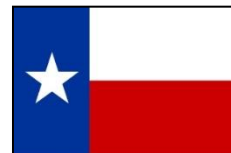


Plants & Production

Danny Gierhart, P.E.
Asphalt Institute Regional Engineer
Tuttle, Oklahoma



Basic Functions of Plants

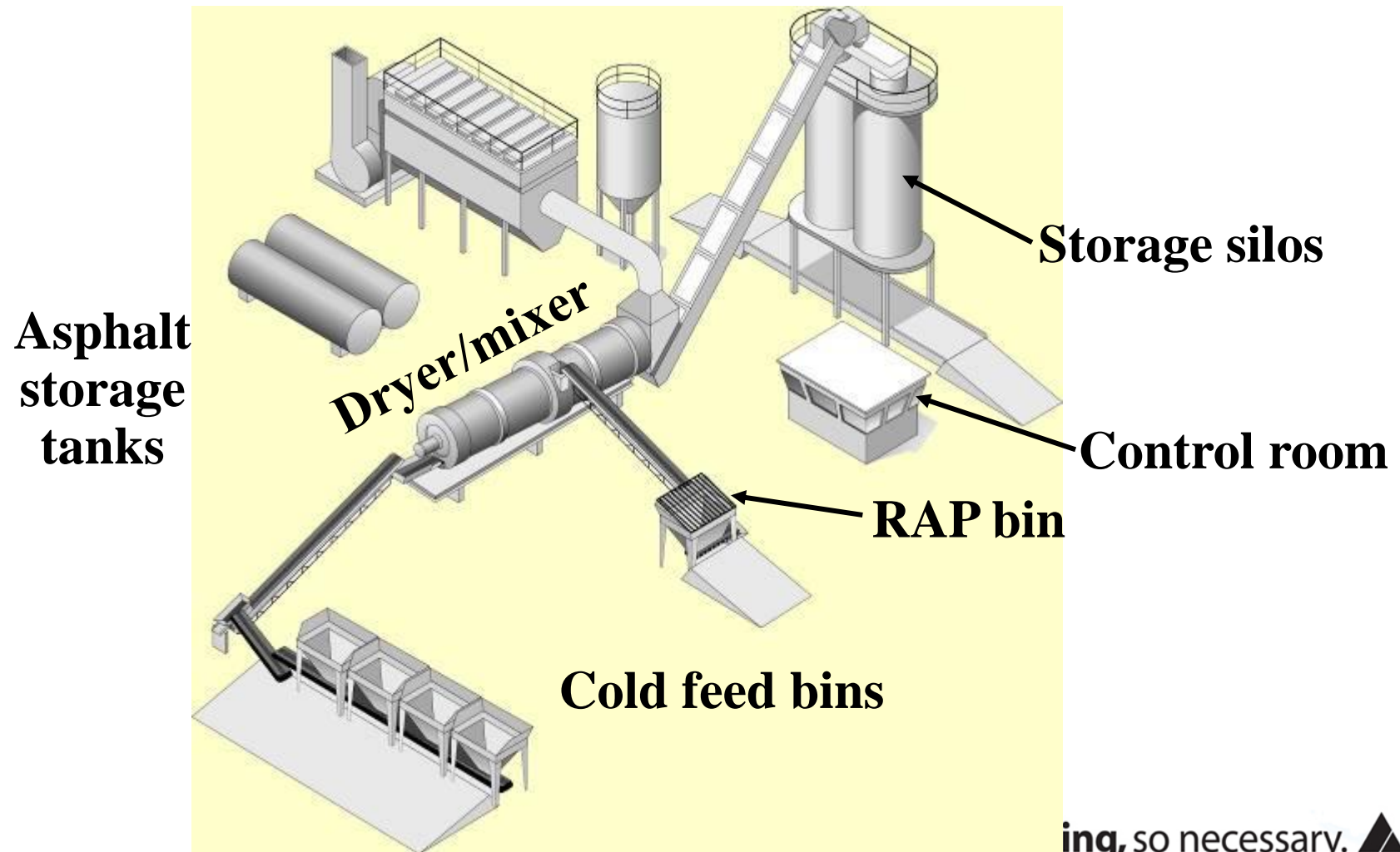
- Store component materials
- Combine aggregates in proper proportions
- Heat and dry aggregates
- Add and mix liquid binder in proper proportions
- Coat aggregates uniformly
- Store mixture and load trucks without segregation

Reproduce the mix design !

