

Track B – Asphalt Plant Operations:  
*Material Storage, Handling,  
& Delivery*

2020 MAPA Spring Training – *Black to Basics*  
Holiday Inn Executive Center – Columbia, MO  
February 27-28, 2020



# Aggregate Storage



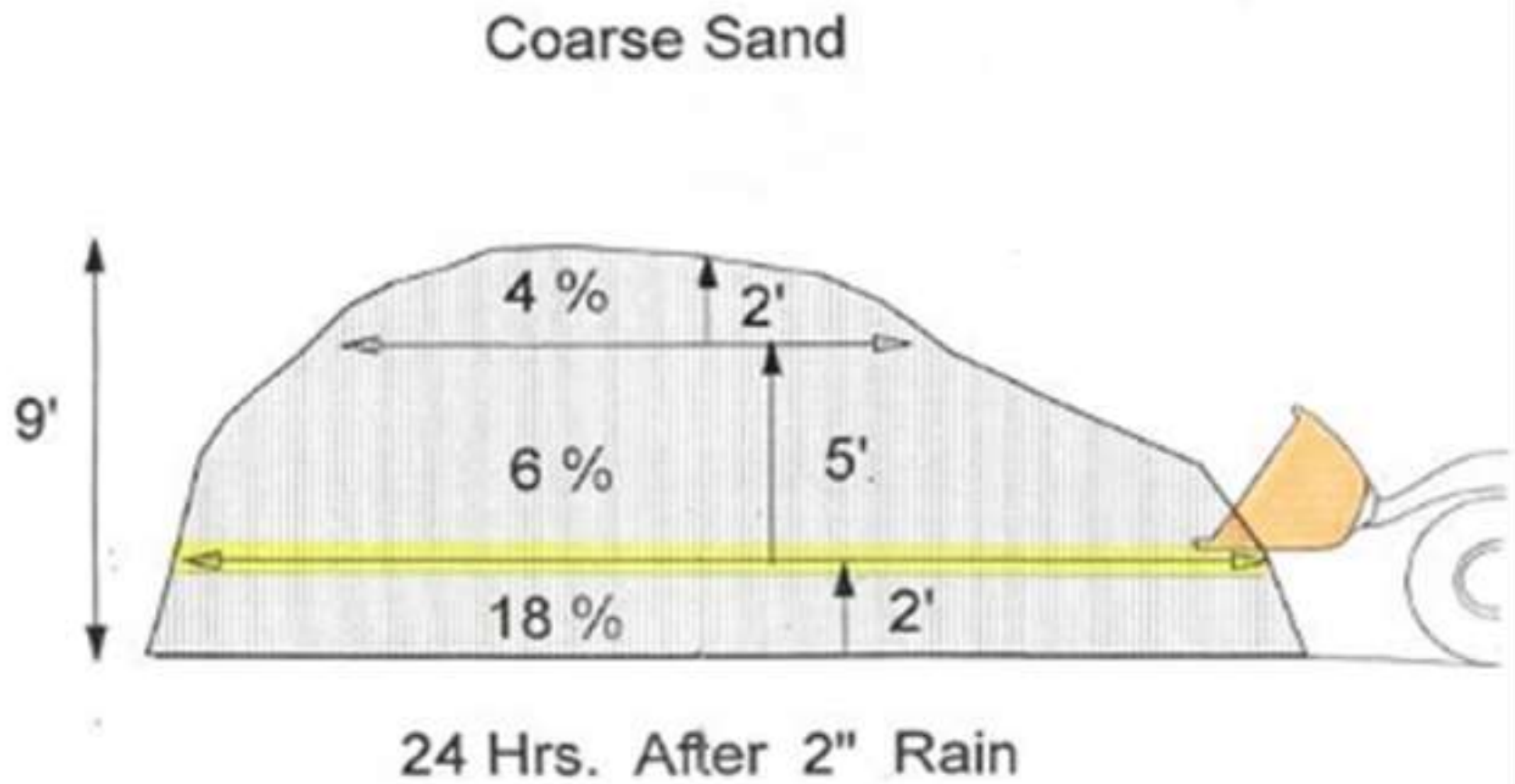
- Separated stockpiles
- Good drainage
- Minimize segregation

# Stockpile Moisture

- Water retention is maximized with well graded fine aggregate with high - #200 content (i.e., screenings)
- Screenings will typically hold more moisture than manufactured sand
- RAP and RAS stockpiles are also very prone to holding moisture

