Procedure for Reducing Samples to Testing Size

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1. Scope:

These procedures are for the reduction of field samples of aggregates to the appropriate size for testing.

2. Apparatus:

2.1 Mechanical Method.

A. Mechanical sample splitter shall be equipped with 3 receptacles large enough to hold the sample following splitting. Only these receptacles shall be used when reducing the sample to the required testing size.

B. Sample splitters shall have an even number of equal width chutes. The number of chutes for coarse aggregate shall not be less than 8, and for fine aggregate, not less than 12. The chutes shall 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. For fine aggregate a splitter having chutes 1/2” wide will be satisfactory when the entire sample passes the 3/8” sieve.

C. The splitter shall be equipped with a hopper or a straight edge pan, which has a width equal to or slightly less than the overall width of the assembly of chutes.

D. The splitter shall be leveled in a manner to ensure uniform material distribution throughout the chutes.

2.2 Quartering Method.

A. Canvas, heavy polyethylene or other suitable surface, or minimum of 24” x 24” x 4” pan.

B. Straightedge, scoop, shovel or trowel.

C. Broom or brush.

3. Procedure:

3.1 Fine aggregate to be split or quartered shall be dry or surface dry before reducing the sample to required size.

Fine aggregate is defined as an aggregate in which the entire sample will pass the 3/8” sieve.

Surface dry condition may be determined, as a quick approximation, if the fine aggregate will retain its shape when molded in the hand, it may be considered to be wetter than saturated-surface dry.

If the moist sample is large, a preliminary split may be made using a mechanical splitter having wide chute openings 1½" or more to reduce the sample to not less than 5000 grams. This portion is then dried and reduction to test sample size is completed.

Coarse aggregates and mixtures of coarse and fine aggregates may be reduced to test sample size using a mechanical splitter, in which the sample will flow smoothly without restriction or loss of material. The quartering method may be used without regard to moisture in the aggregates.

3.2 Mechanical Splitter.

Depending on the type of material, number of samples to be tested and the size of the sample needed for the required testing the appropriate method of splitting must be used.

Method 1 Used when only one container is needed to hold all the material for testing and backups.

A. Adjust splitter bars for required chute width.

B. Place sample in closed hopper, distributing as you pour, and level by hand until material is evenly distributed from side-to-side and from front to back in hopper.

C. Prior to splitting your sample, mix the sample by repetitive blending and mixing the entire sample (3 times) with the splitter.

D. Split the material by opening the gates of the hopper. The sample shall be fed at a controlled rate into the chutes.

E. To assure representative samples, split the original sample into (A) & (B). Split (A) into (a) & (b), reverse (a) & (b) in splitter, combine (B) into (b) & (a). As shown in figure 2.

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F. Check for approximately equal splits by weighing.

NOTE: Rule of thumb - Coarse aggregate splits within 500 grams or fine aggregate within 30 grams.

G. Sample (b) can be tested or reduced further as needed. Sample (a) can be saved as a backup. If four samples are required then split samples (a) and (b) to have four approximately equal samples.

Method 2 Used when two containers are needed to hold all the material for testing and backup

A. Adjust splitter bars for required chute width.

B. Place sample in closed hopper, distributing as you pour and level by hand until material is evenly distributed from side-to-side and from front to back in hopper.

C. Prior to splitting your sample, mix the sample by repetitive blending and mixing the entire sample (3 times) with the splitter.

D. Combine and blend (1) and (2) using the splitter as shown in figure 3.

E. To assure representative samples, split (1) and (2) to obtain the four samples (a), (b), (c), (d). These samples can be tested or reduced further as needed.

F. Check for approximately equal splits by weighing.

NOTE: Rule of Thumb - Coarse aggregate splits within 500 grams or fine aggregate within 30 grams.