Types of Facilities

- **Batch**
- **Continuous (drum mix)**
- **Combination**

Drum Mix Plant - Typical Layout



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

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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



Photo by: A. BREITENBACH
Available by the Geoengineer Website
<http://www.geoengineer.org>



Segregated stockpile

Paved & Sloped Area

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PAVED, SLOPED STOCKPILE AREAS SAVE MONEY

Covered Stockpiles

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KEEP RAIN OFF STOCKPILES

Horizontal Asphalt Tanks

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Training, so necessary. ▲

Vertical Asphalt Tanks

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Cold Feed Bins



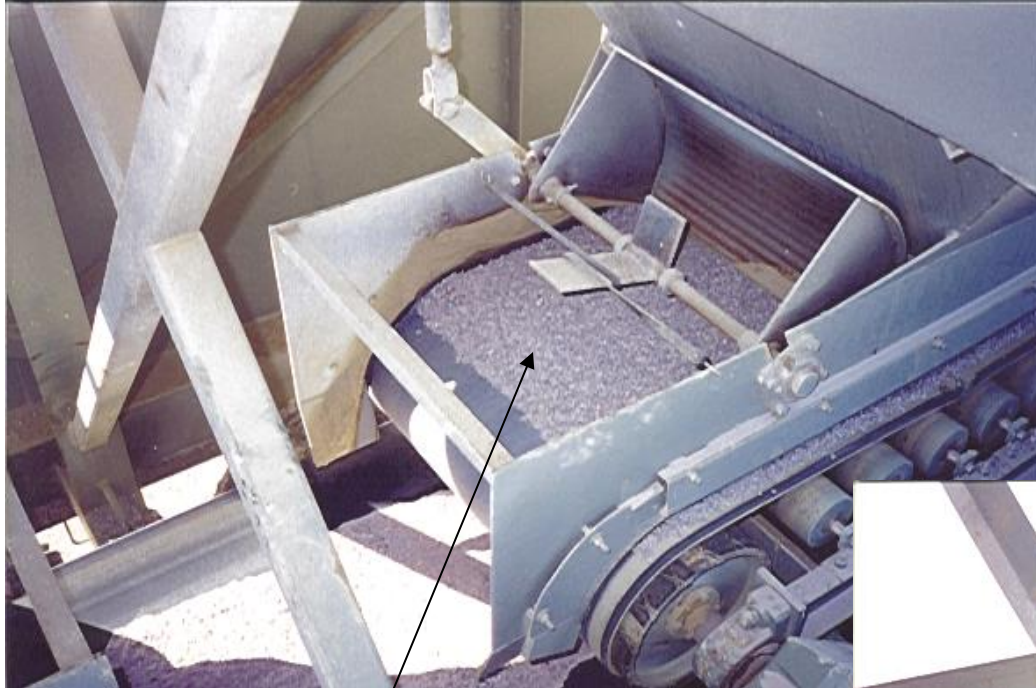
**Vertical
Dividers**

Cold Feed Bins



Cold Feed Bin Belt

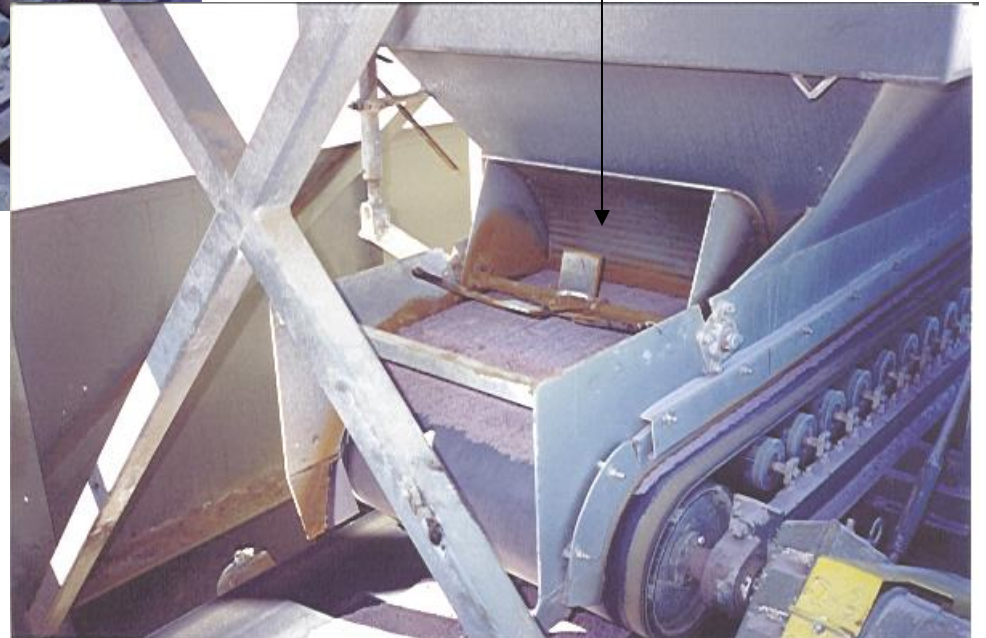
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Belt Speed