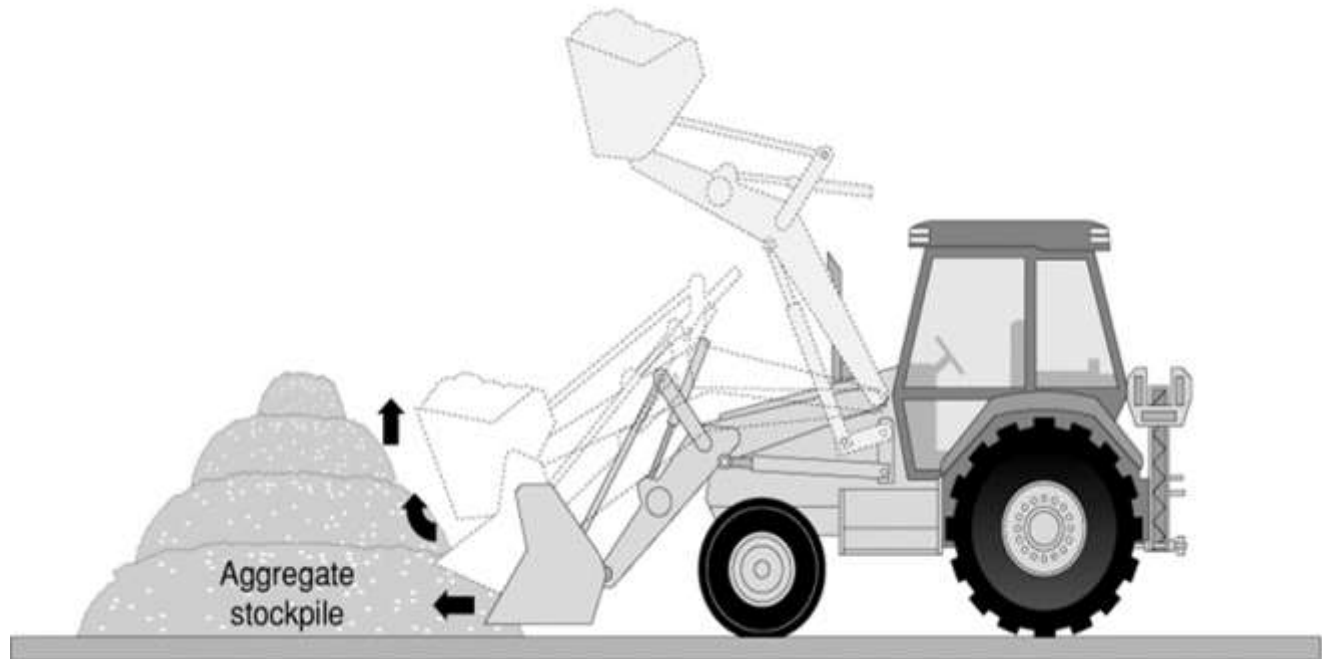


# Stockpile Moisture



# Stockpile Moisture

- Avoid contamination by removing material from just above grade
- Reduce possibility of segregation by rotating up and through material



# Aggregate Delivery

- Dividers on Aggregate Cold Feed Bins
- Material bins should not be heaped above divider walls



# Aggregate Delivery

- Aggregate Cold Feed System
  - Provides uniform flow of aggregates to dryer
  - Flow rate controlled by:
    - Gate opening
    - Belt speed
  - Consistent feed rate



# Aggregate Delivery

- Aggregate Cold Feed System
  - Scalping Screen rejects oversize
  - Weigh Bridge monitors flow rate
    - Must be maintained
    - Properly calibrated
    - Wind Guards installed



# RAP Delivery

- Special Requirements and Designs:
  - More horsepower (larger output required)
  - Special designs to promote flow of material
  - RAP more prone to bridging
  - “Lump breaker” often found at discharge



# Asphalt Cement Storage

- Tanks can be horizontal or vertical
- Tanks typically have hot oil heating coils
  - Some are heated electrically or with a burner



