

METHODS OF SAMPLING AND TESTING
MT 602-04
ACCEPTANCE, INDEPENDENT ASSURANCE AND FINAL RECORD SAMPLING

1 Scope:

- 1.1 Samples are to be obtained on a random basis for materials specified in MT-601 and in specified numbers as related to yards, tons or other units of measurement.

2 Referenced Documents:

2.1 MT Manual:

MT 317 Procedure for Monitoring In-Place Bituminous Density and Air Voids
MT 416 Random Sampling Technique
MT 601 Material Sampling, Testing and Acceptance Guide

3 General:

- 3.1 *Classes of Samples and Tests:* Three classes of samples and tests are required for each project. They are "Acceptance samples and tests," "Independent Assurance samples and tests," and "Final Record samples and tests."

- 3.2 *Frequency of Sampling:* The frequencies at which Acceptance, Independent Assurance and Final Record samples are taken should conform in general with guide schedules determined by the State and approved by the FHWA. Rigid conformity with a frequency pattern established as a guide for general application is not expected. In general, the given frequencies are set at a minimum. As job conditions such as the uniformity of materials at the source, the methods and equipment used, and weather conditions vary, further sampling and testing can be done. The number of samples and the distribution of the locations from which they are taken should be such as to make certain that the materials incorporated and construction produced are acceptable in accordance with the plans and specifications.

- 3.2.1 The number of Independent Assurance and Final Record samples is given in table form in MT-601. Take Final Record samples in accordance with paragraph 6.2.1. Two exceptions to this frequency of sampling are Surfacing Aggregates and Bituminous Treated Base, each of which requires one sample per 4 miles (6.4 kilometers) of 2-lane roadway. Keep in mind that rigid conformity with the above schedules is not expected. In addition to the above, district or area engineers are free to sample any material at any time and designate the sample as an Acceptance, Independent Assurance, or Final Record sample.

4 Acceptance Samples and Tests:

- 4.1 These are random samples taken and tests made on a day-to-day basis to ensure the quality of materials being incorporated or proposed for incorporation into a construction project. Acceptance samples and tests are the principal means of determining whether the materials and workmanship are satisfactory or whether corrective action should be taken before the work proceeds. Acceptance samples and tests may be any of the following:
- 4.2 Samples of materials taken and tested at the construction site by MDT personnel who are not associated with Final Record sampling of the project.
- 4.3 Samples of materials taken at the construction site by MDT personnel and tested promptly at the district laboratory, area laboratory or Materials Bureau with results reported immediately to the project personnel,

4 Acceptance Samples and Tests: (continued)

- 4.4** Samples of materials taken by MDT or delegated inspection agency personnel at the production or processing plant, shipping point, or other source of origin remote from the project and tested promptly at the district laboratory, area laboratory or Materials Bureau with results reported immediately to the project personnel, or
- 4.5** Samples taken and tested by the manufacturer or supplier with test results or certificates being sent to the project and district laboratory, area laboratory or Materials Bureau personnel when shipment is made.

5 Independent Assurance Samples and Tests:

- 5.1** These samples are taken at random per MT-416 from materials or from construction work in progress and are not necessarily intended to check compliance with specifications. They are taken and tested to provide an independent spot check of the adequacy and effectiveness of the results obtained in Acceptance sampling and testing and to supplement these test results. If differences are discovered between Acceptance and Independent Assurance samples, it must be determined immediately why deviations exist and corrective measures taken to assure proper testing techniques. If Independent Assurance samples are to accomplish the purpose for which they are intended, they must be taken at the same place, by the same method and at the same time as routine Acceptance samples.
- 5.1.1** *Independent Assurance sampling will be witnessed by the district or area laboratories in accordance with the frequency shown in MT-601.* When Independent Assurance samples are taken, obtain a sufficient quantity of material to provide three separate samples made up by splitting or quartering. Test the first sample in the field, mark the second sample Independent Assurance and send to the district or area lab and mark the third sample Independent Assurance and send to the Materials Bureau. This procedure allows a direct comparison between the field, district or area lab and the Materials Bureau.
- 5.2** *Surfacing Sampling* - Independent Assurance surfacing samples are split in the field either into two or three portions. In the three-portion split, one portion is tested in the field, the second in the area or district laboratory and the third in the Materials Bureau laboratory. Normally assigned personnel perform the testing in each case. The Materials Bureau portion is shipped immediately after the field and area or district laboratory results have been recorded on the accompanying laboratory forms. In the two-portion split, one portion is tested in the field and, the other is tested in the area or district laboratory. The field test results are recorded on the area or district test reports, copies of which are distributed to the Materials Bureau.
- 5.3 Concrete Aggregate Sampling:**
- 5.3.1** Sampling concrete aggregate shall be done by the District Laboratory Supervisor or his designated representative.
- 5.3.2** Portland cement concrete aggregate Independent Assurance samples are split into two portions. One portion is tested in the area or district laboratory, the other is shipped to the Materials Bureau laboratory for testing immediately after the area or district test results have been recorded on the accompanying laboratory forms.
- 5.3.3** Independent Assurance samples may be selected by MDT personnel who are not associated with the taking of Acceptance samples on the project, or from samples taken for Acceptance purposes provided such samples have been taken under their observation and control. Independent Assurance samples from other than concrete cylinders or beams are to be continuously in the custody or under the observation of properly trained personnel not associated with Acceptance