**Bin Feed is
determined by:**

Gate Opening



Training, so necessary. ▲

Collector Belt

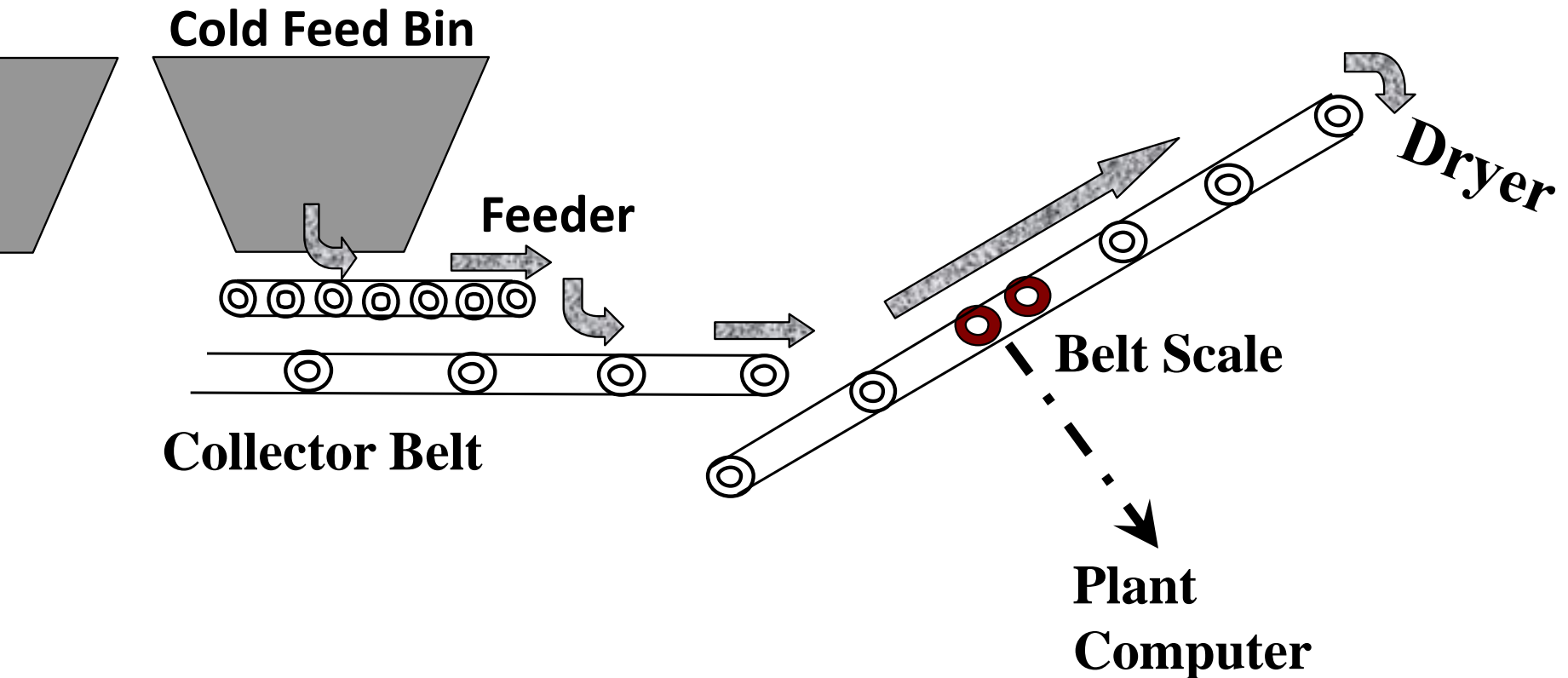
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Training, so necessary. ▲

