerances, the laboratory supervisor/ lead technician will contact the Quality Control Manager who will have the Technical Support staff remove it from service and clearly mark it by attaching a red ribbon or tape. The equipment will be returned to service only after appropriate repairs are made and the Technical Support staff or other outside entities (ISO/IEC accredited) have performed the necessary calibration and/or verification procedures which show the equipment to function satisfactory or to meet specification tolerances.

GENERAL PROCEDURES:

- The Technical Support Staff will maintain a database, which tracks each piece of equipment requiring calibration or verification and the maintenance of this equipment. The laboratory supervisor/ lead technician will be responsible for maintenance and documentation of equipment in their lab. An email reminder to the Branch Manager, Laboratory Supervisor, or Lead Technician, 10 days before the due date if record has not been submitted. If the record is not completed 5 days from the due date, the QA Manager will receive and email and will investigated. The record for each piece of equipment will contain detailed reports of calibration, verification or maintenance work performed in chronological order and will be maintained by the QC Manager.
- When appropriate an outside vendor will perform required maintenance on equipment. The laboratory supervisor/ lead technician will be responsible for documenting this activity.
- Technical Support Staff will review the database to determine equipment that needs to be calibrated and/or verified on a weekly basis. The QC Manager will designate a technician from the Technical Support Staff to perform the required calibration and/or verification.
- The Technical Support Staff will record calibration and/or verification information in the database, identifying the equipment and the next date calibration or verification required.
- The Technical Support Staff will give a copy of the record to the laboratory supervisor or lead technician. The Technical Support Staff will file a copy of the record in the appropriate book maintained by the QC Manager.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

September 21, 2020

EQUIPMENT CERTIFICATIONS

All equipment certifications will be maintained in the QC Manager's office.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

6.6

September 21, 2020

PROCESSING OF SAMPLES

Identification

All samples accepted for testing will be accompanied by proper sample documentation, or a tag containing the sample ID as it is documented in Sitemanager. The sample documentation or tag identifies the material in terms of the project, the quantity of material represented by the sample, and the material's intended use. The samples identification information is kept with the sample as long as it remains in the materials laboratory.

Storage

After being logged, samples are stored in the area of the laboratory in which testing is to be done. During storage, care is taken to avoid disturbance or contamination. Any AASHTO, ASTM, or OHDL requirements for storage (e.g., the moist storage of Portland Cement concrete cylinders) will be followed.

Retention

Samples with acceptable test results are generally discarded when testing is completed. Those with failing results are retained until a review of those results is completed. At that time the decision is made whether to discard, retest, or continue to retain the sample.

Disposal

Discarded non-hazardous materials are transported daily by materials division personnel to an appropriate area. Hazardous materials (e.g., bituminous concrete extraction solution) are stored in proper containers in an isolated area. Disposal by an approved disposal contractor is arranged periodically by the QC manager.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

6.7

September 21, 2020

TEST RECORDS

Preparing Sample Log

Each sample received by the materials laboratory for testing is recorded in a log, or Sitemanager, by a lab Technician. The following information is required for each sample submitted for testing:

- Sample number, or, sample ID
- Contract ID for project samples
- Description of the material
- Supplier of the material, with Producer Supplier number
- Location from which the sample was taken
- Name of person(s) who sampled the material
- Date of sampling
- Date the sample was received in the materials laboratory
- Condition of sample when received (OK or damaged)
- The date testing was completed will be shown on the test card and recorded in Sitemanager
- The initials of the tester will be shown on the test card, or the Sitemanager user ID

Preparing and Checking Test Reports

Test results are recorded on standard materials division worksheets and/or appropriate Sitemanager template. The lab supervisor or lead technician will review them prior to preparing a test report. The original test report is filed in the project folder in the materials laboratory and copies are sent to the project engineer, the contractor and the supplier, depending on the material. All electronic results on Sitemanager templates may be viewed in Sitemanager.

Test Report Requirements

- Name and address of the testing laboratory.
- Identification of the report and the date issued.
- Name if the client or identification of the project.
- Description, identification and condition of the test sample.
- Date of receipt of the test sample.
- Date of test completion.
- Identification of the standard test method used and a notation of all known deviations from the test method.
- Test results and other pertinent data required by the standard test method.
- Identification of any test results obtained from test performed by a subcontractor.
- A name of the person (s) accepting technical responsibility for the test report.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

6.7.4

September 21, 2020

AMENDING REPORTS

When a report must be amended, a new report form will be filled out, clearly indicating that it is an amended report. The form will be processed in the normal manner and show the amended test results. It will also state the reason for the amendment and be filed with the original report.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

6.8

September 21, 2020

PROCEDURES RELATED TO SUBCONTRACTING
SAMPLE TESTING

Any test results performed by subcontractors will be identified as such on test reports issued by this laboratory. The laboratory will subcontract only with competent, qualified, and capable testing laboratories as determined by a selection committee. Labs performing certain procedures, as related to cement, concrete, aggregate, steel, soil and asphalt must be accredited by AASHTO re:source or CCRL and participate in the appropriate proficiency sample program.

Selection Committee and Selection Process:

A selection committee of materials, design, and construction personnel will review responses received and select a number of testing laboratories for interviews. The selection committee will decide, based on the interviews, which testing laboratory is the most competent, qualified, and capable. The selection committee will also rank the remaining testing laboratories. The Materials Division, upon approval, will negotiate to contact with the selected testing laboratory. If negotiations are unsuccessful, the Materials Division will then negotiate with the second most competent, qualified, and capable testing laboratory, as determined by the selection committee.

Test Reports and Test Results from Subcontractors

Test reports submitted by subcontractors will be reviewed for compliance with contract requirements by the appropriate technical manager. A cover letter of transmittal will be placed with the accepted test report to forward to all appropriate parties.

Test results submitted by subcontractors incorporated into test reports issued by this laboratory will be identified as such in the test report.

Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
www.odot.org

TECHNICIAN EVALUATIONS, CHECKLISTS, TRAINING RECORDS AND EQUIPMENT CALIBRATION, VERIFICATION AND MAINTENANCE REPORTS

Click the link below to view reports.

http://www.odot.org/materials/C97001_WEB_REP/index.htm