G. If eight samples are required then split samples (a), (b), (c) and (d) to have eight approximately equal samples.

Figure 1

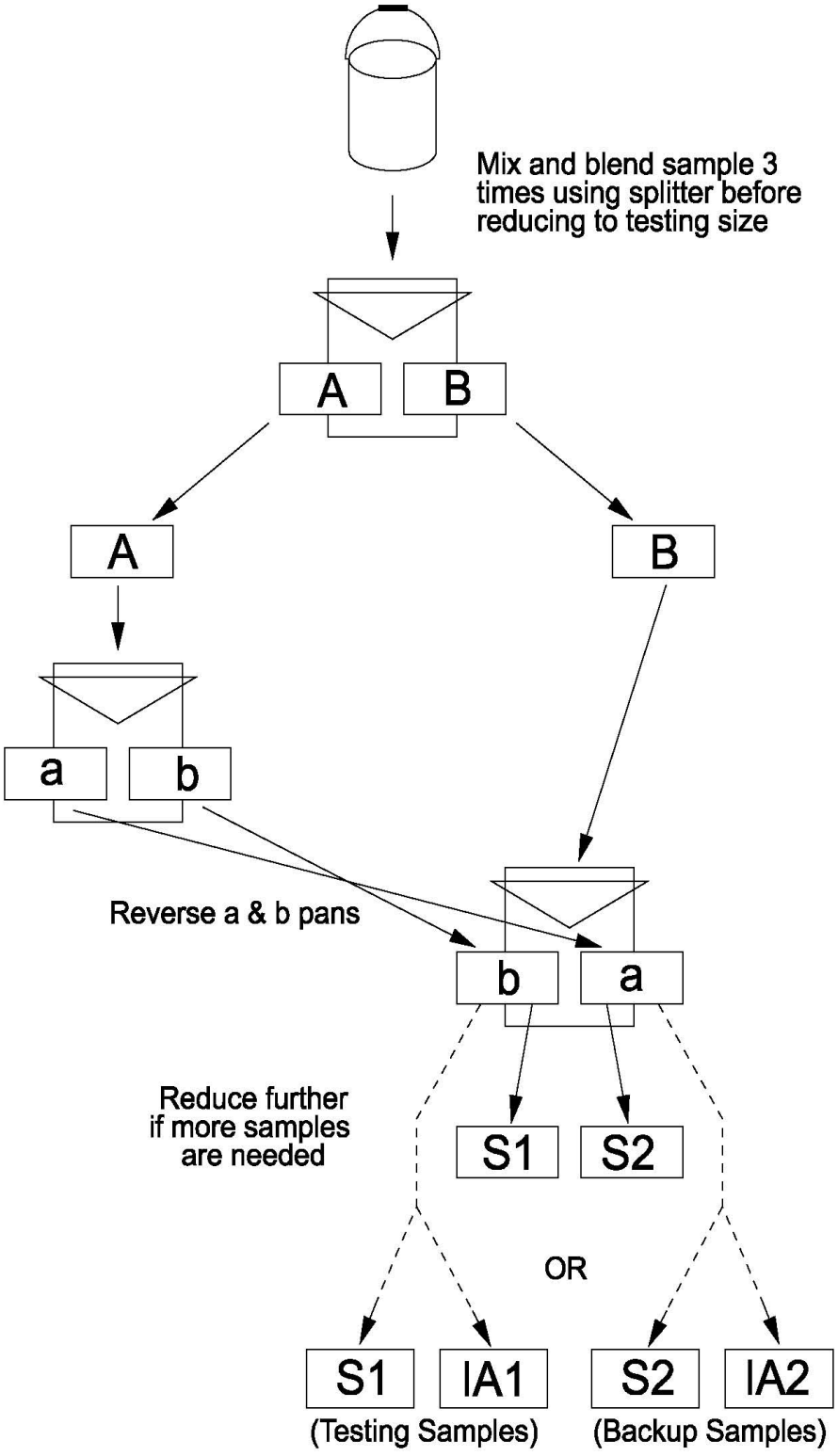

Mix and blend sample 3 times using splitter before reducing to testing size
A
B
A
B
a
b
Reverse a & b pans
b
a
Reduce further if more samples are needed
S1
S2
OR
S1
IA1
S2
IA2
(Testing Samples)
(Backup Samples)

