1002 REDUCING AGGREGATE FIELD SAMPLES TO TESTING SIZE

AASHTO Designation: T 248 (Mn/DOT Modified)

1002.1 SCOPE

These methods cover the reduction of field samples of aggregate to the appropriate size for testing and employ techniques that are intended to minimize variations.

NOTE 1: Under certain circumstances, reduction of the field sample prior to testing is not recommended. Substantial differences between the selected test samples sometimes cannot be avoided. For example: the case of an aggregate having few large size particles in the field sample. The laws of chance dictate that these few particles may be unequally distributed among the reduced size test samples. Similarly, if the test sample is being examined for certain contaminants occurring as a few discrete fragments in only small percentages, caution should be used in interpreting results from the reduced size test sample. Chance inclusion or exclusion of only one or two particles in the selected sample may importantly influence interpretation of the characteristics of the field sample. In these cases, the entire field sample should be tested.

1002.2 SELECTION OF METHOD

A. Fine Aggregates - Field samples of fine aggregates that are drier than the saturated-surface-dry condition (See Note 2, below) shall be reduced in size by a mechanical splitter according to Method A. Field samples having free moisture on the particle surfaces may be reduced in size by quartering according to Method B, or the entire field sample may be dried to at least the surface dry condition, using temperatures that do not exceed those specified for any of the tests contemplated, and then reduced to test sample size using Method A.

B. Field samples of fine aggregate having free moisture on particle surfaces may be reduced to testing size by treatment as a miniature stockpile as described in Method B.

C. If a moist field sample is very large, a preliminary split may be made using a mechanical splitter having wide chute openings 38mm (1-1/2") or more, to reduce the sample to not less than 5000g. The portion so obtained is then dried and reduction is completed using Method A.

NOTE 2: As a quick approximation, if fine aggregate will retain its shape when molded in the hand, it may be considered to be wetter than saturated-surface-dry.

D. Coarse Aggregate - Use of a sample splitter (Method A) or a spinning riffler is preferred; otherwise the field sample shall be reduced by quartering (Method B).

1002.3 FIELD SAMPLE SIZE

When gradation tests only are required, the size of the field sample shall conform to the requirements of AASHTO T 2. When additional tests are to be conducted, the sampler shall assure that the size of the field sample is adequate to accomplish all requested and/or required tests.

1002.4 METHOD A - MECHANICAL SPLITTER

1002.4.1 APPARATUS (See Fig.1)

Sample Splitter - Sample splitters shall have an even number of equal width chutes, but not less than a total of eight for coarse aggregate, or twelve for fine aggregate, which discharge alternately to each side of the splitter. The minimum width of the individual chutes shall be approximately 50% larger than the largest particles in the sample to be split (See Note 3, below). The splitter shall be equipped with at least two receptacles to hold the two halves of the sample following splitting. It shall also be equipped with a hopper or straight-edged pan which has a width equal to or slightly less than the overall width of the assembly of the chutes, by which the sample may be fed at a controlled rate to the chutes. The splitter and accessory equipment shall be so designed that the sample will flow smoothly without restriction or loss of material.

NOTE 3: Splitters are commonly available in sizes adequate for coarse aggregate having the largest particle not over 37.5mm (1 1/2 in.). For fine aggregate a splitter having chutes 12.5mm (1/2 in.) wide will be satisfactory when the entire sample will pass a 9.5mm (3/8 in.) sieve.

1002.4.2 PROCEDURE

Place the field sample in the hopper or pan and uniformly distribute it from edge to edge, so that when it is introduced into the chutes, approximately equal amounts will flow through each chute. The rate at which the sample is introduced shall be such as to allow free-flowing through the chutes into the receptacles below.

NOTE 4: When using the Mn/DOT design (dual 12.5mm [1/2 in.]) splitter, one pass through the splitter constitutes a split. Combine diagonally opposite pans to create a sample (the right rear and left front pans combined are one sample). To further reduce the sample size, pour the resultant sample through one side of the splitter.

Pouring from the same side re-introduce the portion of the sample in one of the receptacles into the splitter as many times as necessary to reduce the sample to the size specified for the intended test. Always alternate pans. The portion of the material collected in the other receptacle may be reserved for other tests.

1002.5 METHOD B – QUARTERING ON A HARD, CLEAN, LEVEL SURFACE

1002.5.1 APPARATUS (See Fig. 2)

Apparatus shall consist of a straight-edged scoop, shovel, or trowel; a broom or brush.

