



Segregation: Causes and Cures

BUILT TO **CONNECT**

Greg Renegar



WHAT IS AGGREGATE SEGREGATION ?

- **When different size aggregates in the mix separate.**
- **Localized places in the mat can't handle the weather or traffic.**

EFFECTS OF SEGREGATION



- AC content varies
- Aggregate gradation out of spec
- Voids vary
- Premature road failure
- Company reputation
- Mill up and replace - \$\$\$\$\$\$\$
- **Plant shut down – Blessing in disguise**

End of load segregation



Birth of a pothole

Potholes are typically caused by deterioration due to segregation, raveling, alligator cracking, or failures at joints and patches.

IMPROPER TRUCK LOADING

BIN KEPT TOO FULL

End of load segregation



Europe 2010



I-75 Tennessee - Kentucky



Honduras (20-mile job)



Honduras segregation



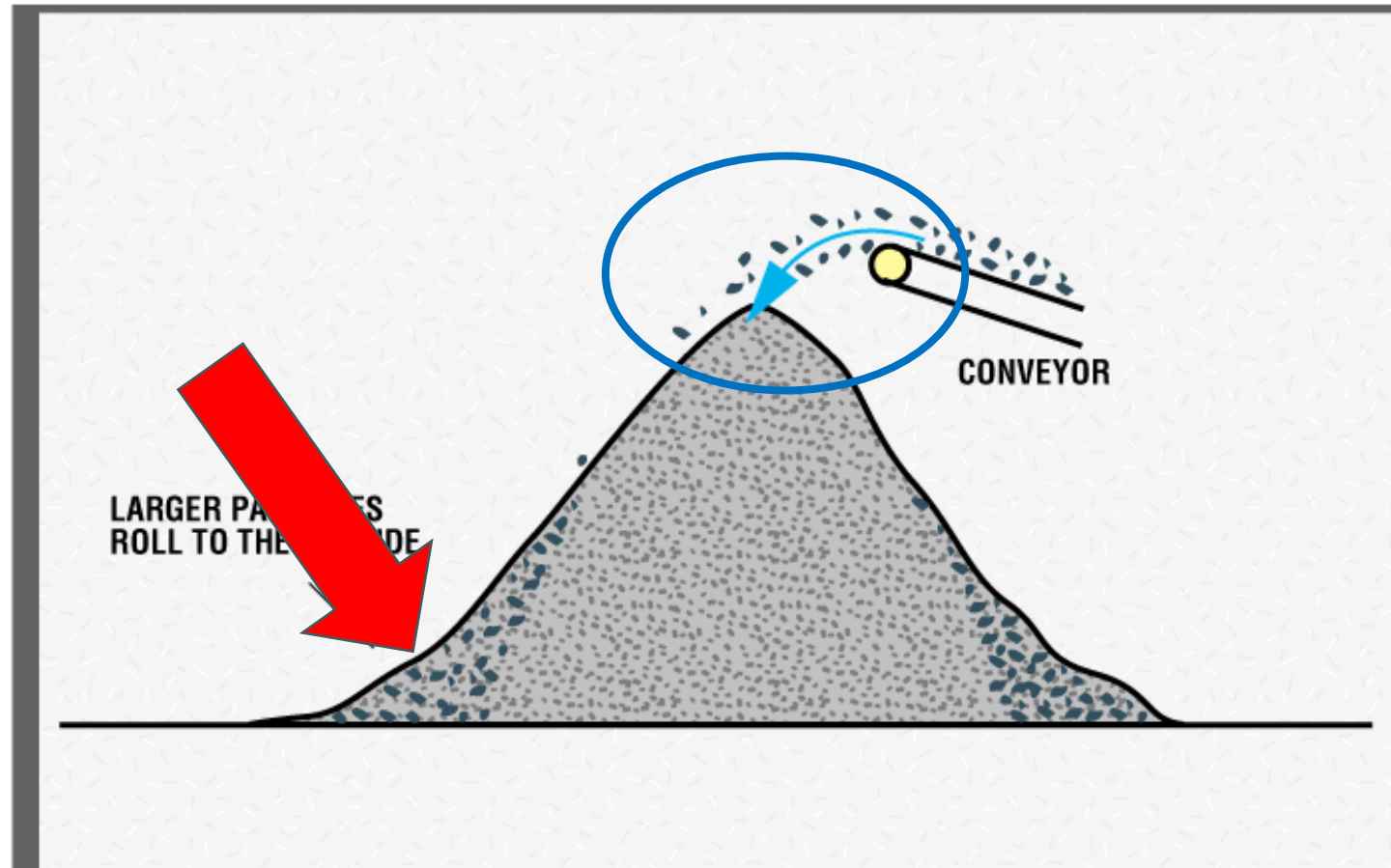
Remaining wet areas left after a rain were noticed