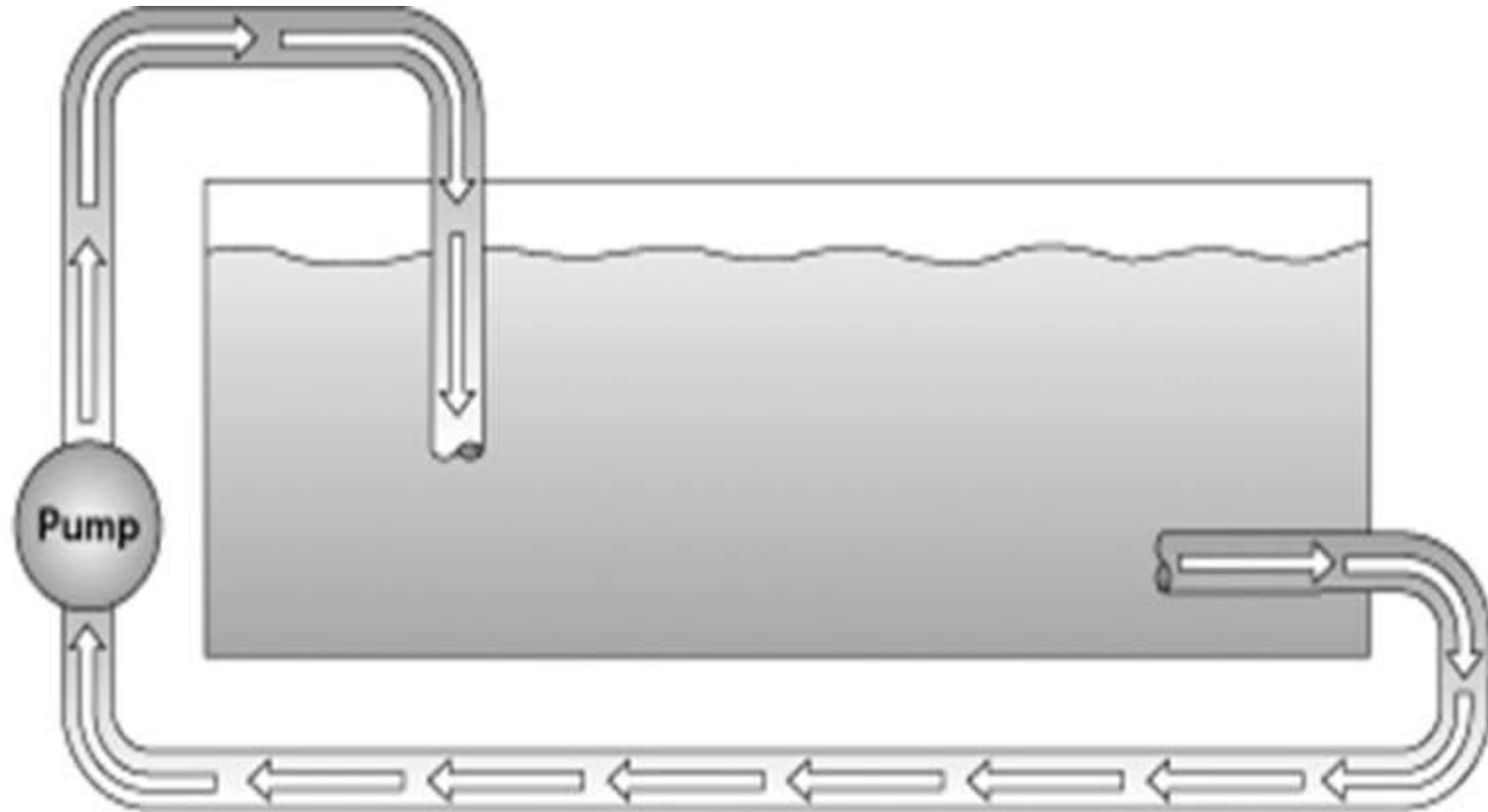
# Asphalt Cement Temperatures

- Critical to proper coating of the aggregate
- Critical for proper placement and compaction
- Critical for a quality paving product
- Control AC temps through tolerances on mixing temperatures

# Asphalt Cement Temperatures

- Manufacturer recommends it
- Protects asphalt from over-cooking
  - Blue Smoke
  - Loss of light ends
- Having a minimum temperature helps with compaction on the road
  - Ensures that the mixture will stay in a condition favorable to achieve compaction

# Asphalt Cement Storage



**Recirculating with a pump is suggested  
for some modified asphalts**

# Asphalt Cement Distribution

- Asphalt binder flow is controlled by the plant automation
- Automation adjusts asphalt binder flow at the asphalt pumping/metering unit
- Thermocouples used to measure temperature of binder at meter should be calibrated to make sure proper binder temperature is being taken

# Asphalt Cement Distribution

- Verify proper specific gravity or AC weight/gallon is entered in meter
- Air leaks in binder lines can cause meters measuring gallons to count air as asphalt
  - Extracted binder content will be low

# Asphalt Mixture Storage

- Many configurations:
  - Portable
  - Stationary
  - Single Silo
  - Multiple Silo
  - Over Truck Scale



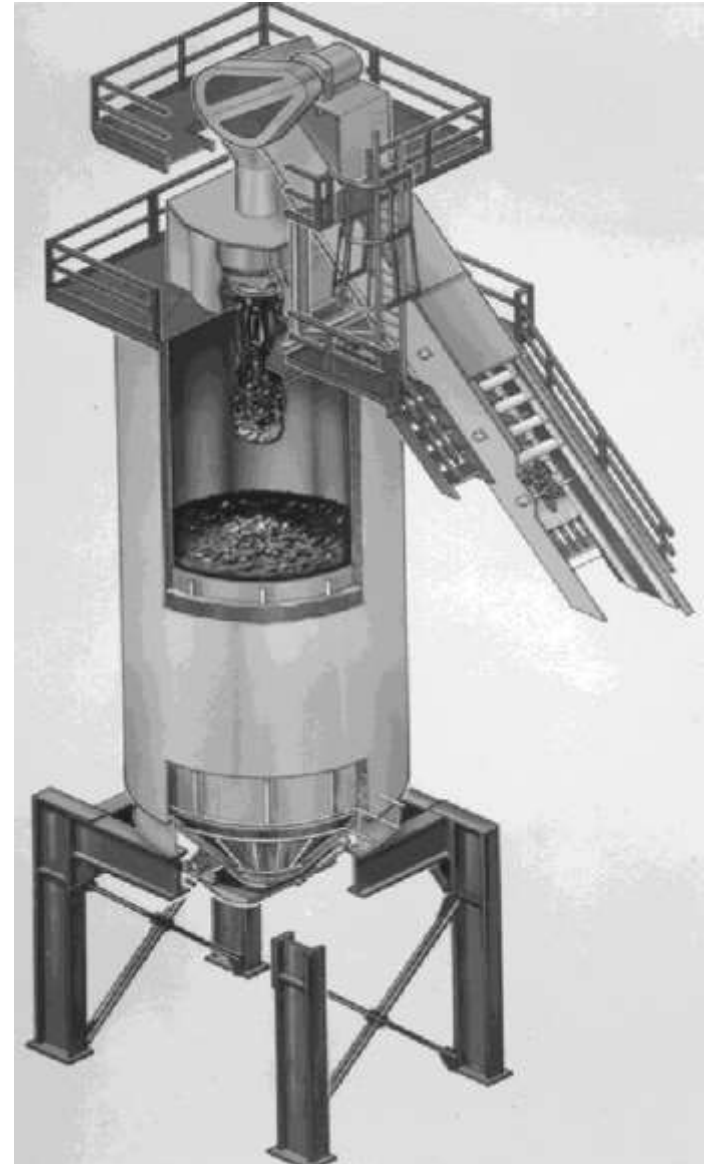
# Asphalt Mixture Storage

- With silos we are mostly concerned about:
  - Segregation
  - Temperature Loss
  - Oxidation