1002.5.2 PROCEDURE

Place the field sample on a hard, clean, level surface where there will be neither loss of material nor the accidental addition of foreign material. Mix the material thoroughly by turning the entire sample over three times. With the last turning, shovel the entire sample into a conical pile by depositing each shovel full on top of the preceding one. Carefully flatten the conical pile by pressing down the apex with a shovel so that each quarter sector of the resulting pile will contain the material originally in it. The diameter should be approximately four to eight times the thickness. Divide the flattened mass into four equal quarters with a shovel or trowel and remove two diagonally opposite quarters, including all material, and brush the cleared space clean. Successively mix and quarter the remaining material until the sample is reduced to the desired size.

1002.6 METHOD C – Quartering on a Canvas Blanket

(For use when floor surface is uneven.)

1002.6.1 APPARATUS (See Fig. 3)

Apparatus shall consist of a straight-edged scoop, shovel, or trowel; a broom or brush and a canvas blanket of sufficient size to accommodate all the sample.

1002.6.2 Procedure

A. Place the sample on the canvas blanket and mix the material thoroughly by turning the entire sample over three times or by alternately lifting each corner of the blanket and pulling it over the sample toward the diagonally opposite corner causing the material to be rolled.

B. Carefully flatten the conical pile by pressing down the apex with a shovel so that each quarter sector of the resulting pile will contain the material originally in it. The diameter should be approximately four to eight times the thickness.

C. Divide the flattened mass into four equal quarters with a shovel or trowel.

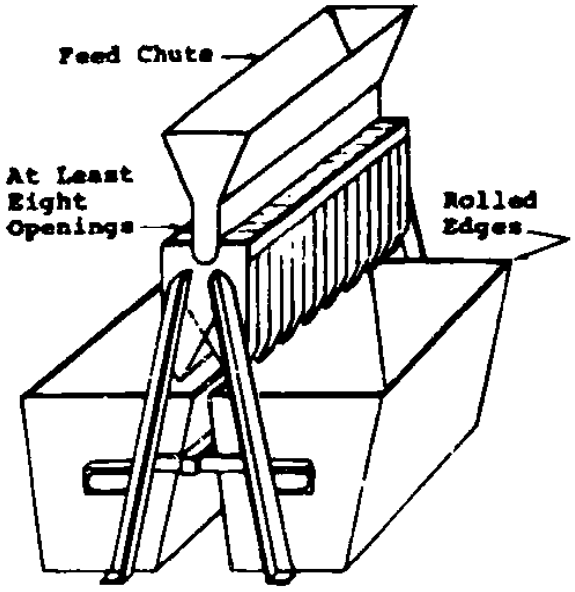
D. If the surface underneath the canvas is uneven insert a stick or pipe beneath the blanket and under the center of the pile. Lift both ends of the stick dividing the sample into two equal parts. Remove the stick leaving a fold of the blanket between the divided portions. Insert the stick under the center of the pile at right angles to the first division and again lift both ends of the stick dividing the sample into four equal parts.

E. Remove two diagonally opposite quarters bring careful to clean the fines from the blanket.

F. Repeat the process until the sample is reduced to the desired size.

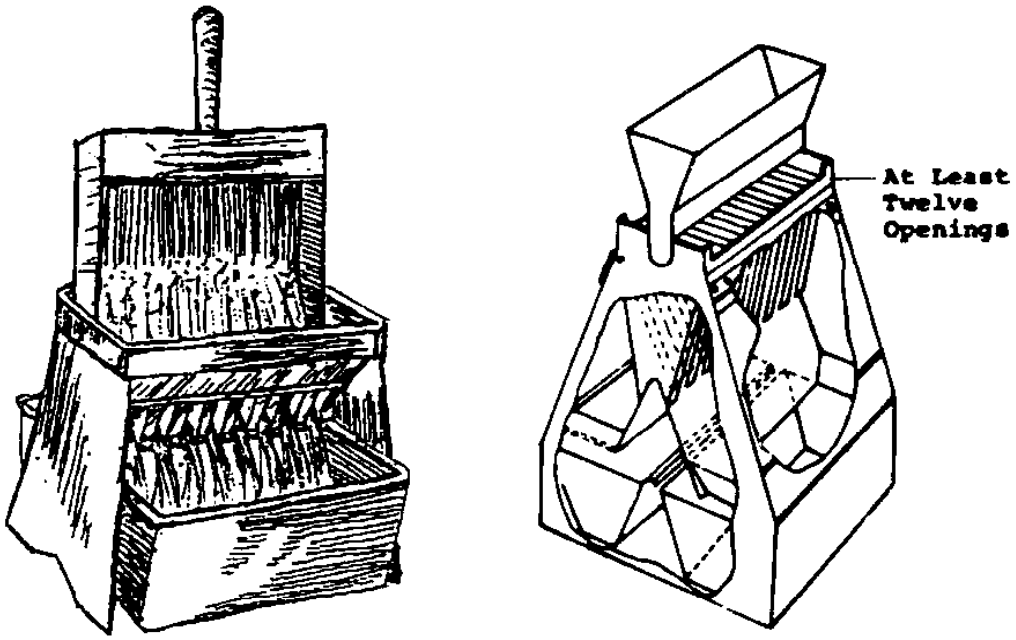
G. Material from the other two quarters may be retained for retests or other procedures.