Segregation in Honduras



Wet areas turned out to be out of spec

Segregation due to momentum

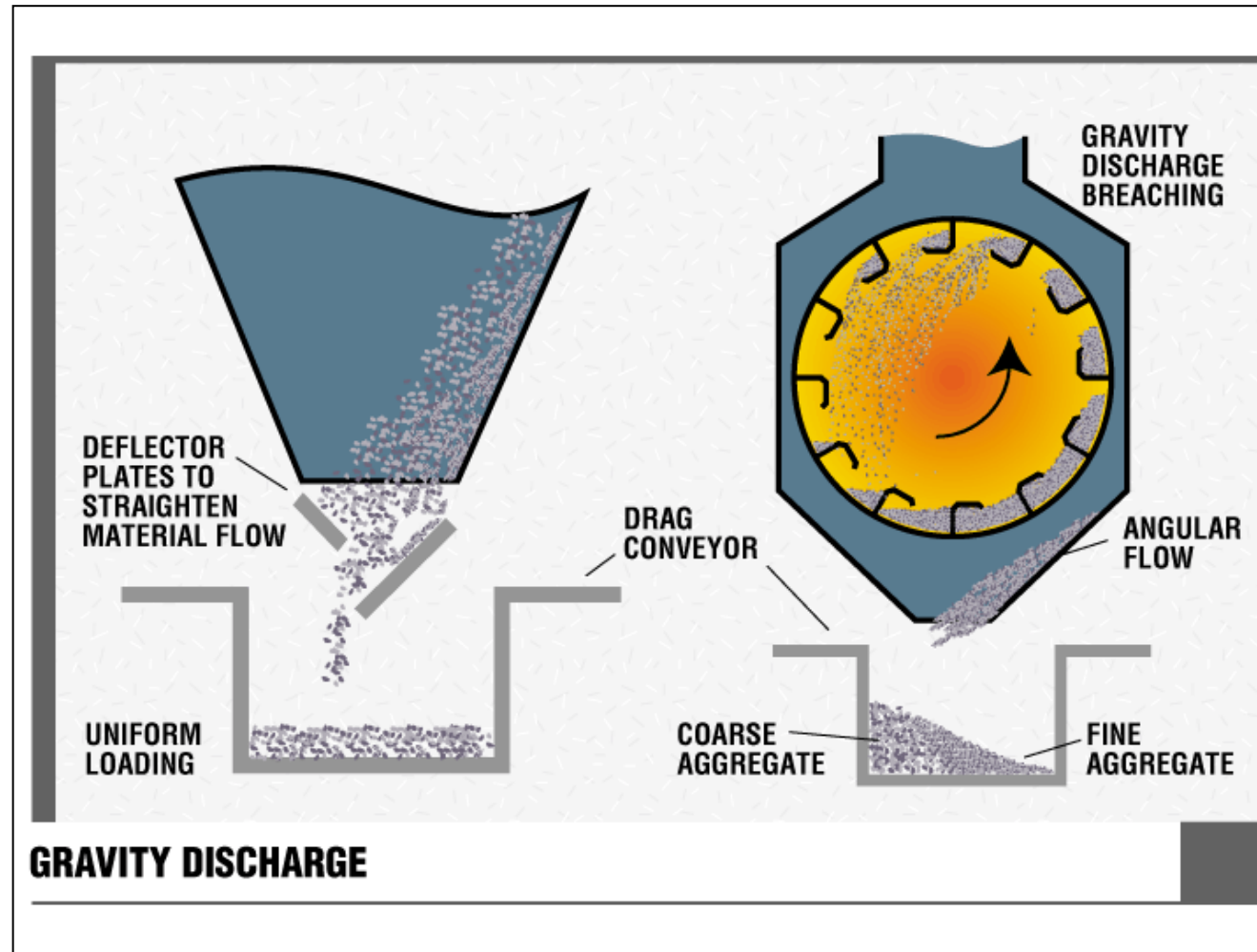


SEGREGATION IN A PILE

RAP stockpile segregation (video)



Segregation at the plant

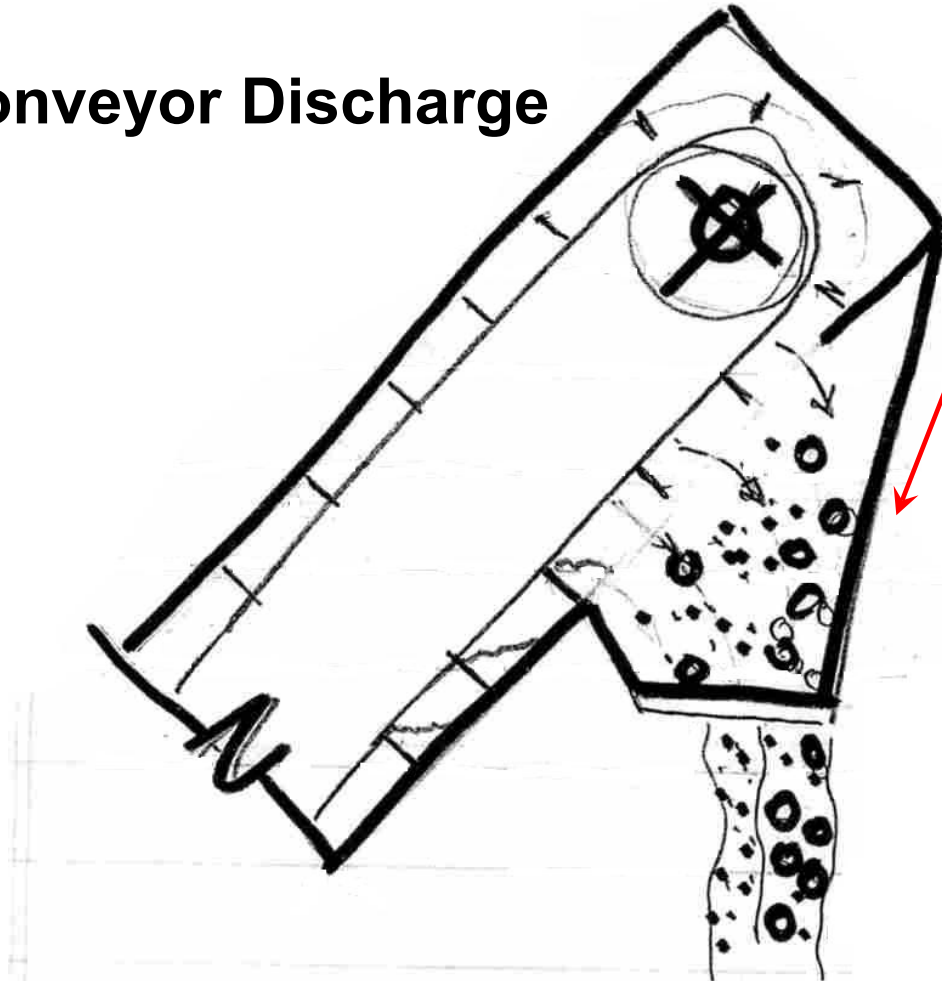


The drag slat **must** be loaded evenly

Segregation at the plant



Drag Conveyor Discharge



Large aggregate being thrown to the far side of chute.

Mix will be segregated in what is being loaded....

- Segregation in batcher
- Segregation in traverse

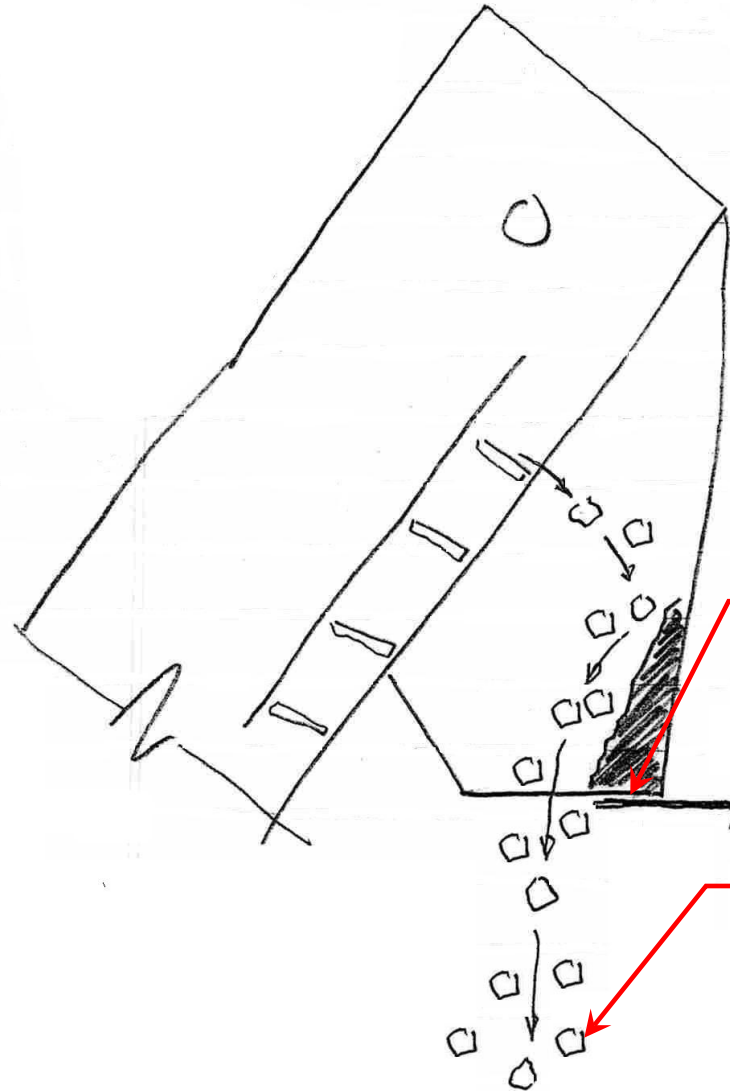
DONE

Segregation at the plant



More Course on One Side of the Truck
(always far side from drag)

How can we fix it?

