Drum Mix Plant Equipment and Operations [Presentation Slides]

Access Copy

March 2024

35mm slides originally created for

TxDOT Research Project 0-440

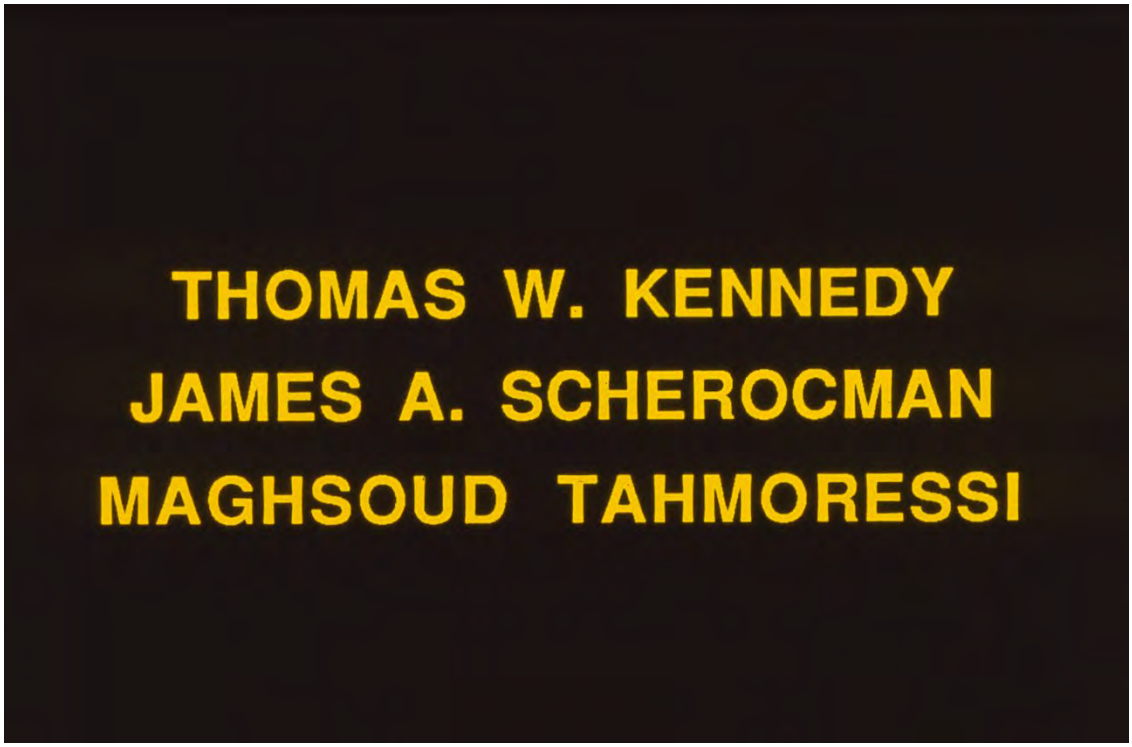
"Evaluation and Training Related to Drum Mix Plants"

Sponsoring Agency: Texas State Department of Highways and Public Transportation
Performing Agency: Center for Transportation Research, The University of Texas at Austin
Report Date: November 1986