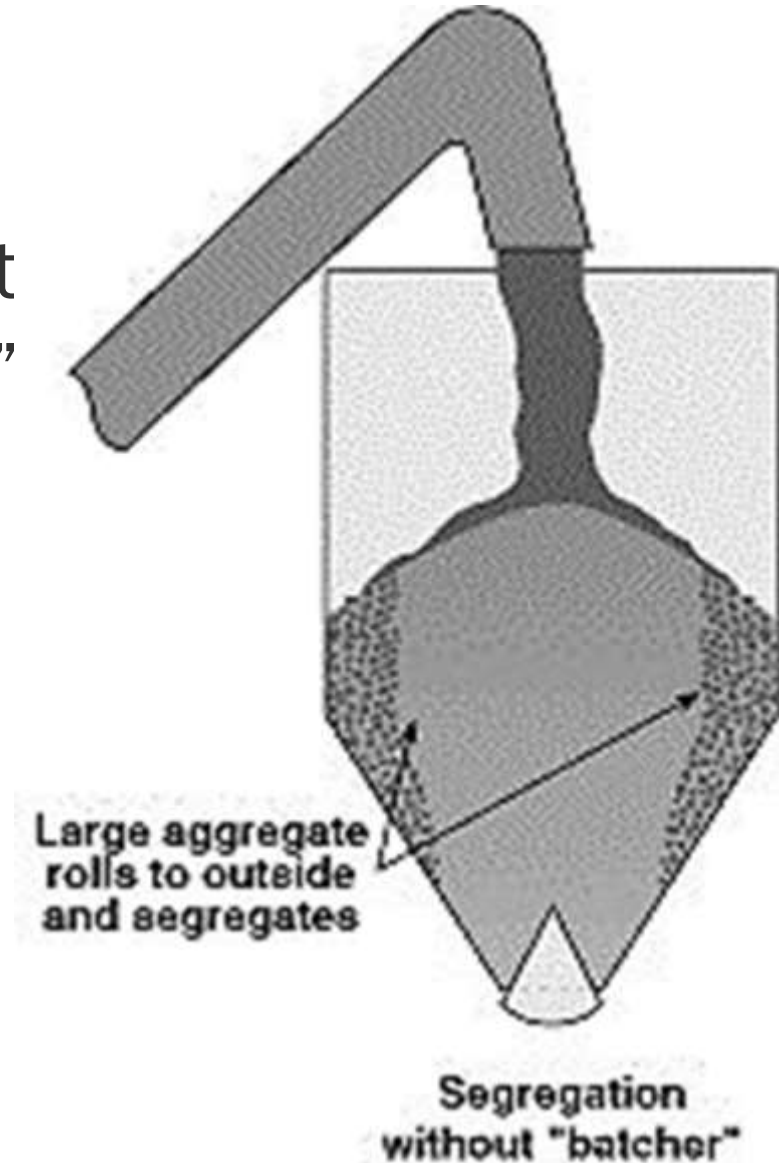
# Asphalt Mixture Storage

- When using a silo, the contractor shall deliver material that is:
  - within the tolerance ranges as set forth on the Job Mix Formula
  - without segregation
  - without balling or hardening