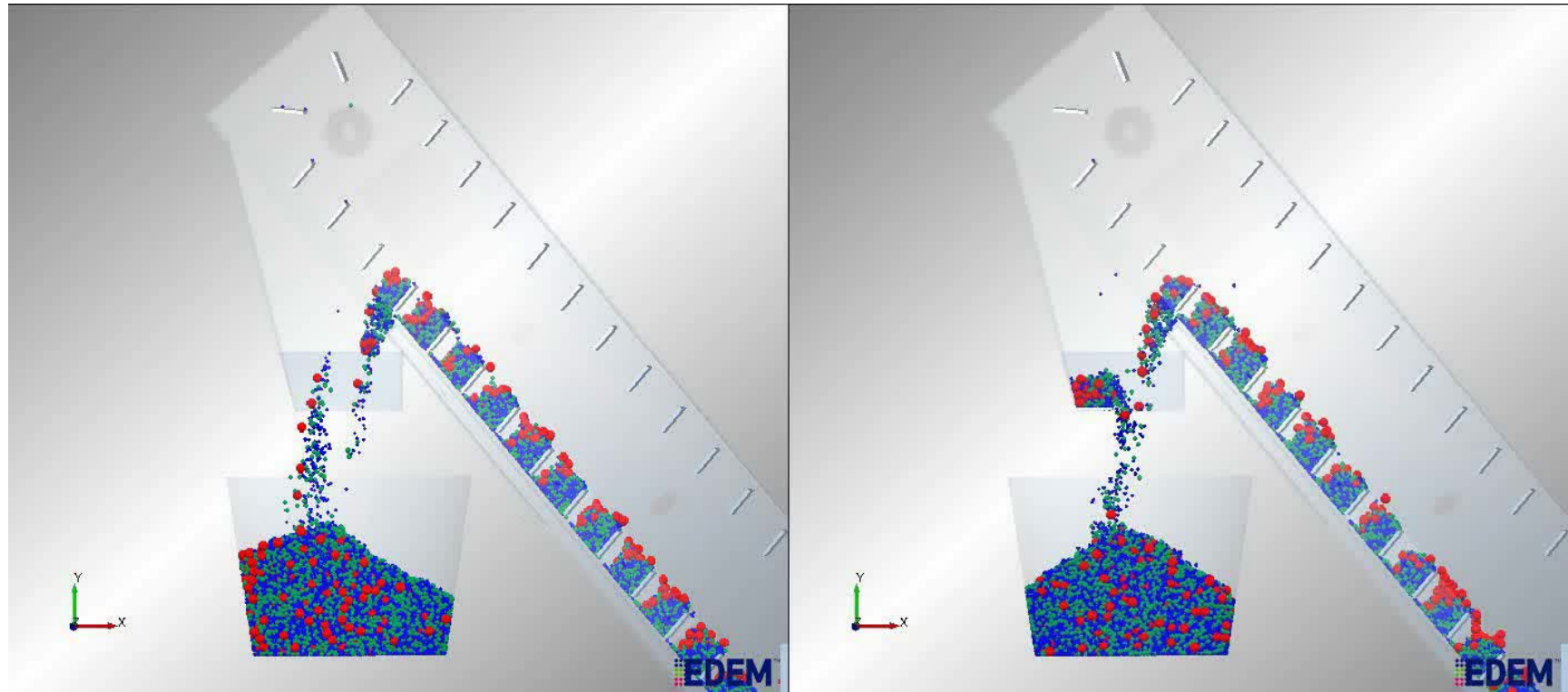


Blocking off 3" to 4" builds up a ramp.

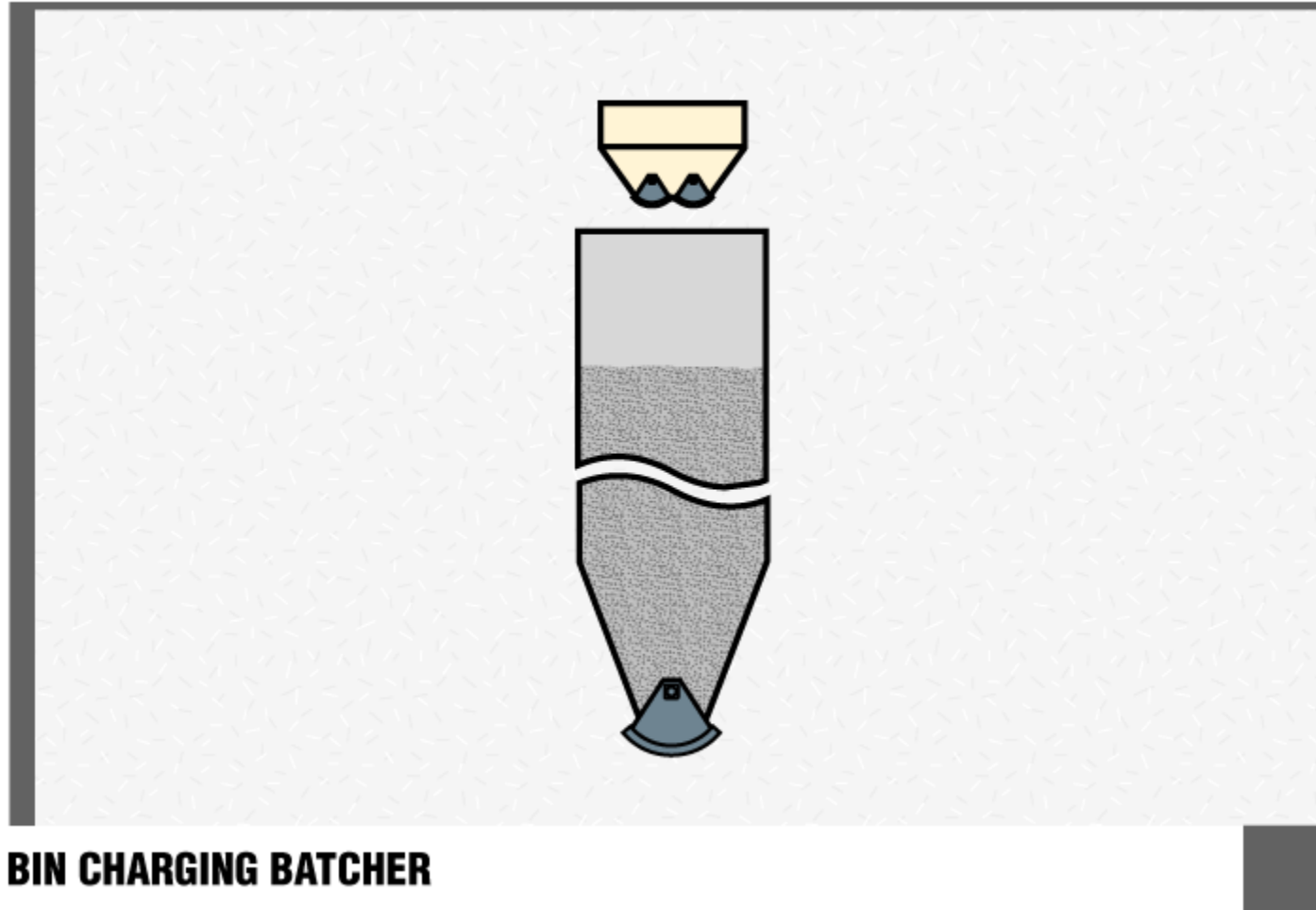
Slide the plate in and watch material in traverse or batcher.