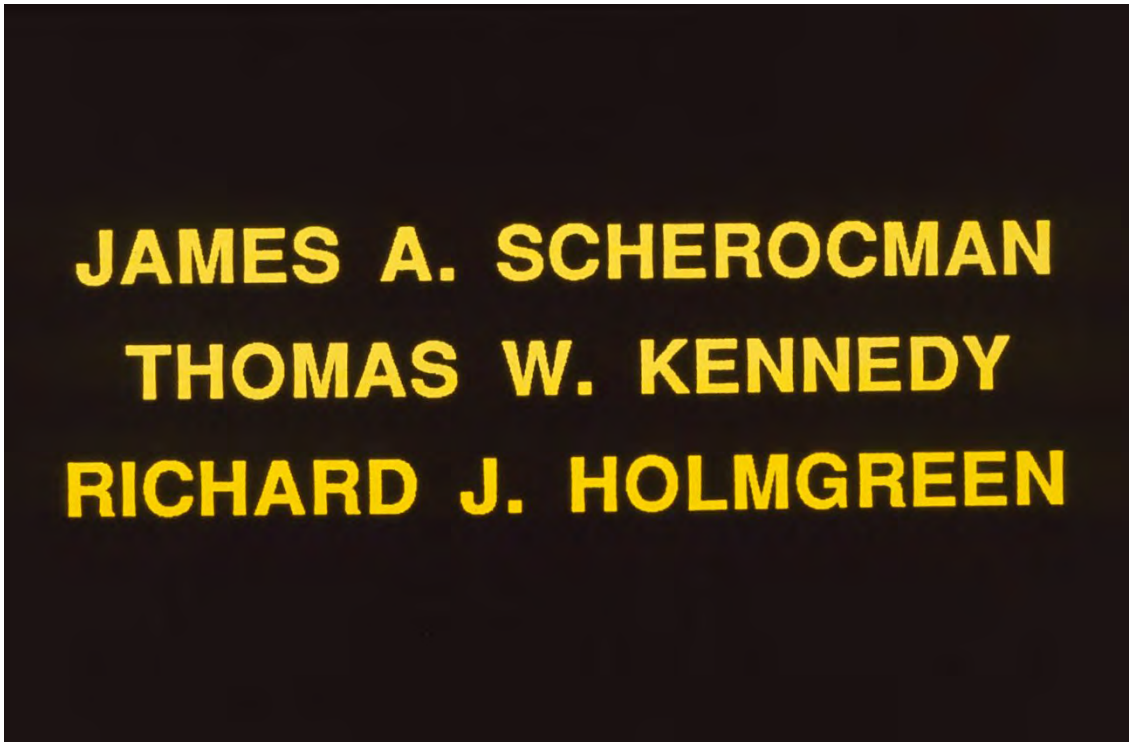
Table of Contents

Introduction. Drum Mix Plant Equipment and Operations

Slide 1



Slide 2