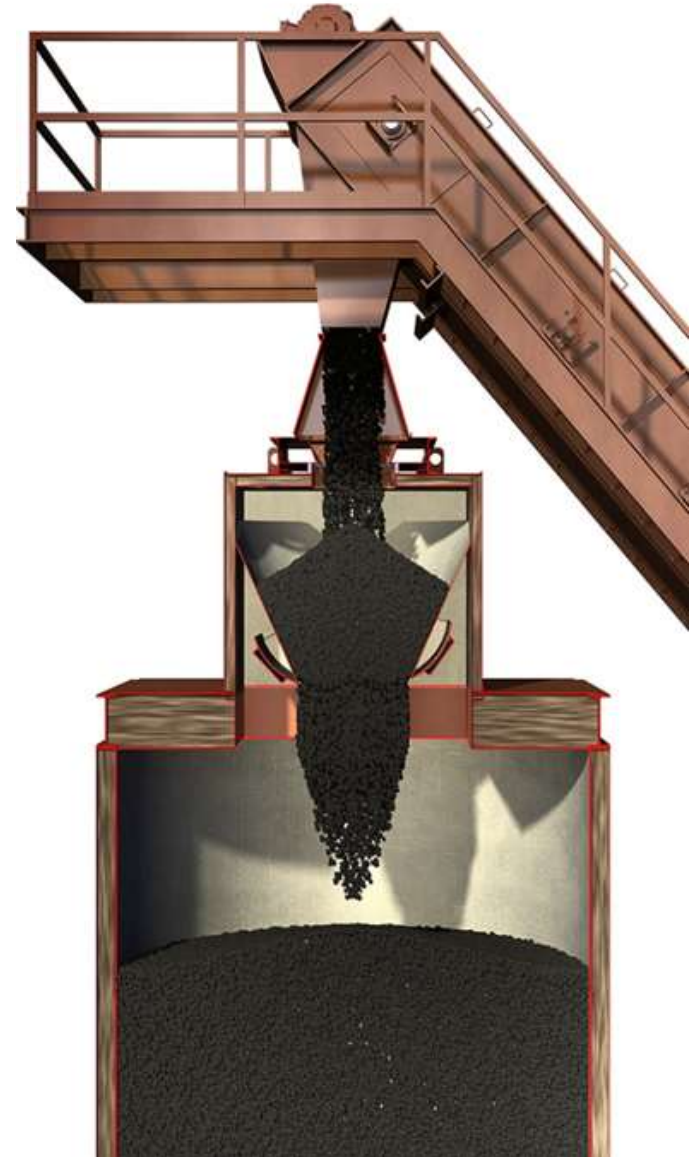
# Asphalt Mixture Storage

- Segregation is a much higher risk in silos that do not use a “Batcher”



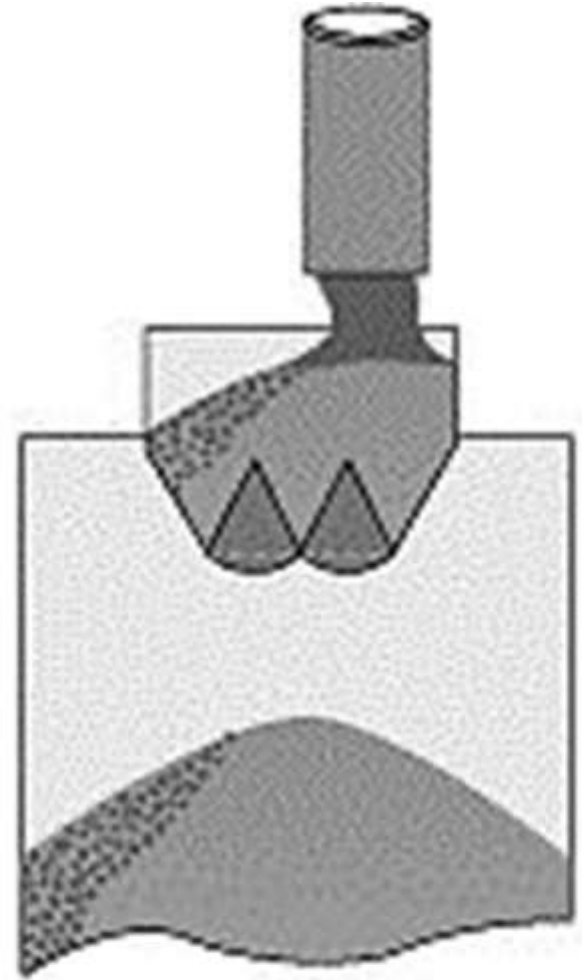
# Asphalt Mixture Storage

- Batchers drop a large mass of material at one time to reduce segregation



# Asphalt Mixture Storage

- To reduce the opportunity for segregation:
  - Feed all batchers in center
  - Feed split-feed type batcher in-line with splitter



