Major reasons for segregation in Asphalt Mixing Plants

Segregation means the separation of coarse and fine materials.
Major reasons for segregation in Asphalt Mixing Plants

Segregation leads to:

- Smoothness problems
- Density below specification
- Loss of overall material durability

Vince Any Ideas?
Major reasons for segregation in Asphalt Mixing Plants

Segregation may occur because of:

- Mix design
- Stockpiling
- Aggregate handling (Virgin and RAP)
- Asphalt Plant Particulars
- Truck Loading and Unloading
- Paver operations

(a) Fine aggregate segregation  (b) No segregation  (c) Coarse aggregate segregation
- Gap graded
- JMF not well graded down to fines
- Steep grading curve
- Challenge: Large stone presence

**MIX DESIGN**

![Graph showing percent passing vs. sieve size raised to 0.45 power. The graph highlights the concept of a gap being BAD.](image)
Segregation may occur because of:

- **Agregate stockpiling** (loader and Truck)
- **Paver operations** (not covered in today's PP)
Segregation of Asphalt Mixtures

Aggregate Handling

Dirty Core, Fine Aggregate

Medium Coarse Aggregate

Conveyor

Coarse Aggregate
DRUM MIX ONLY!

- Aggregate delivery from the cold bins to the drum

  Increased height may cause segregation.
Drum Mixers

Fine

Coarse

Segregation During Drum Discharge
**DRUM MIX ONLY!**

**Drum Mixers**

*Uniformity During Drum Discharge By Fixing a Plow At Point of Discharge*
Hot mineral silo batch type plants
ASPHALT STORAGE SILO

Storage Silo with lateral drag slat

Minimizing Silo Segregation

Always use batcher or “gob” hopper

Maintain as uniform height of mix as possible 30-70%

Load out trucks in multiple drops.

Always discharge in 3 steps

1. Front
2. End
3. Middle
**ASPHALT STORAGE SILO**

**Storage Silo underneath the Mixer**

**Different technology:**

- Horizontal skip with only one dropping point
- *long material angle* (27°)
- Dividing plate to prevent segregation
Improved technology:

Horizontal skip with multiple discharge points

→ Short material angles
Improved technology:

Horizontal skip with multiple discharge points

→ Short material angles
Improved technology:

Horizontal skip with multiple discharge points

→ Short material angles
**ASPHALT STORAGE SILO**

**Improved technology:**

Horizontal skip with multiple discharge points

→ **Short material angles**
ASPHALT STORAGE SILO

**Improved technology:**

Horizontal skip with multiple discharge points

→ **Short material angles**
ASPHALT STORAGE SILO

One discharge point

Three discharge points
Silo extraction with dividing wall to prevent segregation

→ Extraction first from the inner part (short angle)
Transversally arranged outlet flaps shorten the material angle to the Truck tailboard.
TRUCK LOADING SEGREGATION

Single Dump

Single Dump Loading

Front & Rear Segregation
Material discharge with two transversal outlet flaps per silo chamber
TRUCK LOADING

Two transversal outlet flaps

→ First step
Two transversal outlet flaps

→ Second step
SWIVELING OUTLET
TRUCK LOADING WITHOUT SEGREGATION
Sample 1: Traditional Asphalt Loading and discharge
Sample 3; Modified storage loading and unloading process
Thank you for your attention!

ONE MORE TOPIC WE SHOULD DISCUSS

MORE OFTEN
Asphalt Recycling

"Talk about it"

Cold Recycling Systems

- Cold addition via hot elevator
  - max. 15% RAP

- Cold addition direct into mixer
  - 25% RAP

- Addition into aggregate dryer via middle ring
  - max. 40% RAP

Warm Recycling Systems

- Separate dryer to dry and preheat RAP and then addition into mixer
  - max. 60% RAP

- Separate counter flow dryer to dry and preheat RAP and then addition into mixer
  - max. 100% RAP

''Talk about it''
True Recycling = Future of Asphalt
Cost Benefits (example: plant in Netherlands)

Production: 600,000 t per year
RAP: 300,000 t per year

= 50% RAP
If you stand still there is only one way to go, and that's backwards.

Peter Shilton

BE OPEN FOR THE FUTURE...

Thank you!
Questions?