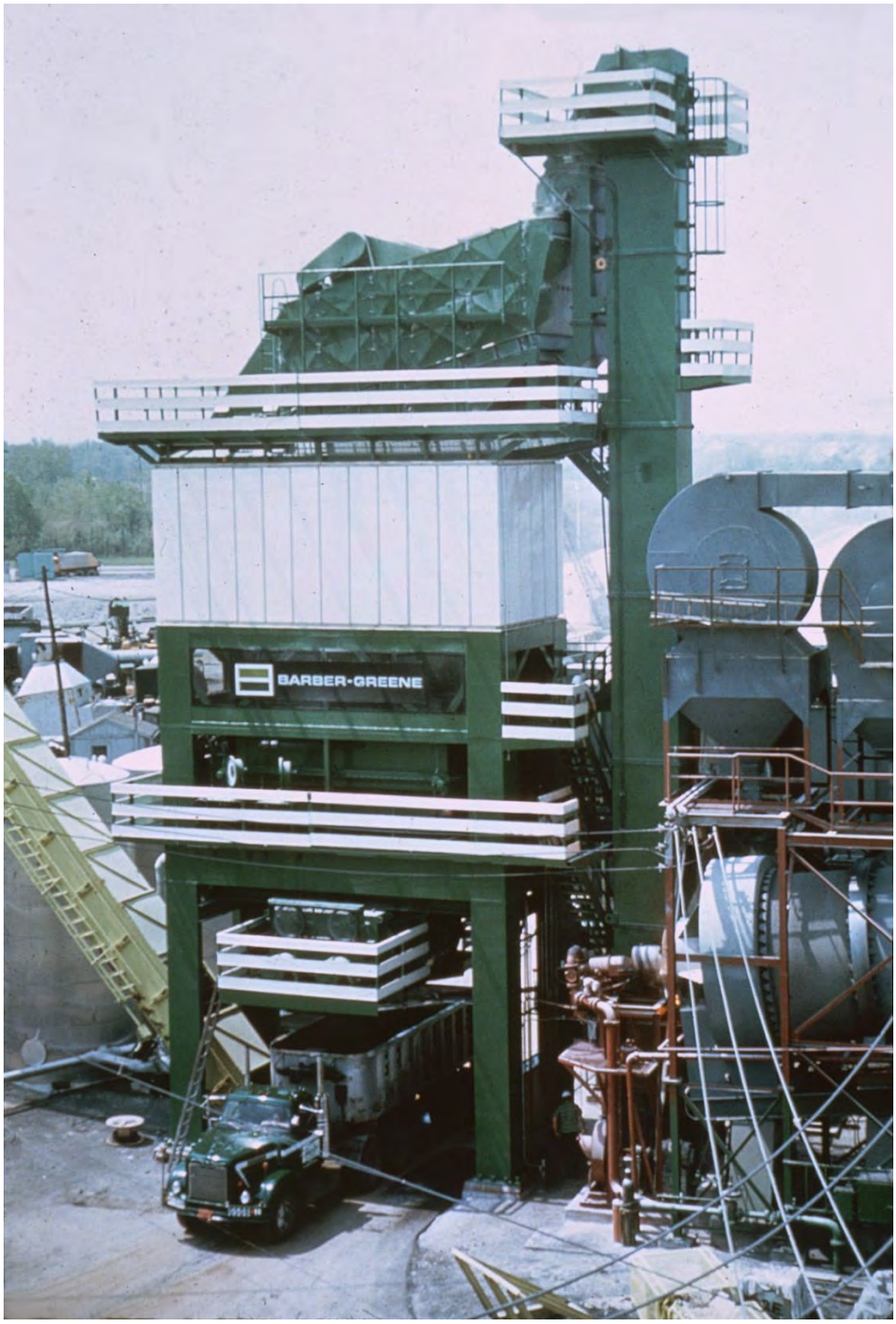


Slide 3

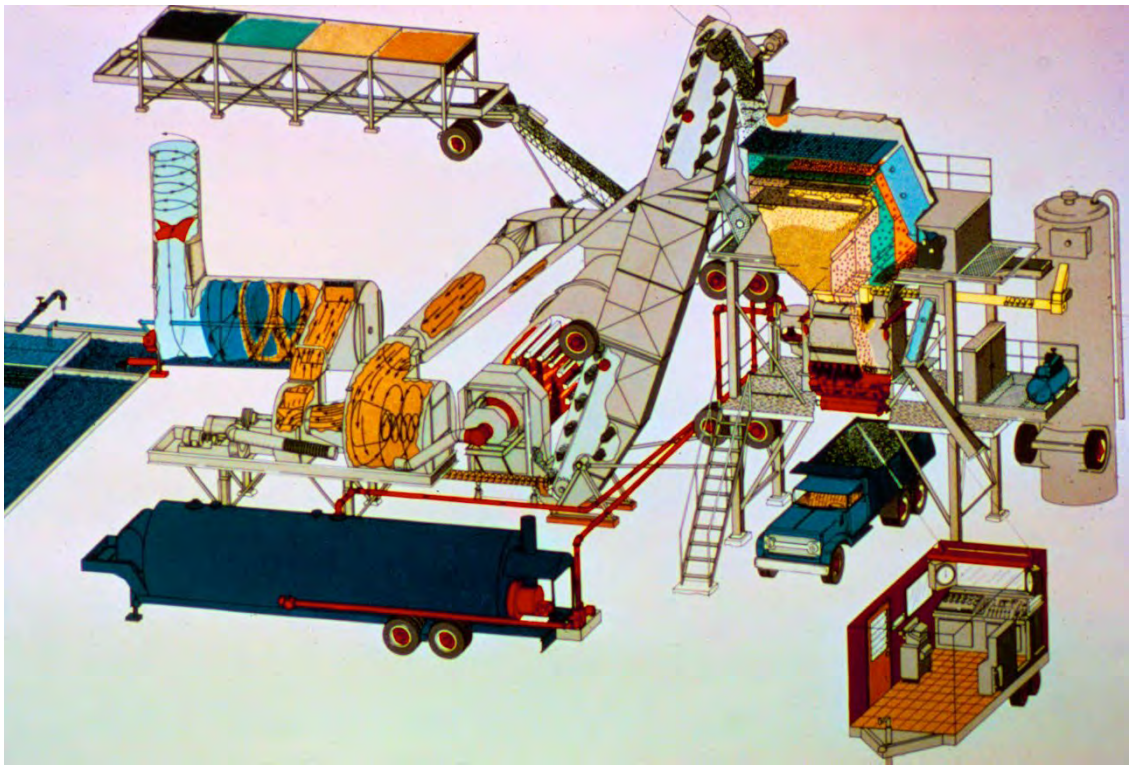
Slide 4. Asphalt Plants

Slide 5. Asphalt Plants [Types]