**Segregation caused by not feeding batcher in center**

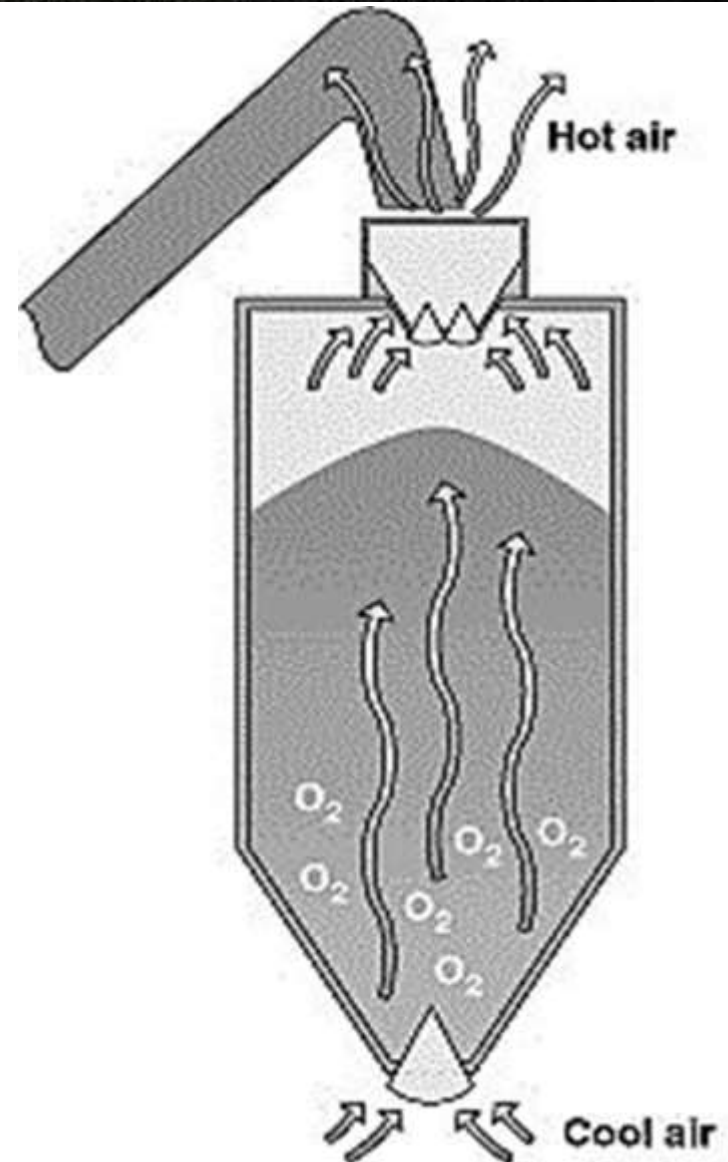
# Asphalt Mixture Storage

- Insulation and hot oil heat helps reduce the effects of heat loss to the atmosphere.



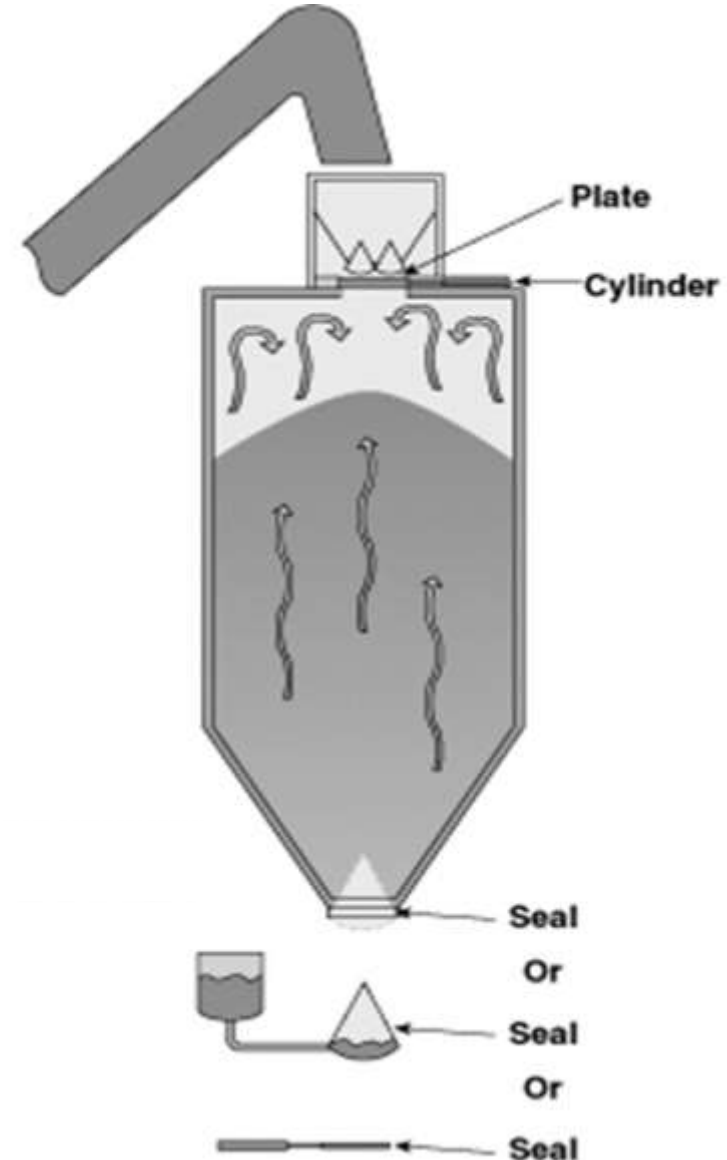
# Asphalt Mixture Storage

- Heat can escape out the batcher and draws in cool air to oxidize the mix
- Insulated batchers and heated silo gates reduce this effect



# Asphalt Mixture Storage

- Seals on the bin top and silo gate area lengthen storage times by reducing the “Chimney Effect.” Air is trapped in an insulated and sealed environment.



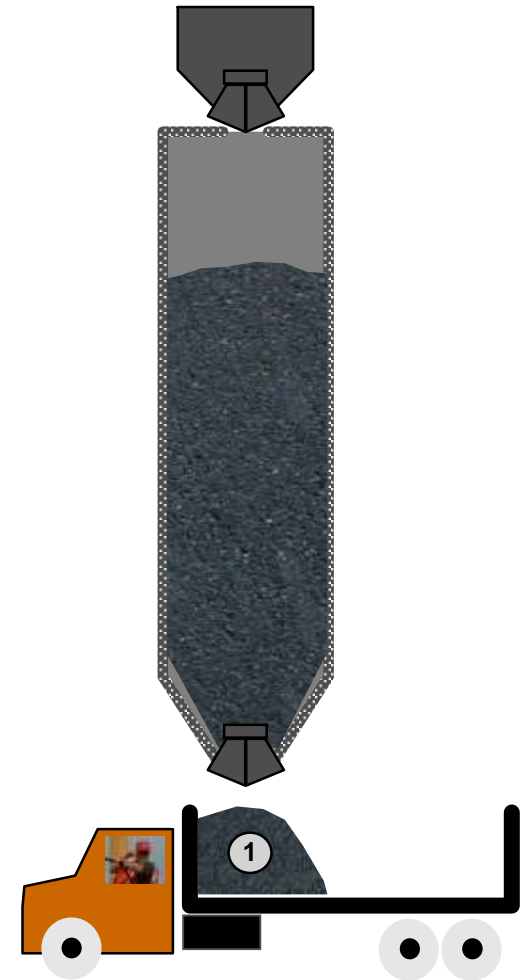
# Asphalt Mixture Loadout

- Truck Driver Communication
  - Truck routing
  - Release agents
  - Silo identification
  - Loadout procedure