DONE

Segregation at SEB Drag Discharge



Silo batcher – Purpose?



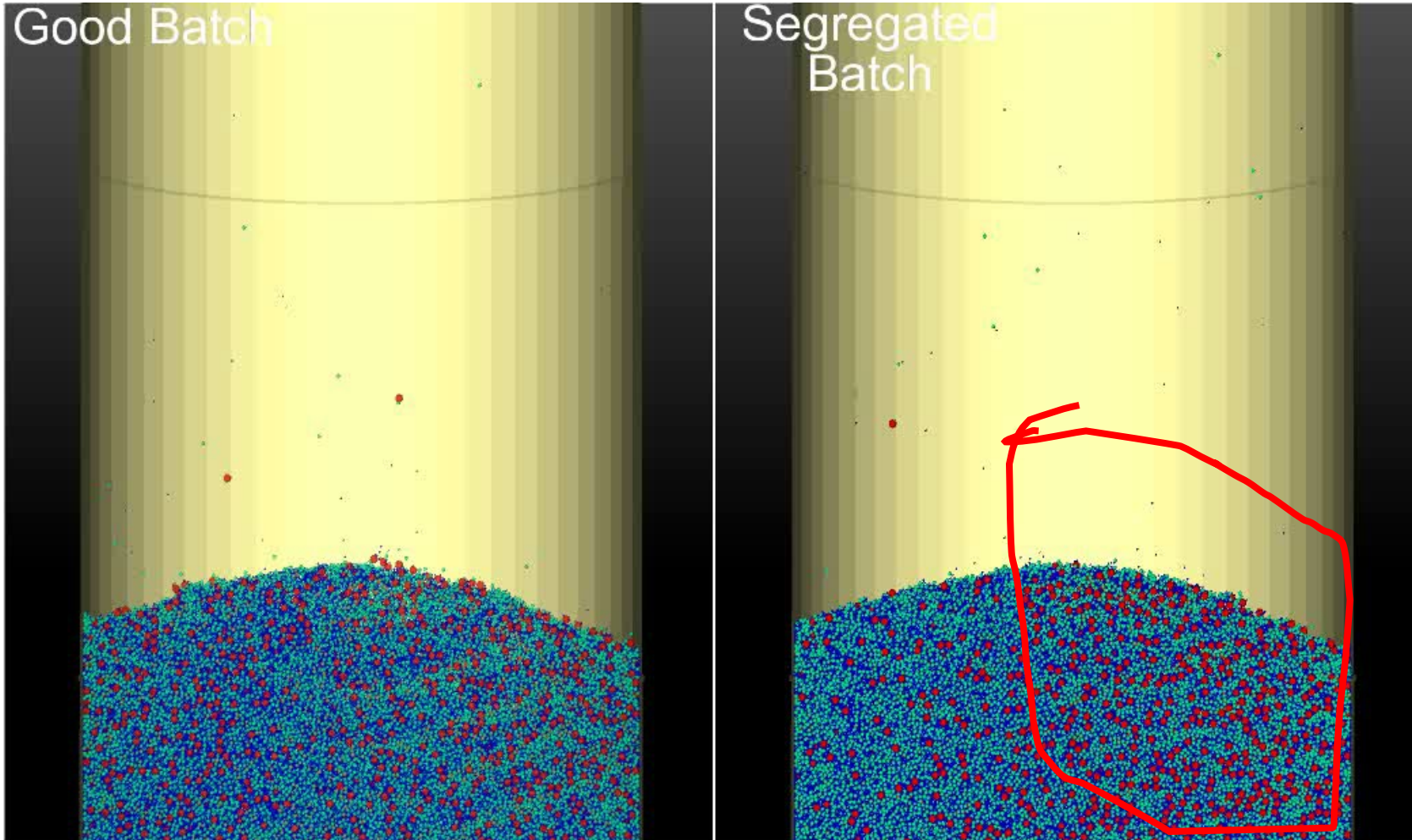
Effect of the batcher

The batcher can't fix segregation, but it can prevent segregation



Uniform mix in batcher

Segregated mix in batcher



Segregation Case Study



Savannah, GA 1987

Plant shut down with “end of load” segregation.

