FOREWORD

The purpose of the Materials Sampling Manual is to establish and standardize construction and maintenance sampling and material acceptance requirements for the Louisiana Department of Transportation and Development.

The manual is divided into three primary parts: Construction Sampling Schedules, Maintenance Sampling Schedules, and Sampling Procedures.

All sampling of materials shall be in accordance with this manual unless otherwise specified by Department contract or purchase order requirements.

The Materials Sampling Manual will be kept current by the issuance of new and revised sampling schedules and procedures. Each manual holder shall ensure his manual is always up-to-date.

Manuals may be purchased from the Department of Transportation and Development, General Files Unit, P.O. Box 94245, Baton Rouge, LA 70804-9245 (phone 225-379-1107). The Manual is also available for viewing through the DOTD Homepage at:

www.dotd.louisiana.gov/highways/construction/lab/home.asp

INTRODUCTION

CONSTRUCTION

I. General

These sampling schedules are arranged in accordance with section numbers of the *2006 Standard Specifications for Roads and Bridges.*

Sampling of materials shall be in accordance with this manual unless otherwise specified by project specifications. This manual is not to be used for the purpose of determining permissible material uses. Any questions concerning the sampling of any material are to be directed to the District Laboratory Engineer. Final authority is vested in the DOTD Materials Engineer Administrator.

These schedules outline sampling & testing requirements for construction. At times, for certain materials, it will be necessary to reference between schedules to obtain correct information. The Department reserves the right to randomly or otherwise inspect, test, and make final acceptance of all material after delivery to the project. Visual inspection at the work site or point of delivery shall be conducted on all materials, regardless of whether previously approved or not.

Sampling and testing requirements for materials or processes specified in Supplemental Specifications or Special Provisions are not included in this manual. The requirements for such materials or processes may be included in the Supplemental Specifications or in the Special Provisions. If no sampling or testing requirements are published, sampling and testing will be as directed by the DOTD Materials Engineer Administrator.

II. Sampling Schedules

The sampling schedules include the following:

A. **Page Heading:** The Section Number and Name from the *Standard Specifications* form the Page Heading. Page Headings are arranged in numerical order by Section number, just as in the *Standard Specifications*. The user can identify the correct schedule by the Item Number. (e.g., Item No. 301(02) would be found under Section 301, Class I Base Course.)

B. **Material:** The Material Column is an alphabetical index to all materials listed in the *Materials Sampling Manual* for construction. The Material Column is divided into two subcolumns.

   1. **Left Subcolumn:** Contains a broad group of closely related materials, listed alphabetically by section number to assist the user in locating a specific material (e.g., Asphaltic Material).
   2. **Right Subcolumn:** Contains an alphabetical listing of individual materials included in the group listed in the left column (e.g., Curing

Membrane). The right Materials Subcolumn may also contain information other than a specified material. Examples of such alternate information are Thickness, Width located under Mixture on Roadway. These entries are used to describe the type of testing conducted on a material. This example reflects the need to conduct depth and width measurements on the compacted mixture on the roadway. When there is no entry in the right subcolumn, the information given applies to the material listed in the left subcolumn.

Note 1: *The Page Heading and Material column will lead the user to the appropriate horizontal information line for a specific material. This information outlines responsibility and minimum testing required by the department's Quality Assurance Program.*

C. **Reference/Tested By:** The column titled Reference/Tested By is a dual purpose column listing the authorization and responsibility for each test.

1. **Reference:** The numerical listing(s) under this heading for each material is the Standard Specification reference (e.g., 301.16(a)). More than one listing is shown when multiple specification references exist. If a standard plan is referenced, it will be listed with the abbreviation "Std. Pl." and then the standard plan number.
2. **Tested By:**
   a. The entry beneath the reference denotes the entity responsible for testing the sample authorized under Reference, (e.g., Proj. Engr.).
   b. Abbreviations used are:

Const. Fab. Insp.	=	Construction Fabrication Inspection Unit
Dist. Lab	=	District Laboratory
Mat. Lab	=	Materials & Testing Section Laboratory
Mfr.	=	Manufacturer
Proj. Engr.	=	Project Engineer

D. **Purpose** -The Purpose Column defines the reason for which the sample is taken and tested (e.g., Acceptance).
Terms used are:

Quality Control - Sampling, testing and inspection by the contractor for the purpose of making adjustments in field construction operations such as mixing, proportioning, temperature control, moisture content, density, etc. at a rate sufficient to ensure that the work conforms to contract requirements or specifications.