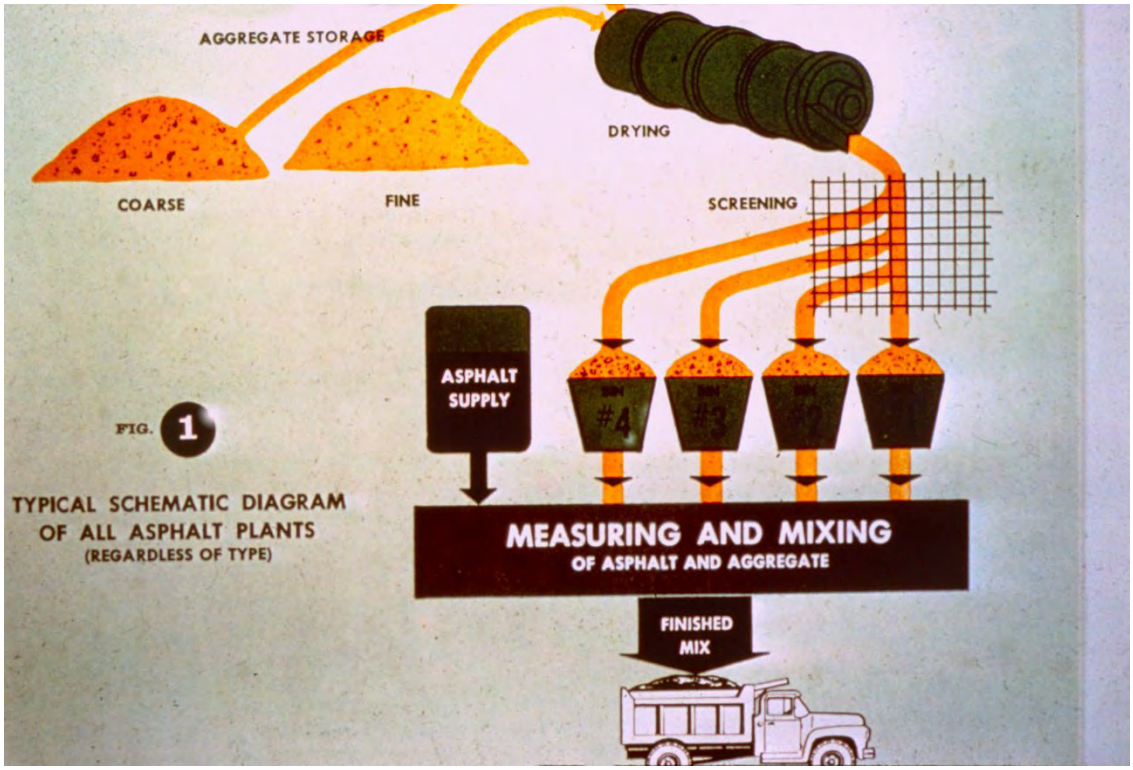
Slide 6. Batch Plant



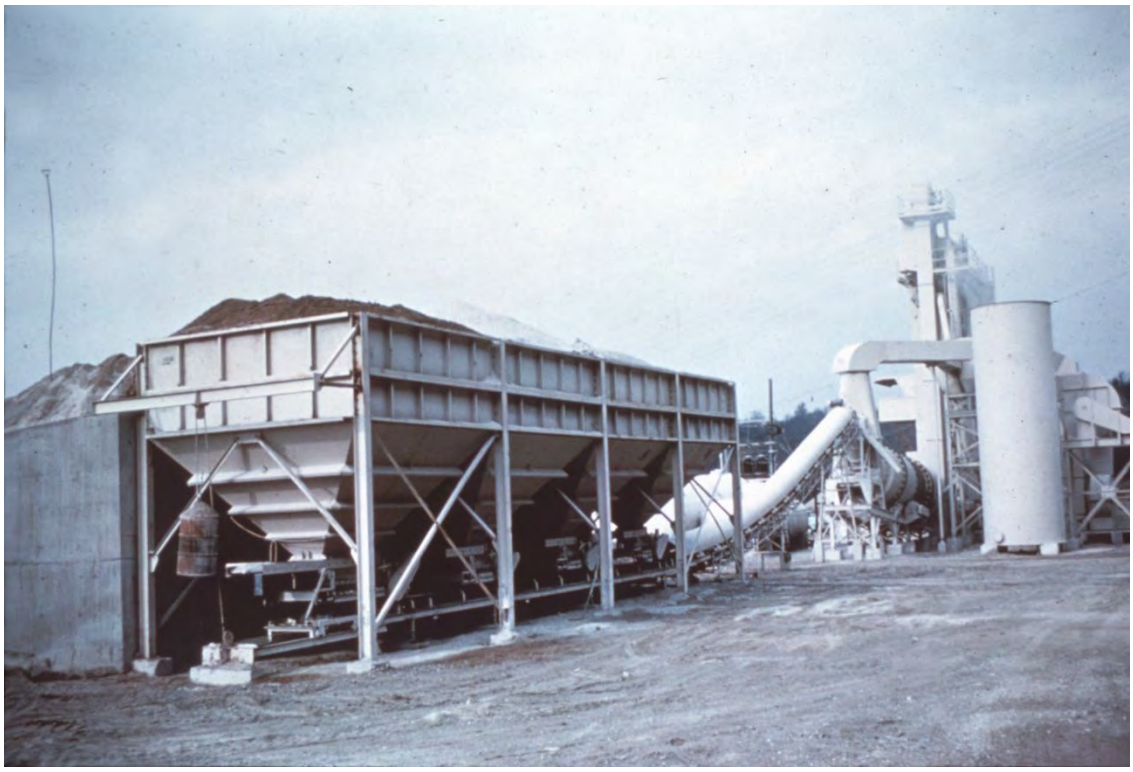