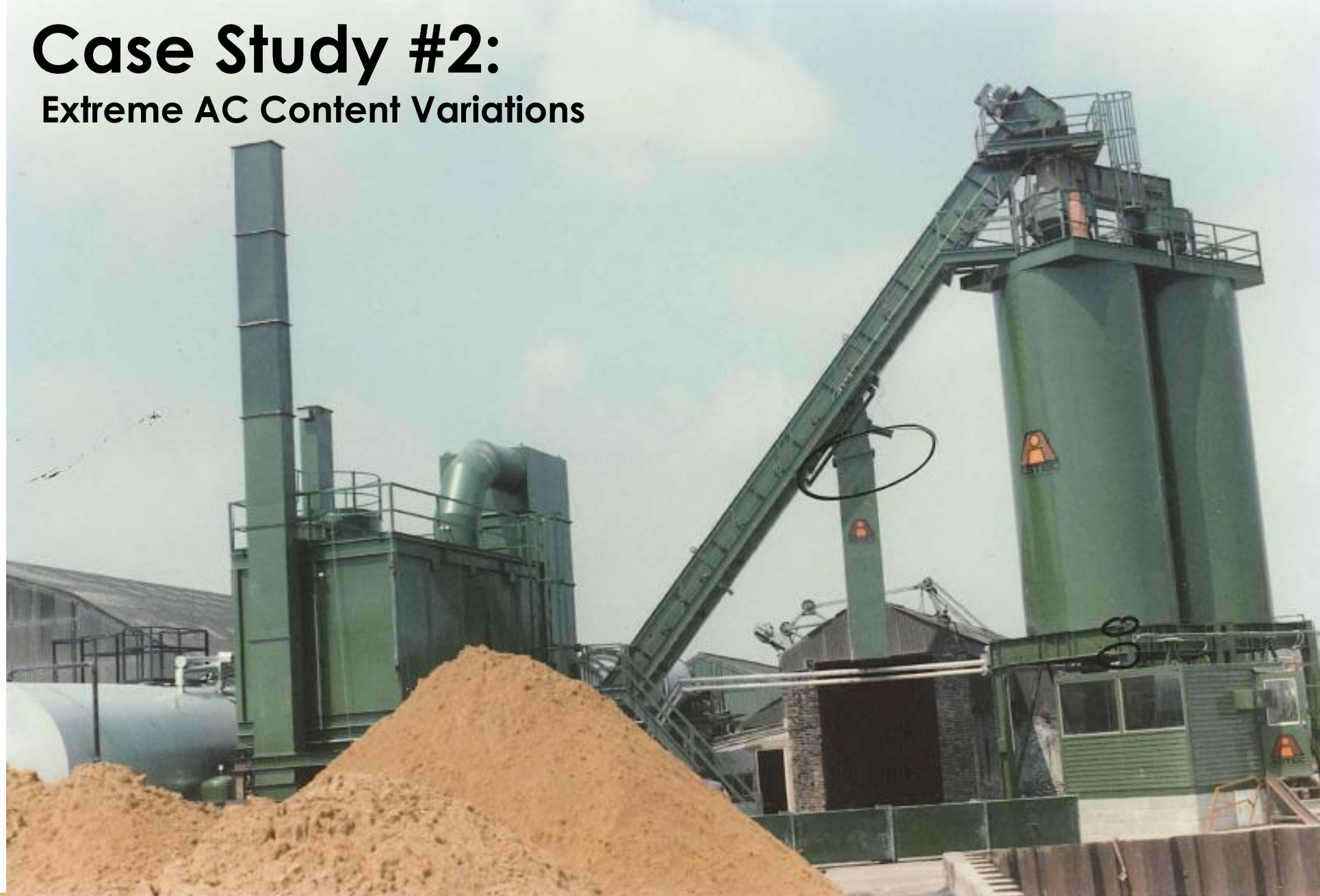
Savannah, GA 1987



- The batcher was replaced with a larger batcher.
- The mix did not segregate at the transfer points.
- The difference was remarkable.

Case Study #2:

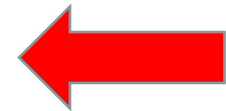
Extreme AC Content Variations



Case Study : London 1986



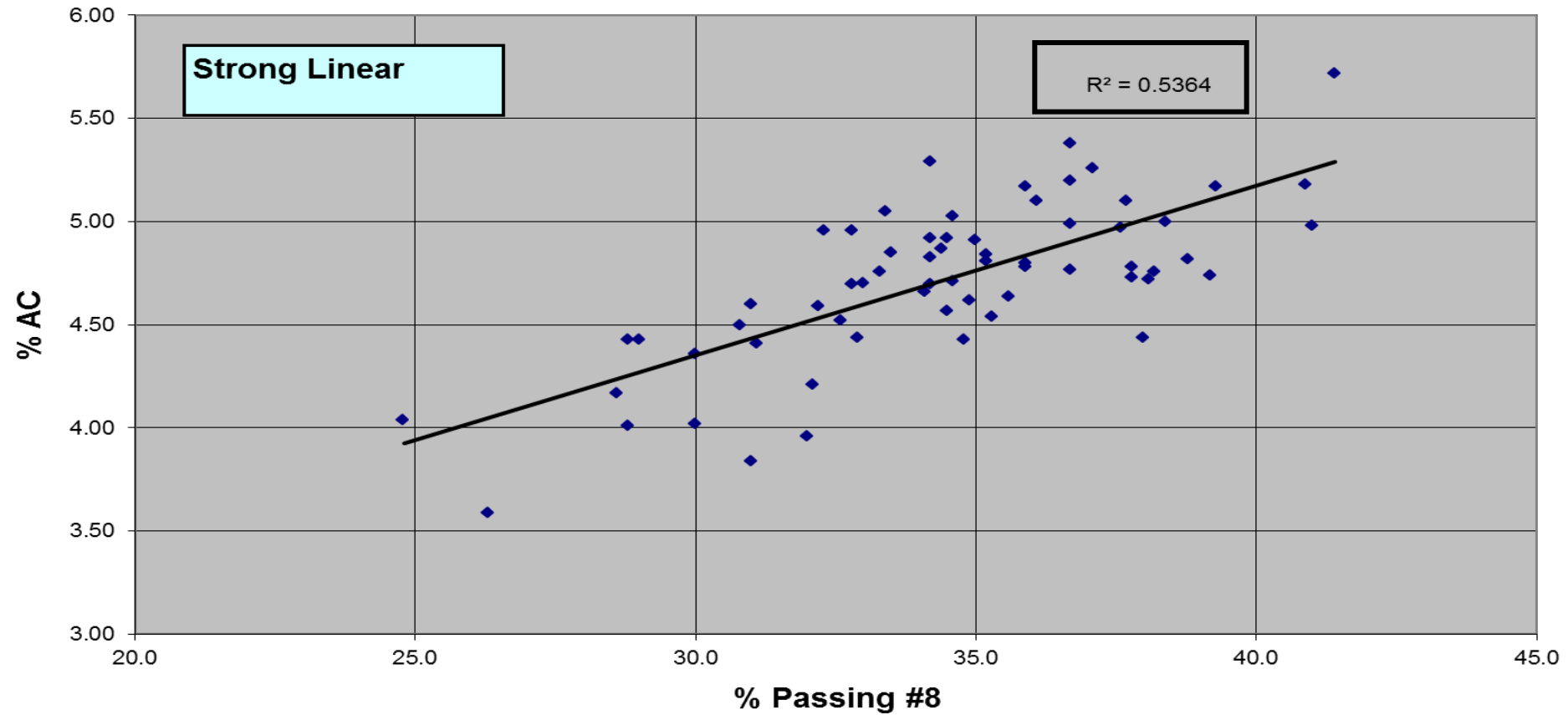
- **AC content variations shut the plant down**
- Very large aggregate mix
- AC system and weigh bridges recalibrated
- Don Brock graphed %AC vs. % minus number 8 sieve
- Saw that coarse samples were low on AC and fine samples were high on AC (linear data)



