Plants & Production

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Basic Functions of Plants

- Store component materials
- Combine aggregates in proper proportions
- Heat and dry aggregates
- Add and mix liquid binder in proper proportions
- Coat aggregates uniformly
- Store mixture and load trucks without segregation

Reproduce the mix design!
Types of Facilities

- Batch
- Continuous (drum mix)
- Combination
Drum Mix Plant - Typical Layout

- Storage silos
- Control room
- RAP bin
- Cold feed bins
- Asphalt storage tanks
- Dryer/mixer
Stockpiling Aggregates

- Good stockpiling procedures are crucial to HMA production.

- If the material in the stockpile is segregated or contaminated, the HMA will be also

- Coarse aggregate piles segregate easier than fine aggregate piles
Stockpiling Aggregates

Good spacing between stockpiles

Use of bulkheads to maintain separation

Horizontal stockpiles with separate aggregate piles
Stockpiling Aggregates

• Angularity of the aggregate is an essential component of good HMA.

• Each time the aggregate is moved and stockpiled, the aggregate degrades and the edges become more rounded

• Handling should be minimized as much as possible
Stockpile Problems

Contaminated stockpile

Segregated stockpile
Paved & Sloped Area

PAVED, SLOPED STOCKPILE AREAS SAVE MONEY
Covered Stockpiles

KEEP RAIN OFF STOCKPILES
Horizontal Asphalt Tanks
Cold Feed Bins

Vertical Dividers
Cold Feed Bins
Cold Feed Bin Belt

Bin Feed is determined by:

Gate Opening

Belt Speed
Collector Belt
Collector Belts/Conveyors

- Collects material and transfers to dryer
Single Deck Scalping Screen
Heat And Dry Aggregates

Aggregate Dryers

- Gas or liquid fueled burner
- Removes moisture from aggregate
  - Surface and internal
- Heat aggregate to production temperature
- “Super-heat” aggregate for heat transfer to cooler RAP being blended
Two Types of Dryers

Aggregate & Air

- Parallel-flow
  - Same direction
- Counter-flow
  - Opposite direction
Counter-Flow Drum-mixer Zones

Air

Hot Mix Asphalt

AC

Mixing
Combustion
Heating
Drying

Aggregate
DRUM MIXER DAMS
Effective Aggregate Veiling
Emission Control Equipment

Clean air

Dryer or Drum

Primary

Larger Fines collected

Secondary

Dust collected and returned to plant process

Exhaust

Air

Training, so necessary.
Cutaway of Baghouse

Captures Dust
Returns to mix
Accurate metering
Baghouse Filter Bags

**Filtering mode**

- Dirty air
- Dust falls from bag
- Dust clings to bag

**Bag cleaning mode**

- Impulse reverse air

Clean air

Dirty air

Dust falls from bag

Dust clings to bag

**Bag cleaning mode**
Insufficient Drying

- Trapped moisture
- Poor asphalt - aggregate bond
- Tender mixes
- Rapid heat loss after mixing
- Asphalt content errors
Insufficient Heating

- Poor mixing
  - Rich and lean spot
  - Uncoated Aggregate
  - Poor compaction

- Insufficient heat transfer to RAP
Stationary Silo Installations
Proper loading of trucks helps reduce segregation.
Plants and Production

• Summary
  – Batch and drum plants (drum most common)
  – Aggregate must be properly stockpiled to prevent segregation, contamination, high moisture content
  – Aggregate and binder must be carefully proportioned before drying and mixing
  – Sufficient mixing to heat, dry aggregate and obtain uniform coating of binder
  – Final step in production is to temporarily store and then transport HMA to project site without segregation
Questions?