Slide 7



Slide 8

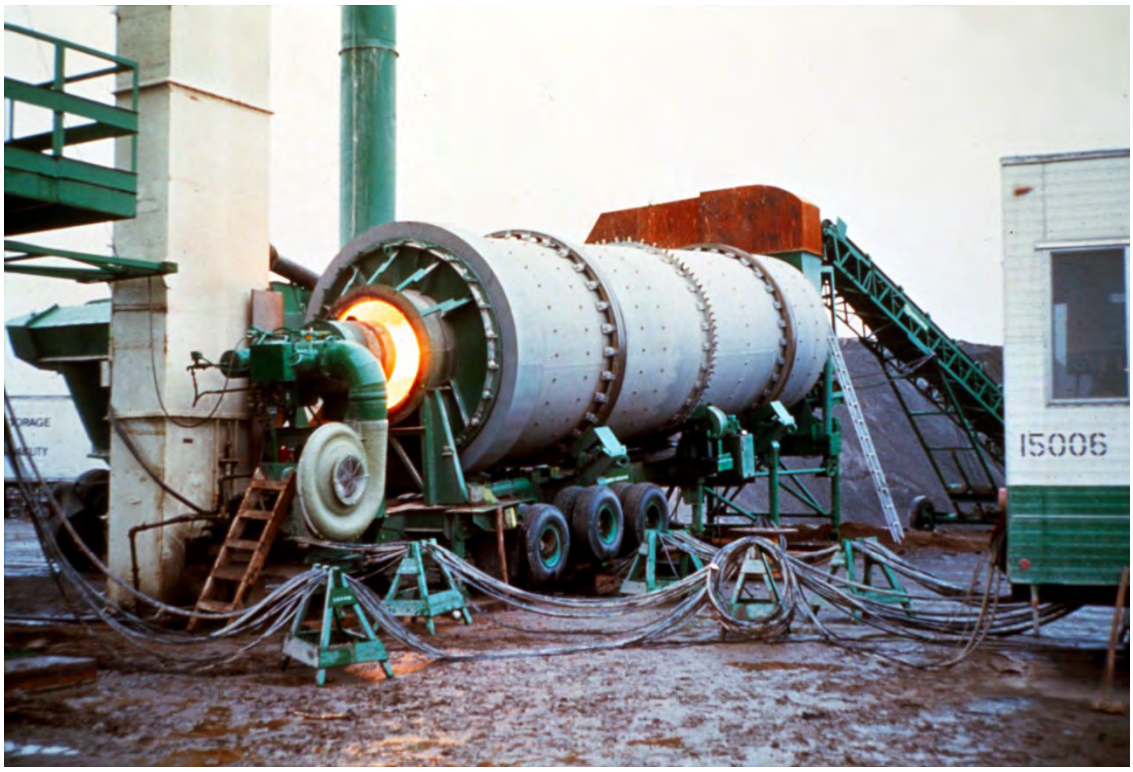


Slide 9. Typical Schematic Diagram of