

**Sampling of Aggregates  
for  
Use as Highway Materials**

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- Overview**
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- Importance and Types of Sampling
  - Nominal Maximum Size
  - Segregation, Degradation, Contamination
  - AASHTO T2 - "*Sampling of Aggregates*"
  - Summary
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## Why is Sampling Important?

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- To evaluate the quality of a potential aggregate source
  - To control product at supply source
  - To control operations at site of use
  - For acceptance or rejection of the materials
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## Sampling

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- Remember, sampling is equally important as testing
  - Take samples that represent all of the material being tested
  - Check for non-conformity in the lot
  - Non-uniform areas may need reblending before sampling
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### Production/Prequalification/Acceptance Sampling

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- **Production** – done at locations nearest plant, e.g. conveyor belt
- **Prequalification** – done at source by state field representative
- **Acceptance** – done at last practical point, e.g. just before loading or at the roadway

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### Aggregate Size Designations

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- **Nominal Maximum Size**
  - The largest sieve on the gradation table for an aggregate size on which any material may be retained
- **Maximum Size**
  - The largest sieve size through which all material must pass

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# AASHTO T2 Sample Size

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Nominal Maximum Size of Particles		Minimum Mass of Field Samples	
mm	in	kg	lbs
9.5 or smaller	3/8 or smaller	10	25
12.5	1/2	15	35
19.0	3/4	25	55
25.0	1	50	110
37.5	1 1/2	75	165
50.0	2	100	220
63.0	2 1/2	125	275
75.0	3	150	330
90.0	3 1/2	175	385

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## Field Sample / Test Portion

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- **Field Sample** - a sufficient quantity of material to be tested to estimate of the average quality of the material.
  - **Test Portion** - a quantity of material split from the field sample large enough to be representative of the material and to provide enough material for a test to be conducted.
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## Segregation, Degradation, Contamination

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- **Segregation** – the separation of one size of particles from a mass of different sizes
  - **Degradation** – the break down of particles of one size into particles of smaller sizes
  - **Contamination** – the introduction of undesirable or unfit material into a specification aggregate
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## Sampling

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- Use proper tools and equipment to minimize segregation
- Ensure proper sample size is obtained
- Use common sense
- Practice safety
  - Contact safety officer if questionable situation arises

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## Equipment

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- Square Point Shovel
- Sample bags, tags, forms, etc.
- Sand tube (fine aggregate only)
- Special equipment for location and situation

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**Sampling Locations**

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- Flowing Discharge Belts or Bins
  - Cold Feeds
  - Bituminous Plant Hot Bins
  - Stopped Conveyor Belts
  - Stockpiles
  - Trucks or Other Haul Units
  - Roadway
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**Flowing Discharge Belts or Bins**

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- Do not sample the initial or final flow of material
  - Rails may be required for pan or container support
  - Use a suitably sized container to obtain a representative sample
  - Obtain the sample from the entire cross section of the flow of aggregates
  - Do not overflow container
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## Cold Feeds

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- Use adequately sized pan or container to avoid overflowing
- Pass the pan under bins on belt

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## Bituminous Plant Hot Bins

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- Aggregates withdrawn from hot bins may be combined at same percentages as bituminous mix being used

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## Conveyor Belts

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- Stop the belt
  - Use two templates (when available) shaped to fit the contour of the belt
  - Scoop all material into container using a brush for the fines
  - Prevent material from outside the sampling area from contaminating the sample
  - Obtain a minimum of three increments per sample
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## Sampling from Conveyor



## Stockpiles

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- Different methods of sampling stockpiles
  - Production stockpile sampling is not preferred when another location is acceptable
  - Best to sample stockpiles as they are being built or as material is being removed so uniformity is maintained prior to shipping
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## Definitions

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- **Production Stockpile** – built with conveyor belts or trucks dumping loads taken directly from plant.
  - **Miniature Mixed Stockpile** – built with loader from scoops taken from production stockpile and mixed thoroughly
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## Coarse Aggregates -- From Production Stockpile

- Select 3 to 5 equally spaced locations along a line from the base to the top of the pile
- At each location prepare a sampling bench and take a sample from as far inside the pile as possible
- Preferably use a shield to prevent flow of aggregate into the sampling area

## Sampling from Side of Production Stockpile



## Flat Top Stockpiles

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- Select 3 to 5 areas along a flat surface
  - Clear away top foot of material
  - Take samples
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## Fine Aggregate Stockpiles

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- Sample in a similar fashion as coarse
  - Increments may be less if material is damp
  - Sampling tube or thief may be used
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## Sampling with a Sand Tube

Sampling  
from Fine  
Aggregate  
Stockpile



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## Trucks, Barges, and Rail Cars

- Use power equipment when available to expose material at various locations & levels
- Otherwise, dig a minimum of (3) trenches 1' wide X 1' deep across the container
- Take a minimum of (3) increments from each trench to comprise sample

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## Compacted Bases at The Roadway (DGA & CSB)

- Sample at the last practical point (behind spreader but before rolling)
- Obtain a minimum of 3 approximately equal samples selected at random from the unit being sampled
- Avoid the tracks of the equipment
- Do not dig into the subgrade

## Roadway Base Sampling



## Other Roadway Sampling Locations

- Bridge ends, narrow shoulders and other areas where a spreader box may not be used
- Sample at the last practical point as determined by the Engineer

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## Miniature Stockpiles Using Mechanical Equipment

- This is the most preferred way to sample for source prequalification testing
- Use loader to dig as far inside the production stockpile as possible at multiple sites
- Blend dug out material into a miniature stockpile & strike off top
- Take multiple increments from the miniature stockpile to comprise field sample



## Shipping Samples

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- Place sample in plastic bag and tie
  - Place plastic bag in burlap sack
  - Attach identification tag to sack
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## Summary

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- ALWAYS take samples that BEST represent all of the material
  - Make sure sample is not contaminated
  - NEVER overflow sampling container
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