Collector Belts/Conveyors

- Collects material and transfers to dryer



Single Deck Scalping Screen

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Training, so necessary. ▲

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

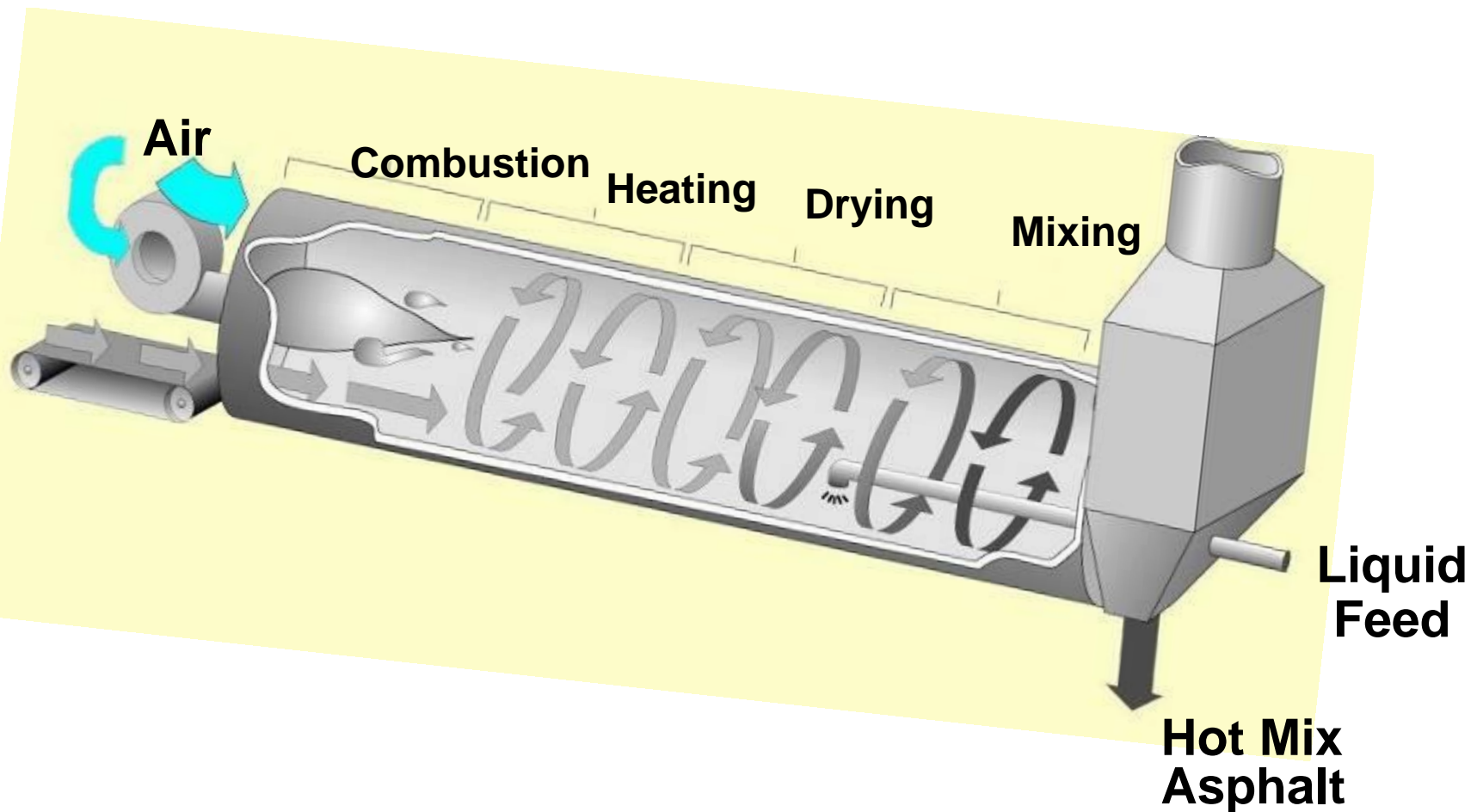


Aggregate & Air

- **Parallel-flow**
 - Same direction
- **Counter-flow**
 - Opposite direction

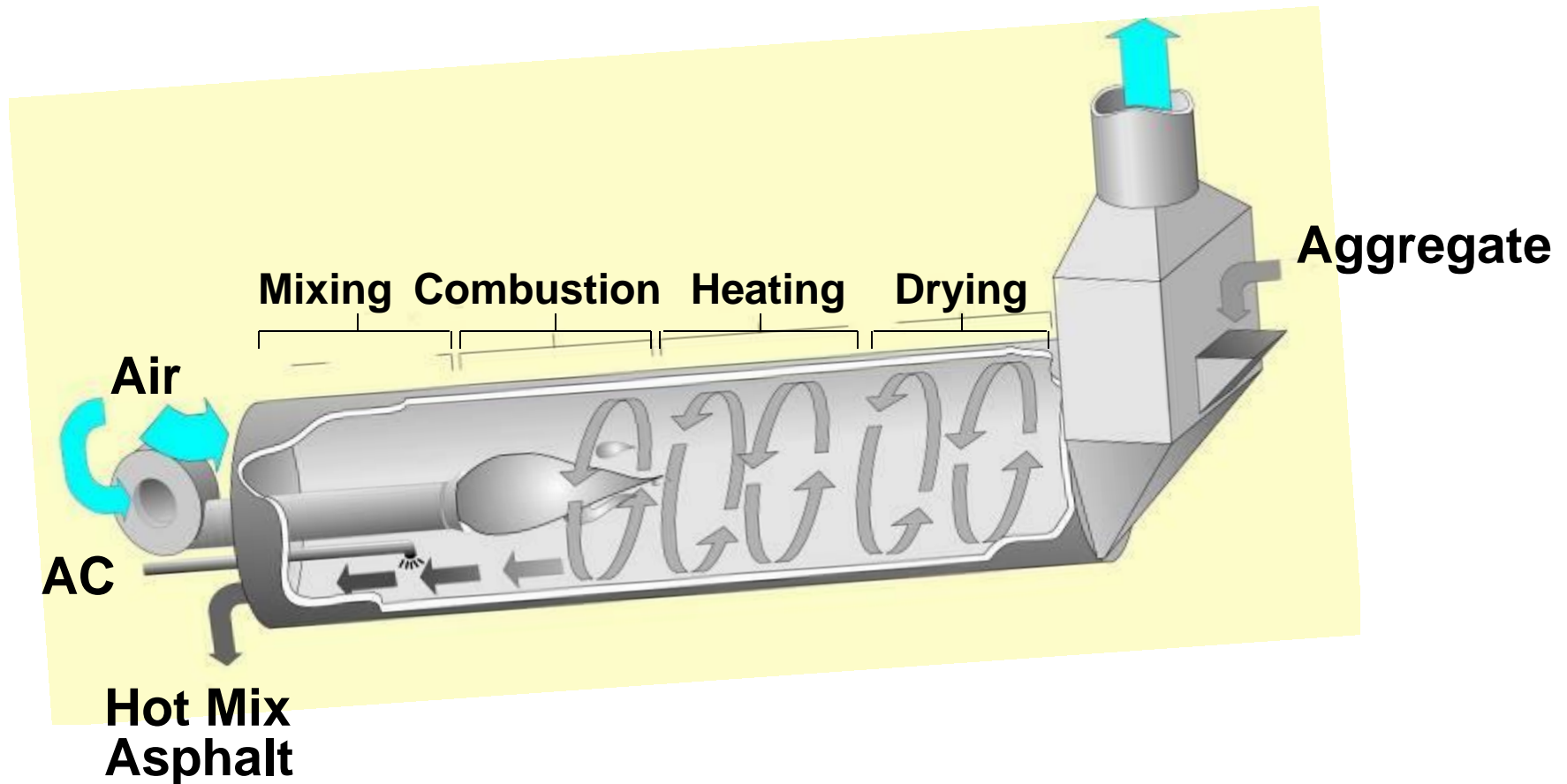
Parallel-Flow Drum-mixer Zones

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Counter-Flow Drum-mixer Zones

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A 3D cutaway diagram of a drum mixer dam. The structure consists of multiple horizontal layers of concrete drums, each with a central opening. The drums are arranged in a staggered pattern, creating a series of chambers. The top layer is colored yellow, while the lower layers are grey. The central opening is a large, irregular shape. The text "DAMS RETARD FLOW" is written in bold black letters, with a black arrow pointing to the central opening. The background is a dark greenish-grey color.