It's all about surface area



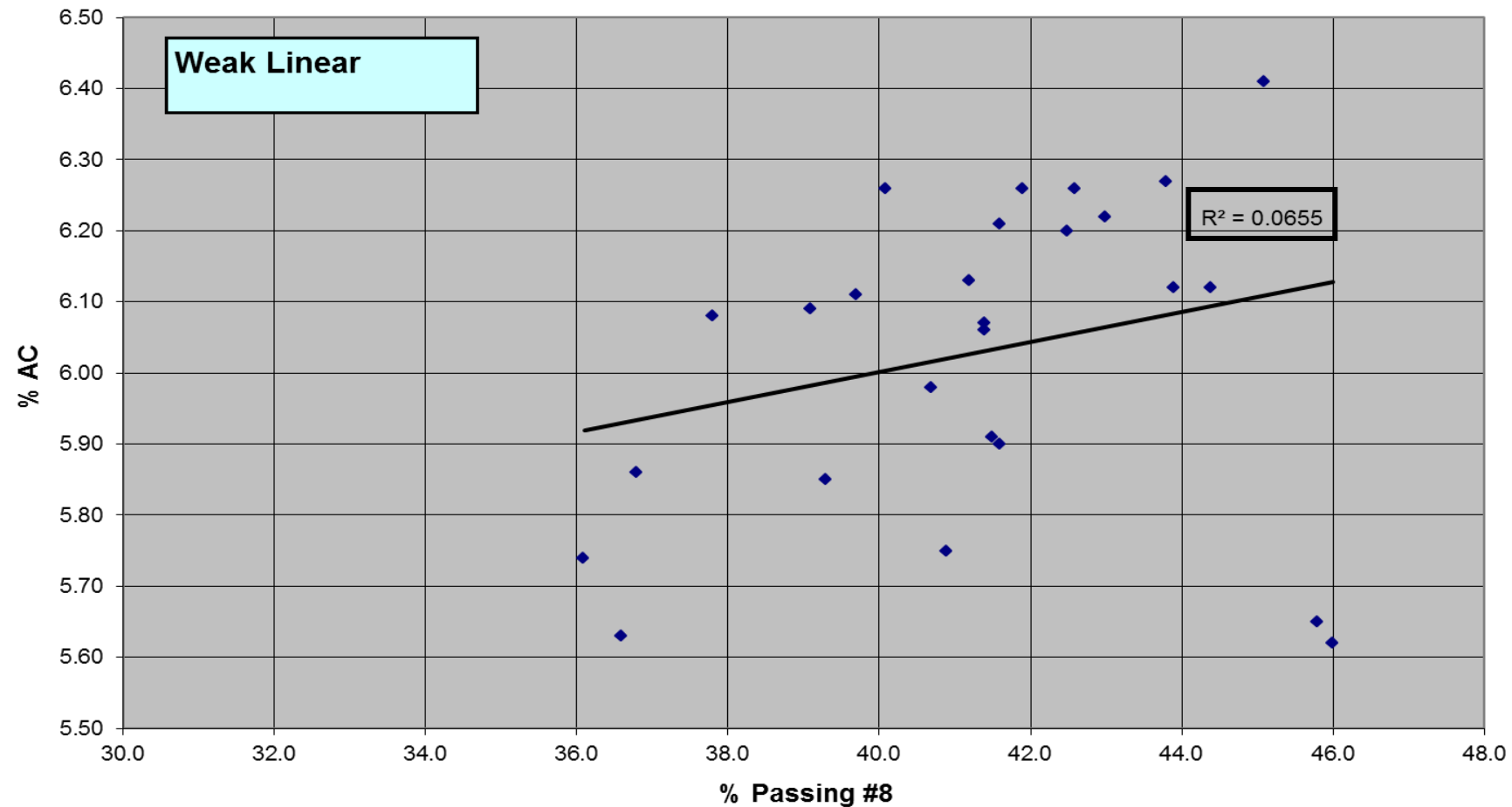
**% AC vs %-#8 sieve
Data from Mix 2**



It's all about surface area



**% AC vs. %-#8 Sieve
Data from Mix 3**



Chute added to straighten mix flow

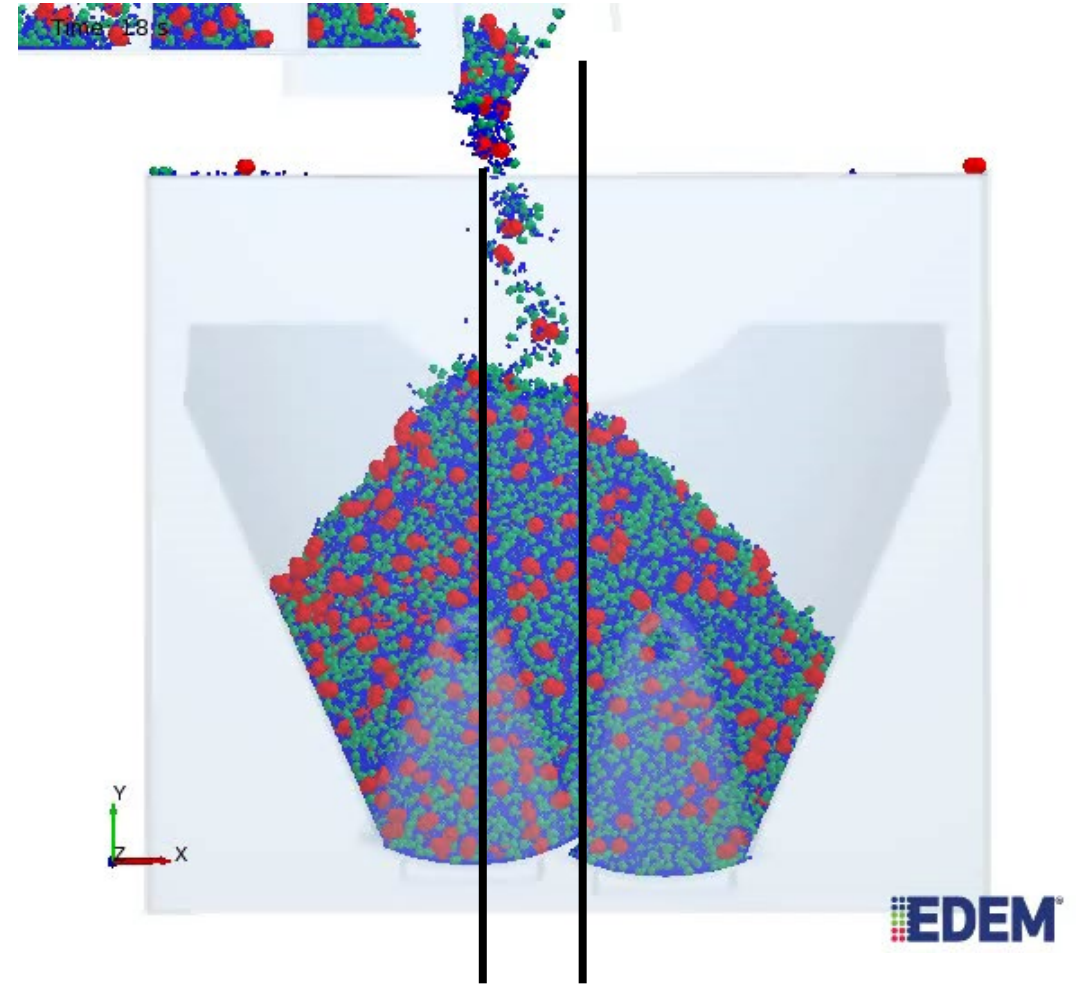