Figure 2

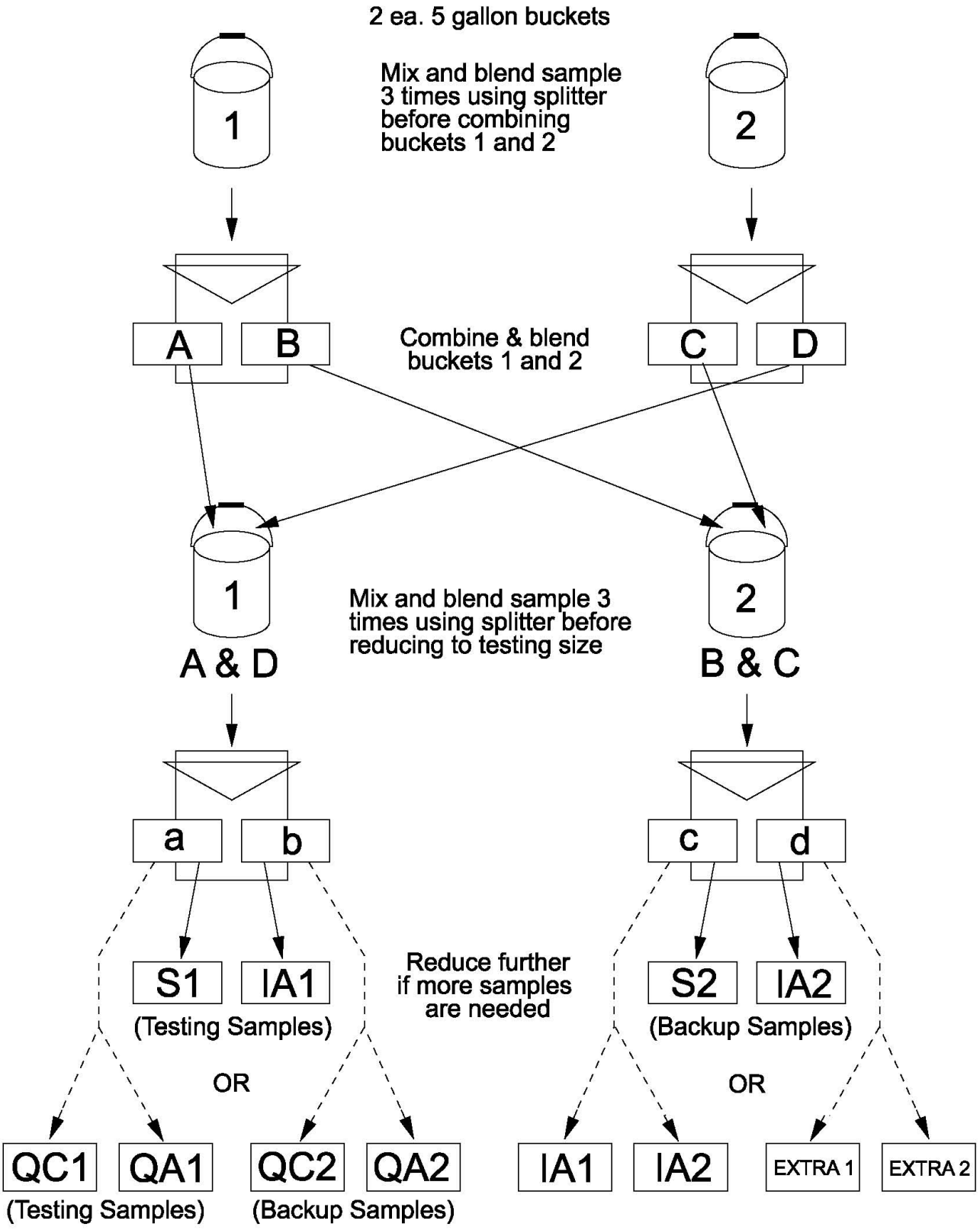
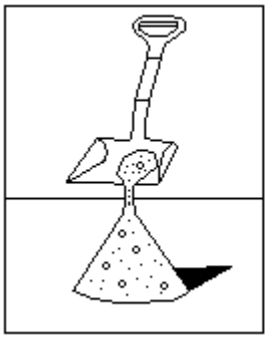

2 ea. 5 gallon buckets
Mix and blend sample 3 times using splitter before combining buckets 1 and 2
1
2
A
B
C
D
Combine & blend buckets 1 and 2
1
2
A & D
B & C
Mix and blend sample 3 times using splitter before reducing to testing size
a
b
c
d
S1
IA1
S2
IA2
(Testing Samples)
(Backup Samples)
Reduce further if more samples are needed
OR
OR
QC1
QA1
QC2
QA2
IA1
IA2
EXTRA 1
EXTRA 2
(Testing Samples)
(Backup Samples)

Figure 3

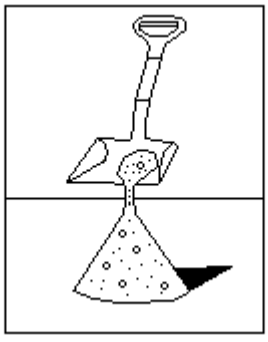
3.3 Quartering.

A. Place the sample on a hard, clean, level surface where there will be neither loss of material nor the addition of foreign material. Thoroughly mix the sample by turning the entire sample over at least three times. With the last turning, shovel the entire sample into a conical pile by depositing each shovelful on top of the preceding one. Carefully flatten the conical pile to a uniform thickness and diameter 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 4 to 8 times the thickness. Divide the flattened mass into 4 equal quarters with a shovel or trowel and remove 2 diagonally opposite quarters, including all fine material, and brush the cleared spaces clean. Successively mix and quarter the remaining material until the sample is reduced to the desired size as shown in figure 4.