(Verif.) Verification - Sampling and testing for the purpose of verifying that correct and accurate procedures

and equipment are being used and of ascertaining that materials used are of the same quality as the previously tested materials. Verification samples are not considered on a “pass/fail” basis for construction purposes but non-verifing results may warrant investigation and additional acceptance sampling and testing as required by the engineer.

Validation - A specific type of verification testing which is used to determine the viability of a laboratory-designed asphalt Job Mix Formula based upon test results of plant-produced mixture.

(Accept.) Acceptance - Acceptance is the process of sampling, testing and inspection to determine the degree of compliance with the specifications for acceptance of materials and/or the contractor’s work. Many products listed on the Qualified Products List require additional sampling to determine the acceptability of the material. Regardless of the acceptance method, all materials may require sampling if they are regarded to be questionable through visual inspection. Acceptance samples are considered on a “pass/fail” basis, or accepted with pay adjustment as allowed by specifications if failing results are indicated by testing of these samples, positive actions should be taken to insure that unacceptable materials are incorporated into the work.

Design - Sampling and testing for the purpose of design. Results of these samples provide contractor and Department personnel with numerical data that is used to determine various factors that facilitate the construction of different phases of a project. This may include samples of soils for cement content and moisture density relationships, asphaltic concrete aggregates for specific gravities, as well as contractor sampling used in the design process for asphaltic and portland cement concrete.

(IA) Independent Assurance - Sampling and testing for the purpose of making an independent random check on the reliability of results obtained in acceptance sampling and testing. IA testing is required on projects that are on the National Hwy Systems (NHS) as designated by the FHWA.. IA results do not independently form a basis for determining the acceptability of materials and construction work, but supplement acceptance results in accomplishing such determinations. (See S 701)

(Prelim. Source Approval) Preliminary Source Approval - Preliminary test representing a specified quantity of material sampled at the source by the supplier or the Department. This is performed for quality assurance acceptance and/or to provide reference data for comparison with subsequent verification or acceptance by a certificate of delivery.

Note 2: *Preliminary Source Approval is not normally performed by the Project Engineer.*

E. **Sampled By/Method:** This is a dual purpose column which lists the responsibility for each sample and the sampling method to be used.
   1. **Sampled By:** The first entry in this column denotes the entity responsible for sampling the material. The same abbreviations listed for **Tested By** are to be used (e.g., Dist. Lab).
   2. **Method:** This column specifies the sampling procedure from Part III of this manual to be used to obtain a representative sample (e.g., S 101).
   3. A reference to a Test Procedure (TR) may be included in this column in lieu of a sampling method. When this occurs, the sampling technique is included in the test procedure, not in a sampling method. (e.g., TR 401 - Information pertinent to selecting a representative test site is included in the test procedure.)

F. **Minimum Frequency:** This column establishes the minimum number of representative sites or samples which are to be selected to represent a quantity of specified material under the Quality Assurance Program. Since these are the **minimum** requirements, the entity referenced under the Sampled By/Method column may require additional sampling to establish that a material meets the Department's criteria (e.g., 1/1000 yd^3).

G. **Minimum Quantity/Container:** This dual purpose column establishes the size of the sample and the container in which it is placed and transported.

1. **Minimum Quantity:** The first entry in this column for each material specifies the minimum amount of material necessary for testing (e.g., 1 gal). When the term “item” appears in this column, sample the required number of every item used for that material. For example, with the Material heading Hardware, "2 of each item" would mean 2 bolts, 2 nuts and 2 washers are to be submitted as the sample.
2. **Container:** The next entry establishes the container used to hold and protect the sample until the material is tested (e.g., friction top can).

Note 3: *There may be no entries in this column if no physical sample is to be taken (e.g., density test). There may be only one entry, a combination of quantity and container (e.g., one full sample sack).*

H. **Cert./Distr.:** This dual purpose column designates the type and number of certification documents required and who is to receive and distribute them. Entries are listed only when a certification is required by the Department. Required certificates for other materials may accompany shipments or be furnished by the contractor or supplier, but all required certifications (and/or Department test reports) are to be approved and reported prior to material use.