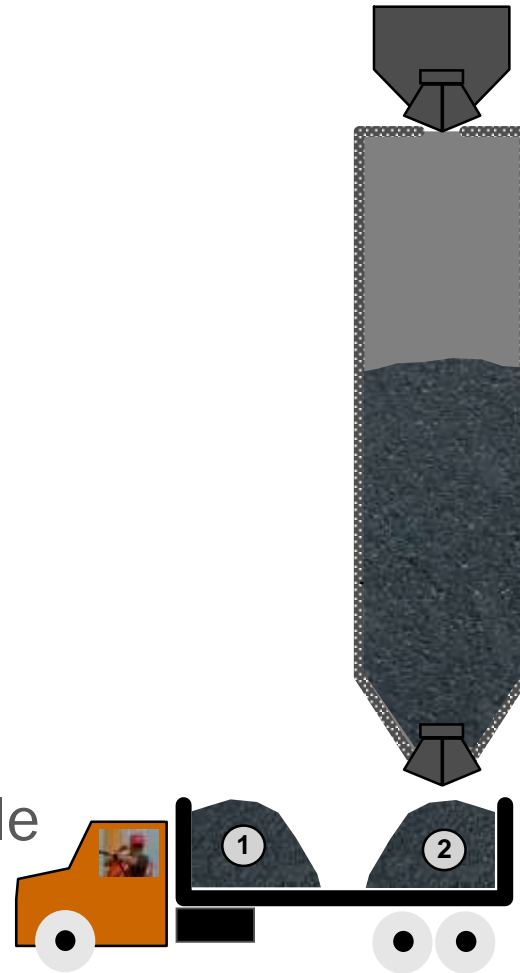
# Asphalt Mixture Loadout

- Truck Loading
  - Use multiple drops
  - Loading sequence:
    - front
    - back
    - middle
  - Always transfer HMA in “bulk”
    - do not allow mix to dribble from silo



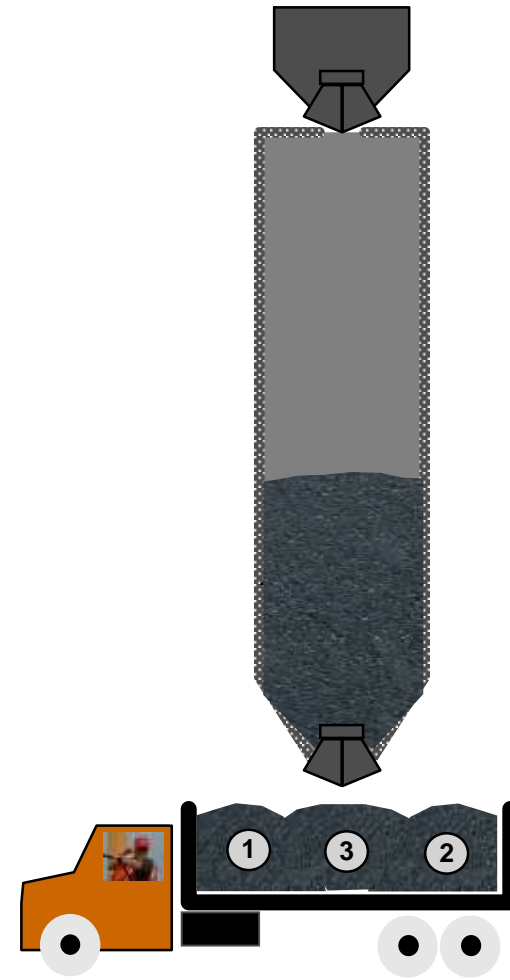
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# Haul Trucks

- Insulated and tarped
  - Especially for thin overlays
  - Front and both sides of bed
- Clean, smooth bed
  - Approved release agent
  - **No diesel!**