**DAMS
RETARD
FLOW**

DRUM MIXER DAMS

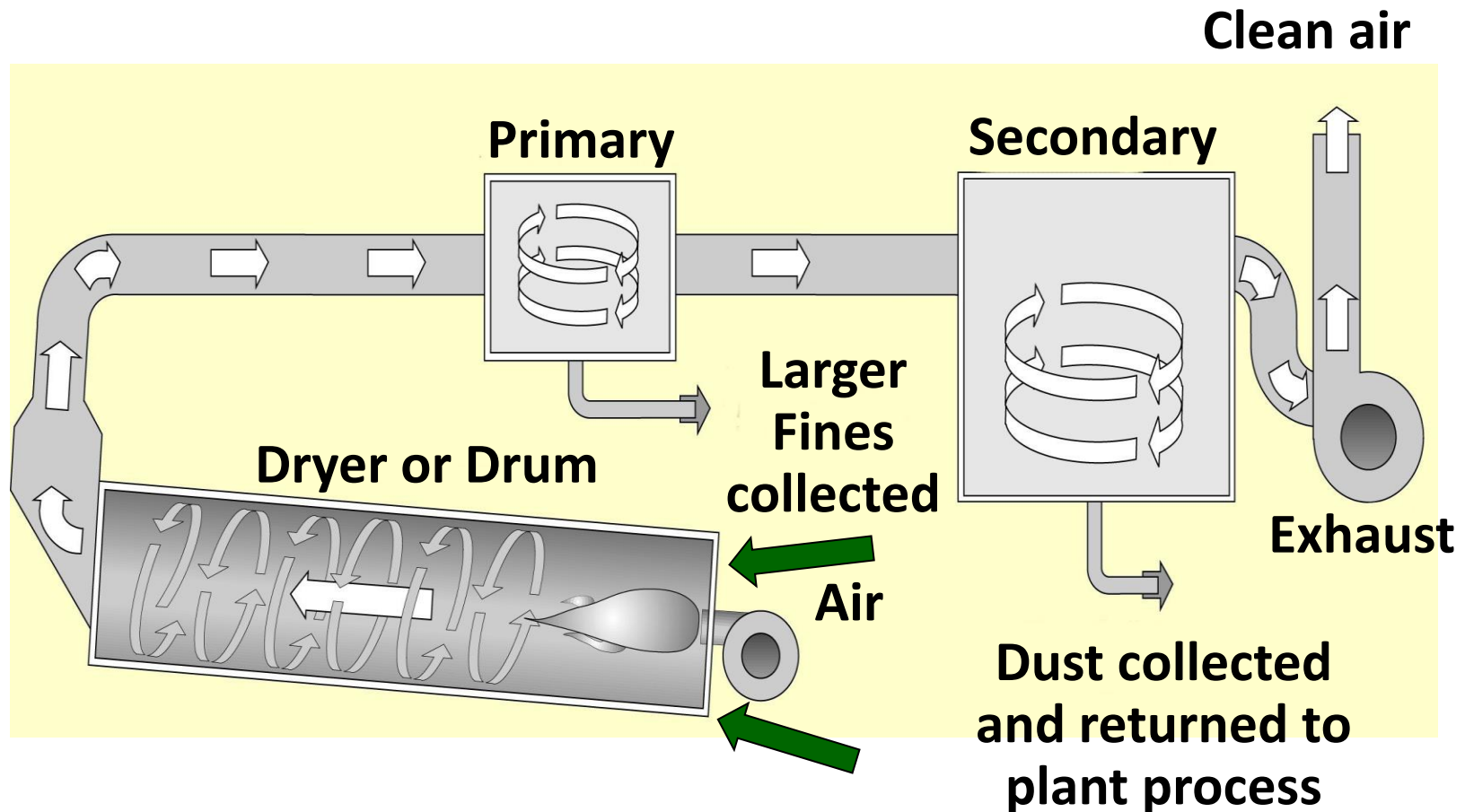
Effective Aggregate Veiling

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Emission Control Equipment

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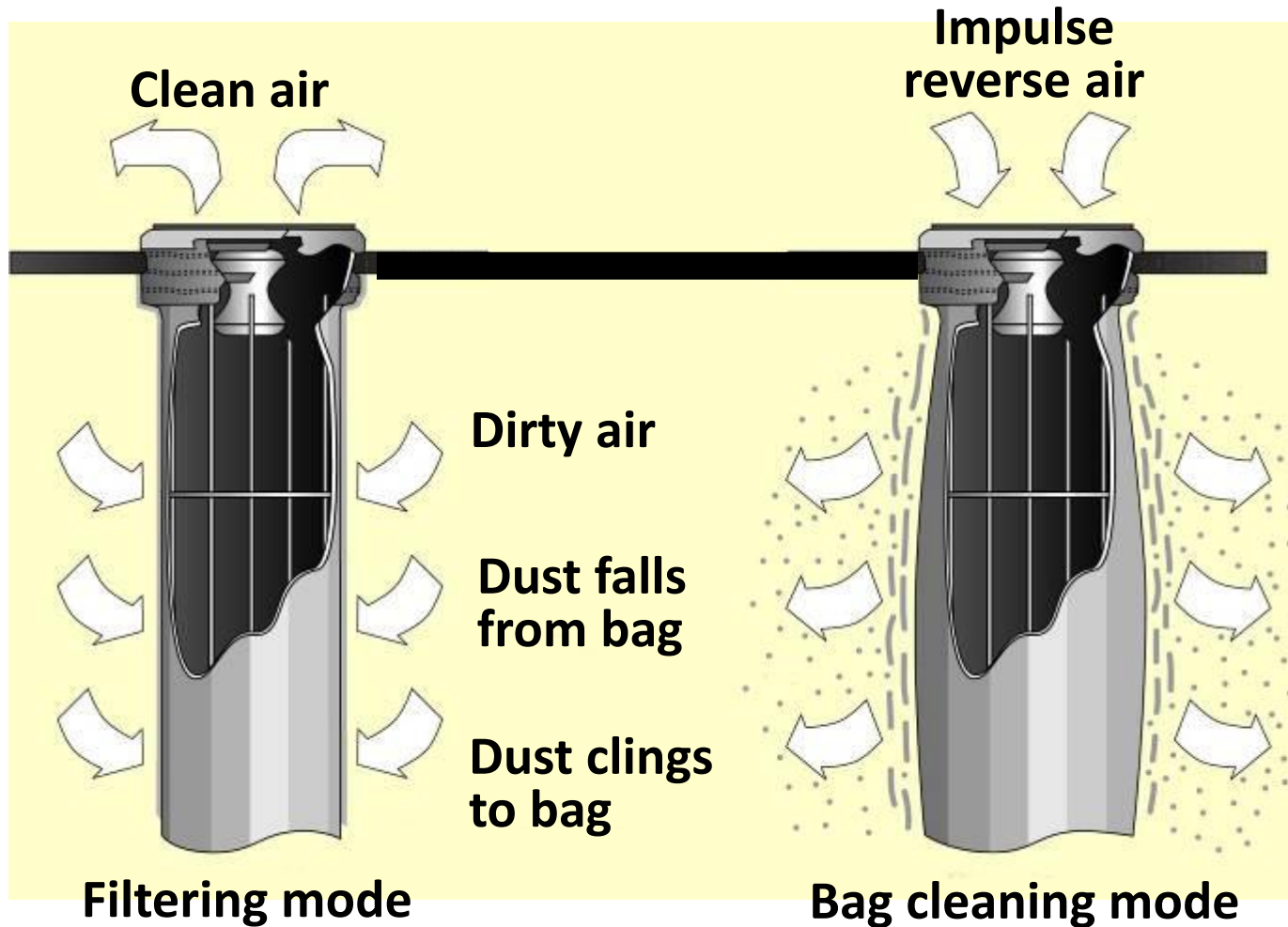
Cutaway of Baghouse

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Captures Dust
Returns to mix
Accurate metering

Baghouse Filter Bags



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

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Training, so necessary. 

Truck Loading

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?