1. **Certificates:** The first entry is a code which signifies the type of certificate required (e.g., CA). The listing of certificates below defines the party responsible for generation of the certificate and any additional necessary information which must appear. See the *2006 Standard Specifications* Subsection 106.04 for further details. Regardless of an approved certificate, sampling and testing may still be required if the material is questionable upon delivery. The abbreviations and definitions of certificates are as follows:

CA = Certificate of Analysis - Certificate from the manufacturer or supplier of actual test results of the material properties. (This also includes "mill test reports.") A Certificate of Analysis shall be furnished with each lot of material delivered to the work.

CC = Certificate of Compliance - Certificate from the manufacturer or supplier stating that the material complies with the required specifications. A Certificate of Compliance shall be furnished with each lot of material delivered to the work.

CD = Certificate of Delivery - Certification on a Department approved form from a manufacturer or supplier listing particular materials shipped. A lab number on a CD relates an approved specific quantity to a set of test results for purposes of tracking. It may contain statements concerning the materials' compliance with specifications. (This also

includes "Certificates of Release.") A Certificate of Delivery shall be furnished with each shipment of material delivered to the work.

2. **Distribution:** This second entry directs the user to information concerning the codes outlining the responsibility for approval and documentation (e.g., 3).

Codes for distribution are as follows:

Code

1 Project Engineer receives one legible copy, reviews, approves and files for documentation.

2 Project Engineer receives two legible copies and sends one to the Construction Fabrication Inspection Unit for review and approval. Project Engineer receives approved copy for documentation.

3 Project Engineer receives two legible copies and sends one to the Materials and Testing Section for review and approval. Project Engineer receives approved copy for documentation.

4 Construction Fabrication Inspection Unit receives one legible copy, reviews and approves. Project Engineer receives approved copy for documentation.

5 Materials and Testing Section receives one legible copy, reviews and approves. Project Engineer receives approved copy for documentation.

6 Construction Fabrication Inspection Unit receives one legible copy, reviews, approves and files for documentation.

7 Materials and Testing Section receives one legible copy, reviews, approves and files for documentation.

8 Project Engineer receives one legible copy, approves and submits to District Laboratory Engineer attached to sample identification. District Laboratory Engineer reviews and files for documentation with test results.

9 Hot mix plant receives one legible copy and files for documentation.

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I. **Small Quantities Rule** - This column when filled, defines a quantity of material. If less than this quantity of material is used on the project the material does not require sampling unless questionable. If no quantity is defined the material does require sampling.

J. **Typical Handling Time** - This column approximates the time for the complete process of a sample including transportation, testing and documentation. This time can be affected by sample load, transportation etc.

K. **Remarks:** This column contains important information which extends the notation under individual columns. Some common types of information found in Remarks are:

1. Clarification of whether a test is required (e.g., Visual inspection by Proj. Engr. Sample only if questionable. Visual inspection is classified as a test. A sample is taken if the material fails the visual inspection.)
2. Reference to other parts of the manual (e.g., See Section 601 of this manual.).
3. Clarification of the quantity of material to be represented by a sample (e.g., Not to represent more than 50 tons.).
4. Establishment of an exception to normal sampling procedures or frequency (e.g., See the Small Quantities Rule.).
5. Other terms commonly used in the Remarks column include:
   a. **EDSM** - *Engineering Directives and Standards Manual*.
   b. **Qualified Products List (QPL)** - Lists which are maintained by the Department's Materials and Testing Section for products which require field or detailed evaluation for which time constraints would delay projects. Source approval sampling, lab testing and field evaluation requirements are included in each QPL qualification procedure.

      These companies have proved that they have *the ability* to produce products meeting our specifications. However qualification of a product is not blanket approval for its use, since qualified products are subject to certification and/or acceptance or verification testing as shown in the following schedules.
   c. **Random or Randomly** - Samples shall be obtained following a random selection process (i.e., without aim or reason, depending entirely on chance alone), and Random Number Tables may be used if desirable; however, use of the Random Number Tables will not be required unless specified.
   d. **Random Number Tables** - Tables of random numbers used to assure the selection of unbiased samples. Such tables are shown in sampling procedure S 605.
   e. **Shipment** - When the term " shipment" is used, it indicates similar material from one source which arrives at the destination in one load.
   f. **Visual Inspection** - Visual inspection at the work site or point of

delivery shall be conducted on all materials, regardless of whether previously approved or not. However, the term "visual inspection" also has another meaning in regard to material acceptance. There are certain materials that under certain circumstances may be accepted at the work site or point of delivery on the basis of visual inspection and will not require a Department test report. In each case these circumstances will be outlined in the Remarks column. Visual inspection may denote checks for specific specification requirements.

g. **Quality Assurance Manuals (QA manuals)** - These manuals provide detailed explanations of DOTD's procedures and specifications used in the implementation of the departments Quality Assurance program.