NOTE 5: Not described in the above methods is the use of a spinning riffler. The use of this device is an acceptable means of reducing the size of a given sample to a workable size provided the manufacturer's recommendations and procedures are followed.



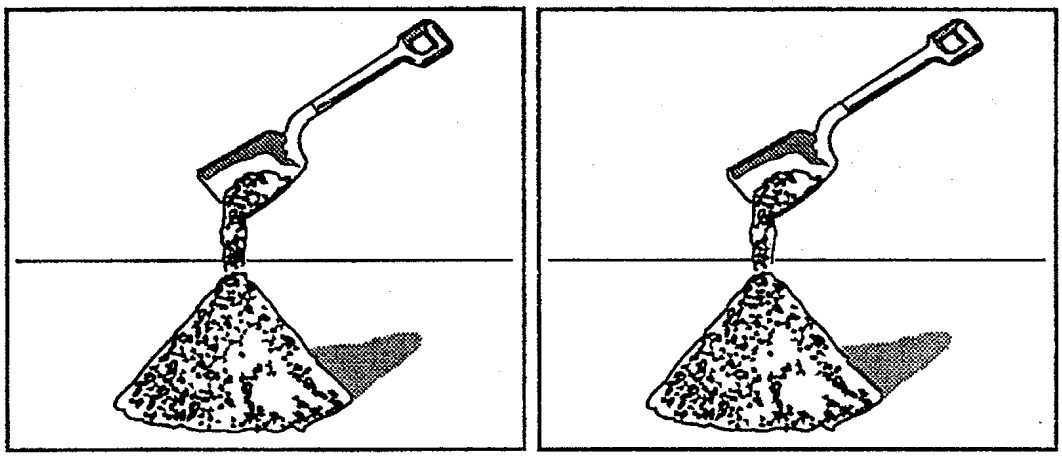
Riffle Sample Splitter

(a) Large Sample Splitter for Coarse Aggregate



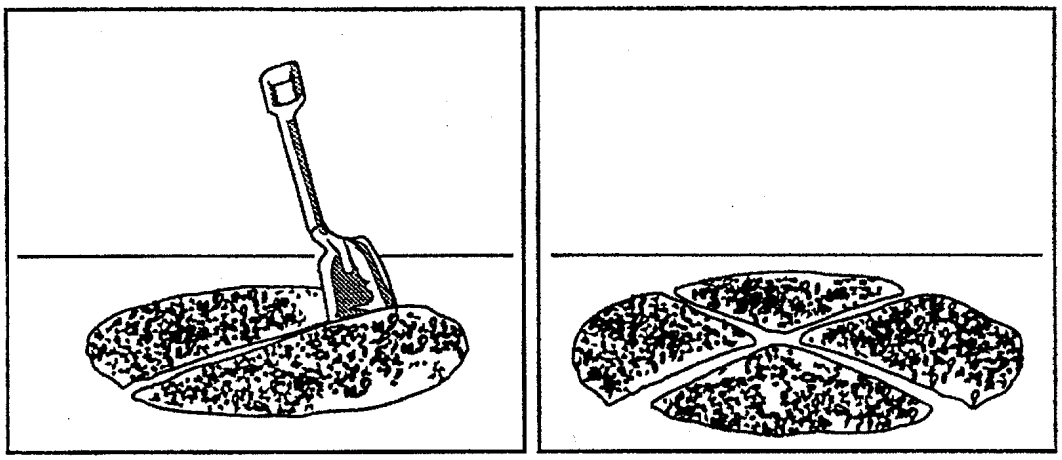
NOTE—May be constructed as either closed or open type. Closed type is preferred. *(b)* Small Sample Splitters for Fine Aggregate.