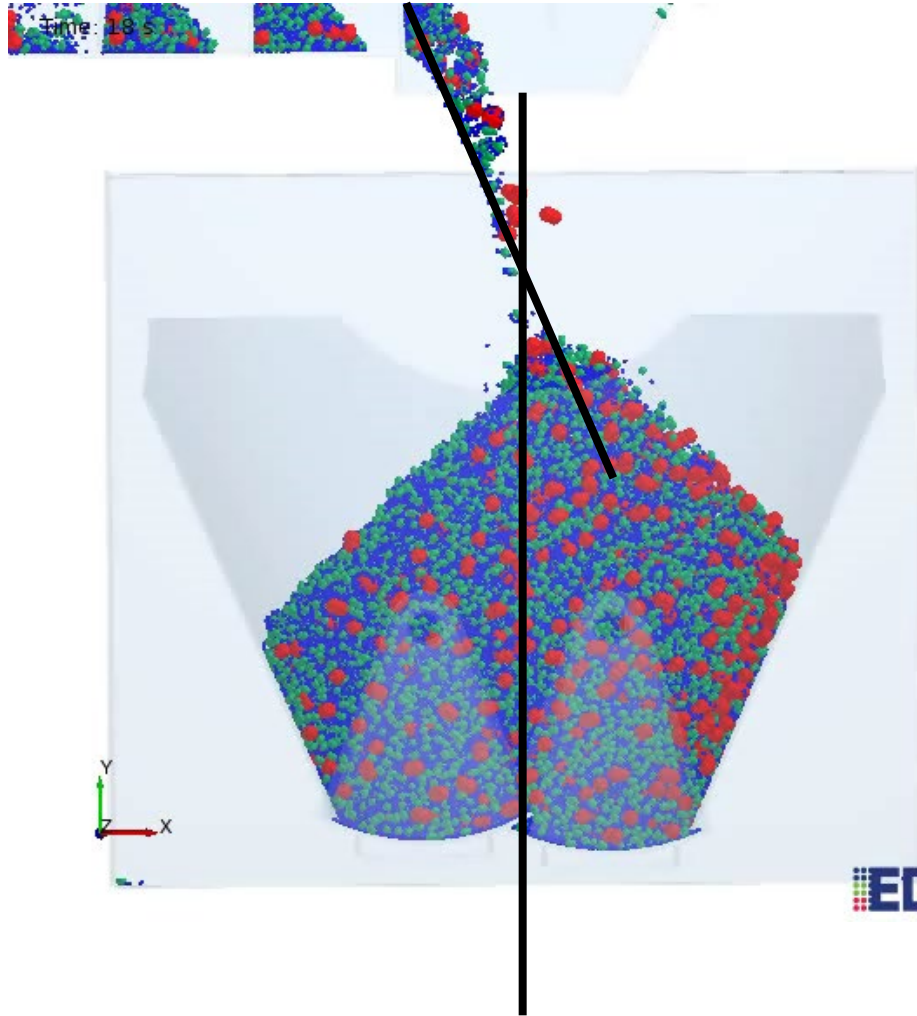


Case Study: London 1986

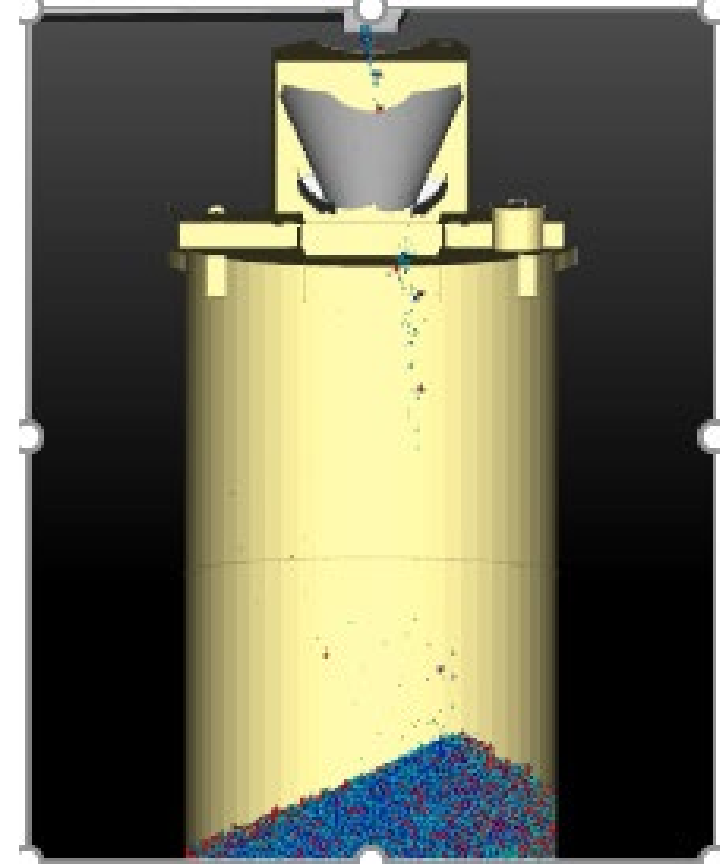
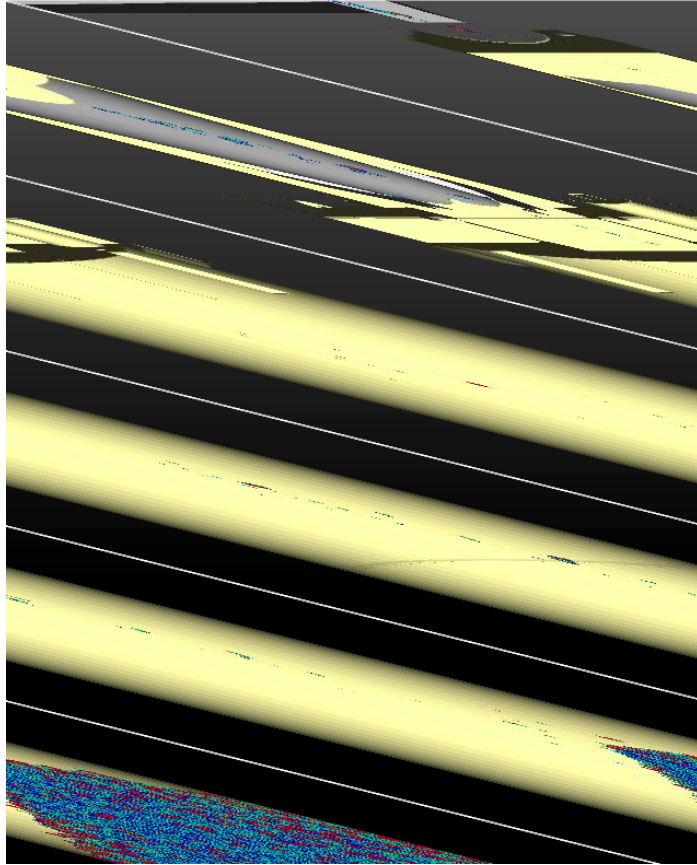


When the flow into the batchers was forced **straight** down into the **center**, the AC content did not vary.