III. Quality Assurance

The concept of quality assurance refers to the combined effort of the contractor through quality control and the Department through inspection and acceptance to produce a transportation project that will provide the public with a durable product exhibiting a high level of performance. To this end, a system of inspection by qualified personnel, both Department and contractor, and statistically based sampling and testing has been established. To ensure that the quality assurance concept functions properly, it is critical that the contractor's quality control and the Department's inspection process be a cooperative, coordinated effort.

IV. Resampling and Retesting

Material will be resampled and retested when the original material is changed by reworking the original material or by adding new material when permitted by specifications to the original material and reworking. The resampled material will be used for determining the material's conformance to contract requirements.

At the discretion of the engineer, when a sample is determined not to be representative, **whether passing or failing**, a new sample shall be taken from the same material and area as the original sample. This sample will be used for determining the material's conformance to contract requirements.

Resampling and retesting will not be conducted to avoid a payment adjustment for failing results unless there is a defective sample.

V. Sampling and Testing for Source Approval

The sampling and testing requirements for QPL approval are not included in this manual but are in each QPL Qualification Procedure.

VI. Sampling and Testing for Informational Purposes Only

Samples submitted to the Department's laboratory may be tested for

"Informational Purposes Only" at the discretion of the engineer. The test report will not indicate pass or fail and the wording "For Informational Purposes Only" will be placed on the report. The test report shall not be used for quality control or acceptance purposes.

VII. Updating Test Reports

A. **Disposition of Failing Tests:** Upon notification of a failing test, the engineer shall describe the disposition of the failing material directly on the exception report, sign and date the disposition in accordance with EDSM III.5.1.2. and forward the report to the district laboratory for database (MATT System) entry. The disposition explains the action taken in response to the failing test and provides justification for that action. When a test report generated by the Materials and Testing Section must be updated at a District Laboratory, the district laboratory will send an e-mail message to the Materials Qualifications Unit stating the project number, material code, lab number and remarks updated.

B. **Incorrect Data on Sample ID Form:** Updated information shall be sent to the District Lab Engineer (or Matlab, as appropriate) with a signed copy in the Project Engineers file. The technician completing the update, will:

a. Print and sign the updated test report.
b. Attach the Project Engineer's request.
c. Send a copy of the complete set to the Project Engineer.
d. Attach a complete set to the original sample ID and refile.

C. Transfer of Test Results and Quantities from Project to Project:

It is the policy of DOTD that test results not be routinely transferred between projects. Under normal conditions, a sample represents material used for one particular project. However, when material represented by a sample from one project is later used on a different project, it is more efficient to transfer part of this "already-tested-and-approved" quantity to another project rather than to sample and test the same material again.

To transfer test results,

1. The Project Engineer (requesting the transfer) must email a request to the original Project Engineer to verify the quantity of material available for transfer.
2. The original Project Engineer sends via email the quantity of material available for transfer.
3. The Project Engineer (requesting the transfer) can then email a request to transfer test results, along with the original Project Engineer's quantity verification email, to the lab which performed the test, (District Lab or Matlab).
4. The Lab will review the request, update the database (Matt System, if appropriate), respond to the email and print out the hard copies for file.

VIII. TESTING PRIORITIES

The following represents a general prioritization schedule used by the District Laboratories and the Materials & Testing Section:

1. Check sample or resamples
2. Acceptance samples
3. Design samples
4. Preliminary Source Approval sample for acceptance
5. Verification sample
6. Independent assurance
7. Preliminary source Approval to provide reference data (QPL, NPE, etc.)

Samples of material with the same priority are tested in the order received. The Laboratory Engineer may override the above to accommodate unusual circumstances and improve efficiency. To assist in prioritization, the Project Engineer may indicate the “date needed” on the sample envelope; however, the availability of results are not guaranteed by that date.

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