FIGURE 1 - Sample Splitters



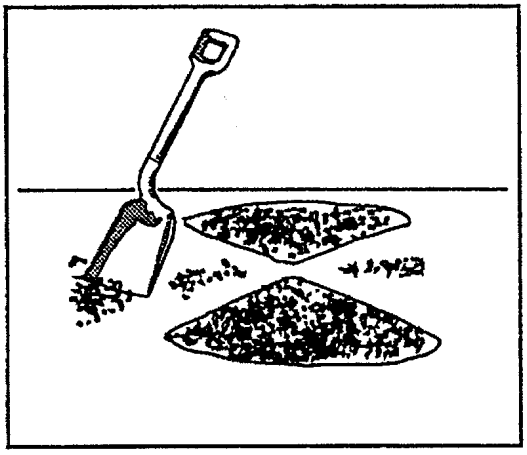
Cone Sample on Hard Clean Surface

Mix by Forming New Cone



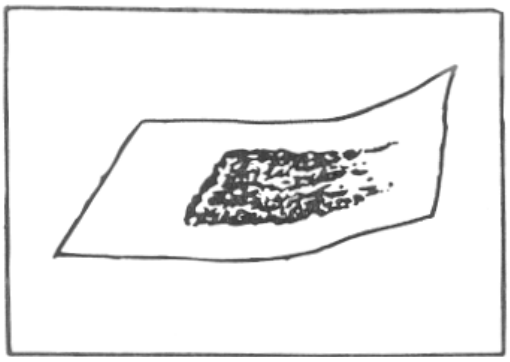
Quarter After Flattening Cone

Sample Divided into Quarters

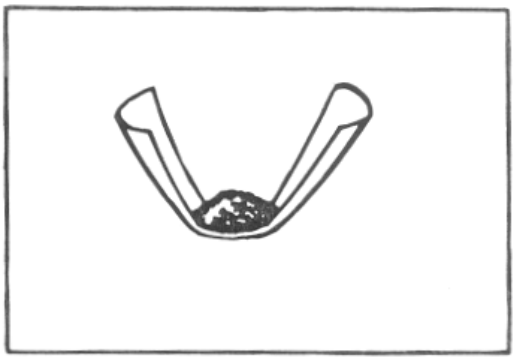


Retain Opposite Quarters
Reject the Other Two Quarters

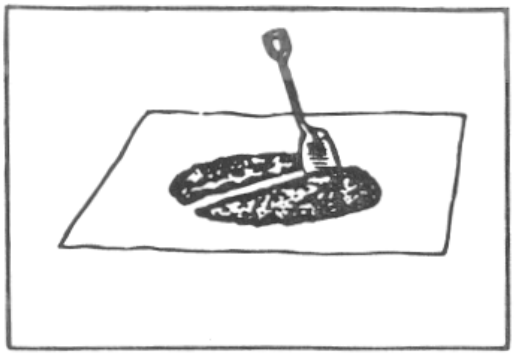
FIGURE 2 - Quartering on a Hard, Clean, Level Surface



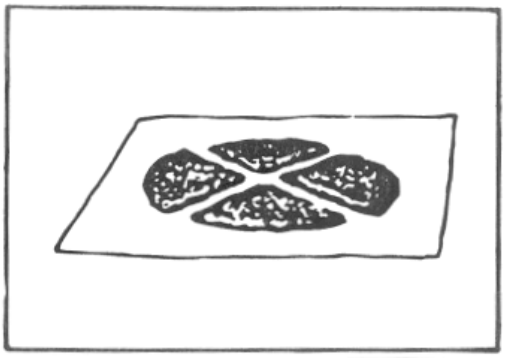
Mix by Rolling on a Blanket



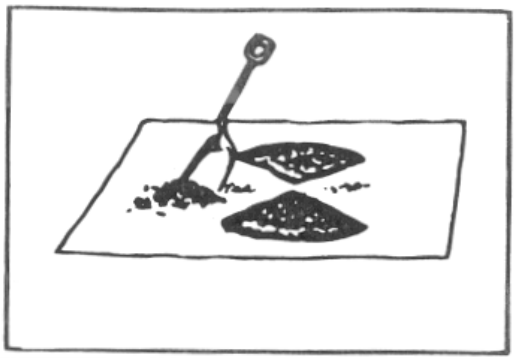
Form Cone After Mixing



Quarter After Flattening Cone



Divide Sample Into Quarters



Retain Opposite Quarters
Reject the Other Two Quarters

FIGURE 3 – Quartering on a Canvas Blanket

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