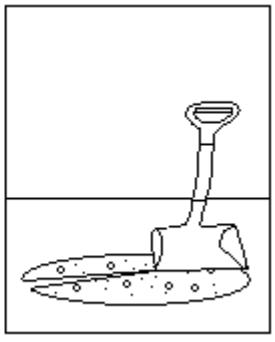
B. As an alternative when the floor surface is uneven, the field sample may be placed on a canvas blanket and mixed with a shovel as described in paragraph 3.3.A. or by alternately lifting each corner of the canvas and pulling it over the sample toward the diagonally opposite corner causing the material to be rolled. Flatter and divide the sample as described in paragraph 3.3.A. or if the surface beneath the blanket is uneven, insert a stick or pipe beneath the blanket and under the center of the pile, then lift both ends of the stick, dividing the sample into 2 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 4 equal parts. Remove 2 diagonally opposite quarters, being careful to clean the fines from the blanket. Successively mix and quarter the remaining material until the sample is reduced to the desired size as shown in figure 5.



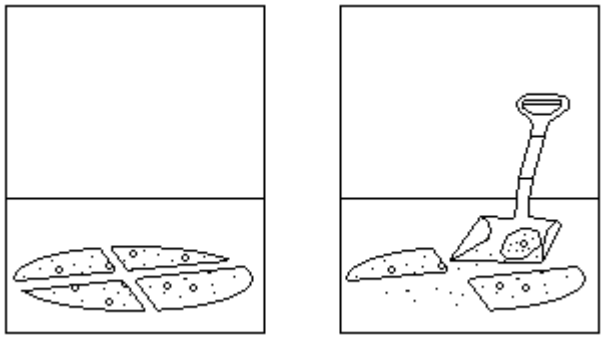
Cone sample on hard, clean level surface



Mix by forming new cone



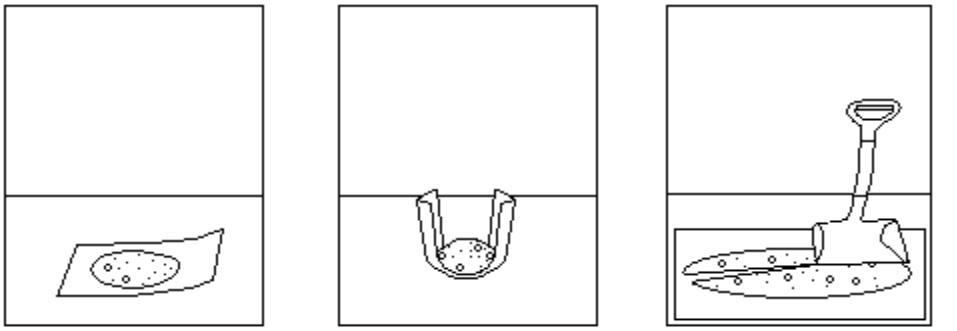
Quarter after flattening cone



Sample into quarters

Retain opposite quarters
& reject other two quarters

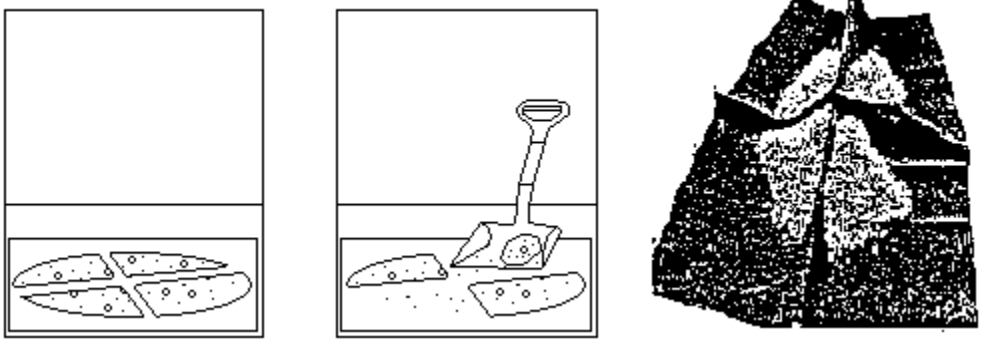
Figure 4



Mix by rolling on blanket

Form cone after mixing

Quarter after flattening cone



Sample into quarters

Retain opposite quarters
Reject other Two Quarters

Figure 5

4. Report:

None required.

5. References:

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