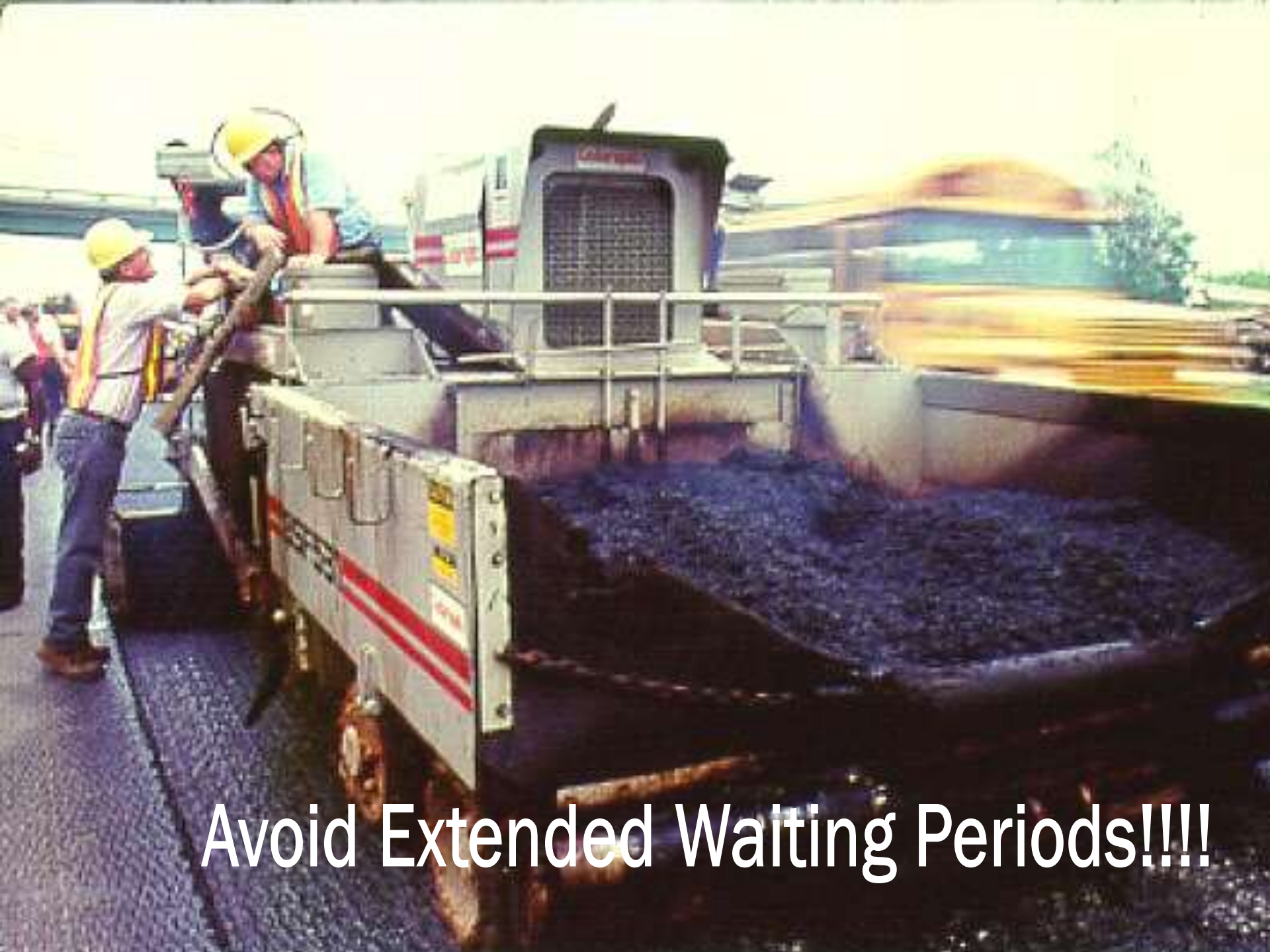


# Haul Trucks/Material Transfer



# Mix Delivery

- Correct Number of Trucks for Uninterrupted Delivery to Paving Site
- Truck Driver's Training
  - Constant Delivery
  - Getting In and Out of the Paver
  - Expeditious Cycling of Trucks



**Avoid Extended Waiting Periods!!!!**

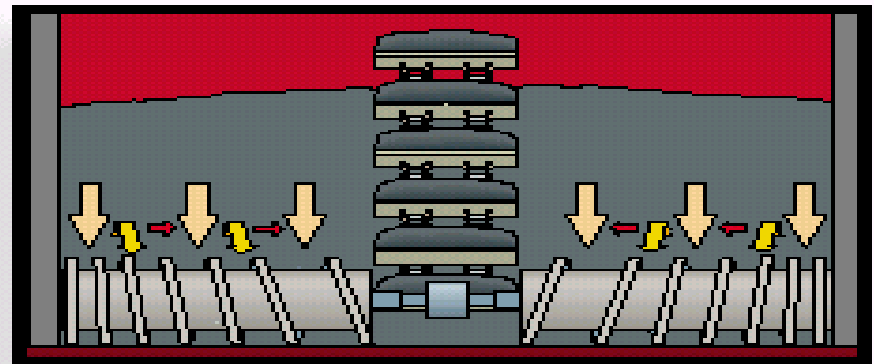
**Avoid Running the Hopper Empty!!!**



# Use of Material Transfer Vehicles



MTV remixer blends segregated mixture from truck and delivers it to the paver



**TRIPLE PITCHED AUGER**

# Mix Delivery

- Material Transfer Vehicle
  - Can help both mixture and temperature segregation
  - Keeps paver moving
  - However, it does add another LARGE piece of equipment to the paving train
    - Too big for some projects
    - Vertical clearance issues
    - Underground utilities
    - Bridge weight limits



# Summary

- Aggregate stockpile management and control is the first step at the production facility towards quality mixtures
- Cold Feed system must be properly maintained and calibrated in order to achieve the JMF target
- Asphalt Cement storage and distribution is also vital to ensuring quality mixtures and long-life pavement performance

# Summary

- Proper silo storage practices are important for maintaining the integrity of the plant produced mixture
- Even something as fundamental as loadout can have a significant impact on the quality of the final mat texture
- Truck Driver training is vital to the success of the final pavement's performance

# Questions?



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