5.3 Concrete Aggregate Sampling: (continued)

Sampling until they are shipped or delivered to the district laboratory, area laboratory or the Materials Bureau for testing. Exceptions to this requirement may be made when adequate measures, such as sealing the container with single use seals, are taken to protect samples between the time they are taken and the time they are delivered to the district laboratory, area laboratory or Materials Bureau for testing.

5.4 Mixtures:

- 5.4.1** For Portland cement concrete, bituminous concrete and other mixtures, Independent Assurance samples should be taken and tested for each individual component of a mixture for which the Independent Assurance samples were taken. Independent Assurance samples should also be taken from the completed mixtures and tested for those requirements that are applicable to the combination of materials or to the individual component materials after combining and processing. For example, Independent Assurance samples of bituminous concrete would normally be tested for percent of asphalt, gradation, and other desirable properties, such as stability, etc., while Independent Assurance samples of Portland cement concrete would be tested for slump, percent of air and strength.

5.5 Testing:

- 5.5.1** The testing of Independent Assurance samples is to be done at the district laboratory, area laboratory or Materials Bureau except tests such as slump tests on concrete that must be performed immediately after the sample is taken.
- 5.5.2** The Independent Assurance sample must be taken to the laboratory as soon as possible and tested without delay. The results obtained for each of the required tests are to be delivered promptly to the Project Manager. Results should be compared with Acceptance test results obtained on similar material and an evaluation made as to the accuracy of the Acceptance sampling and testing. Project personnel should be notified if improved procedures, closer inspection and control, and possible corrective action is required.

6 Final Record (FR) Samples and Tests:

- 6.1** These samples are taken at random per MT-416 from completed construction work or completed portions thereof under the same requirements and procedures as for Independent Assurance samples except that District or Area Laboratory personnel will take the FR samples.
- 6.1.1** Final Record samples should be taken at each individual stage of the construction work as it is completed and before it is covered or disturbed by a subsequent construction stage. This minimizes damage to finished work and facilitates the satisfactory procurement of samples. (Note 1)
- 6.1.2** Whenever test results indicate that significant changes have occurred in the gradation, plastic limit, or liquid limit of untreated aggregate, base, or sub-base materials (because of processing, contamination, or other reasons, after the materials were incorporated into the construction), these changes should be reported with an explanation.

Note 1 - Final Record Cores do not need to be taken on Thin Lift Overlay projects because these types of projects are not designed for extended service life or they are not adding structural strength.

6.2 Frequency:

- 6.2.1** Final Record core samples on newly constructed Plant Mix Surfacing shall be taken as follows:
- 6.2.2** The sample frequency shall be a minimum of two cores per 2-lane mile taken at 1/2 mile intervals.

6.2 Frequency: (continued)

6.2.3 The cores shall be sampled in accordance with Section 2.2 and the cores will be tested in accordance to MT-317.

6.2.4 Core sample locations will be referenced to centerline.

7.3 Purpose:

7.3.1 Final Record core samples are taken and tests made for the following purposes:

7.3.2 To determine adequacy of pavement thickness and other construction requirements but not for the purpose of checking compliance with specification requirements. These samples are taken to verify conformity with plans and specification requirements applicable to the completed construction and not to the materials before they are incorporated into a construction project. In this respect, Final Record samples and tests serve the same purpose relative to completed construction as Independent Assurance samples and tests performed relative to work in progress and materials not yet incorporated.

7.3.3 To furnish information relative to the amounts of change in properties of the material used in the work. In this respect Final Record samples and tests are for physical research purposes to ascertain the need and basis for possible improvements in future designs and specifications.

7.3.4 To determine if corrective measures may be necessary. In this respect the Final Record samples and tests serve to indicate whether previously unknown or unsuspected conditions may exist on the project that may have a detrimental effect on the completed construction.