Off-set batcher loading



Batcher gates held open



Maintenance Matters



Caused by batcher gate wear

Critical Batcher Rules To Remember



- Make the batch as **large** as possible.
- Load the batcher in the **center**.
- The mix must flow **straight** down.
- Close the gates on **8"** of mix.

Truck loading is critical



Truc loading is critical



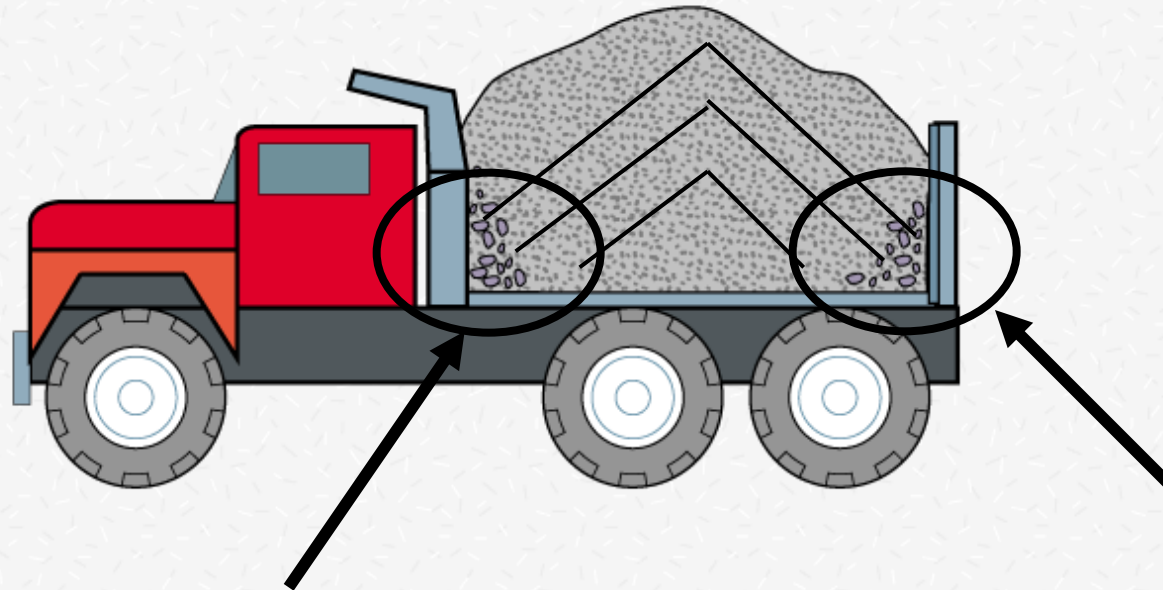
“End of the Load” coarse aggregate
How Did it Get There?

Truck loading is critical



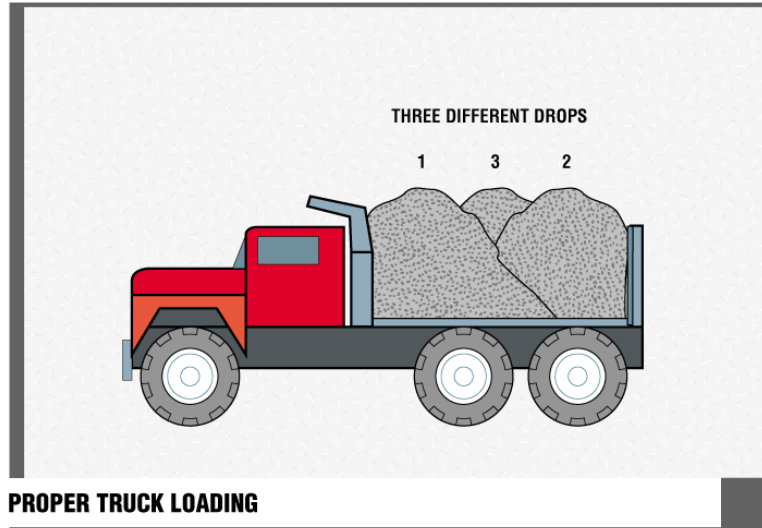
Larger aggregate will roll off into the corners of the truck bed and cause end-of-load segregation.

SINGLE DROP



IMPROPER TRUCK LOADING

Truck loading is critical





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physically connects the world.



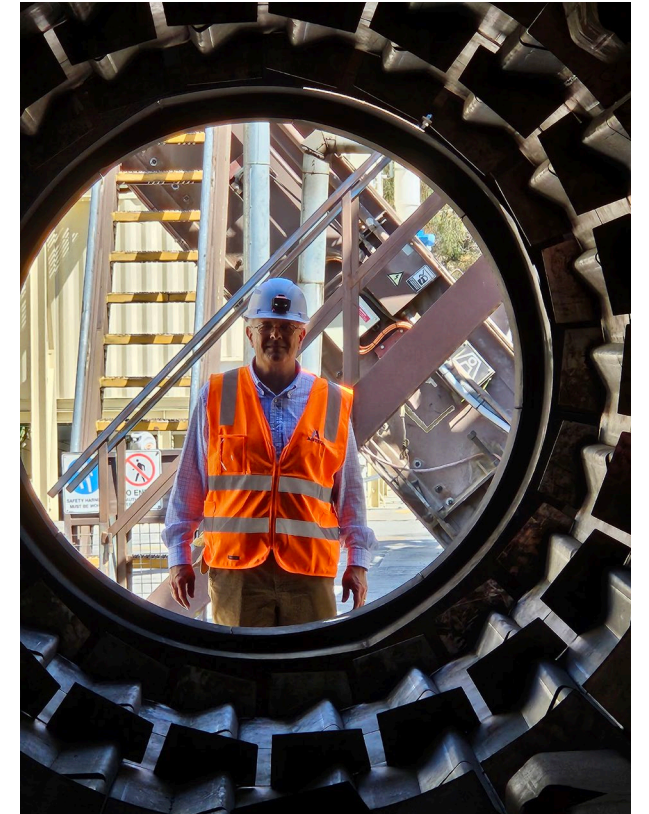
Scan to learn more





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Thank You!





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