All Asphalt Plants (Regardless of Type)

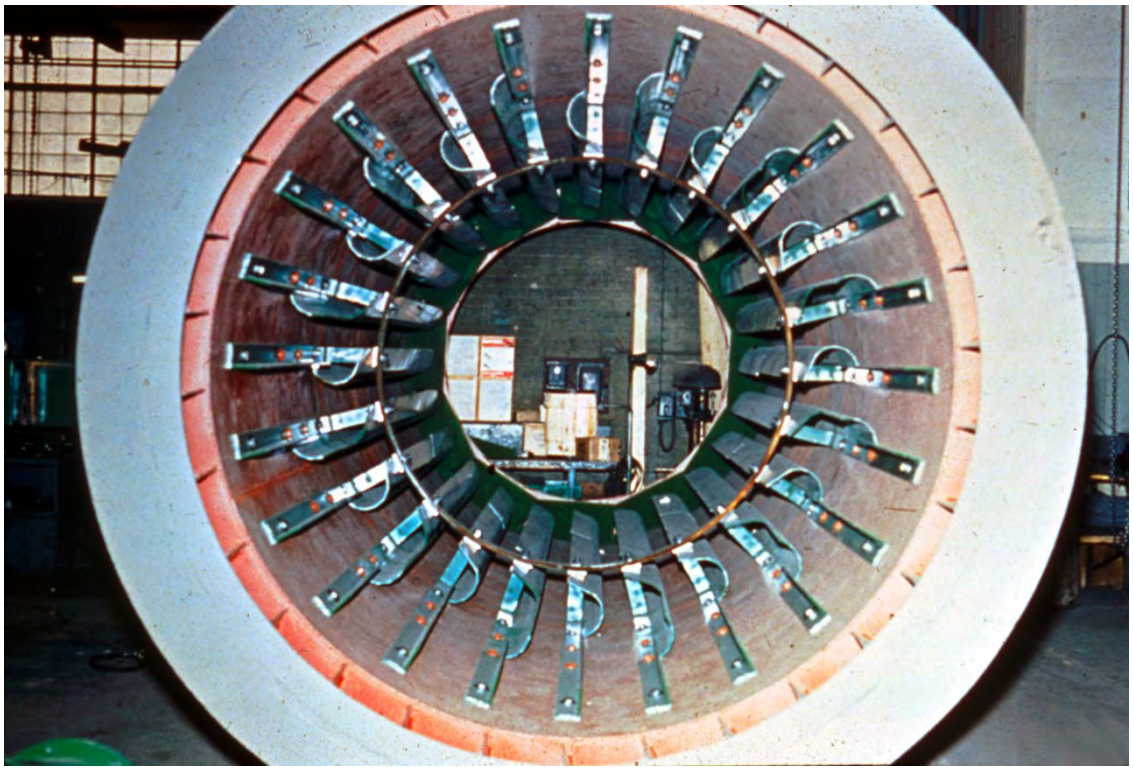


Slide 10

Slide 11

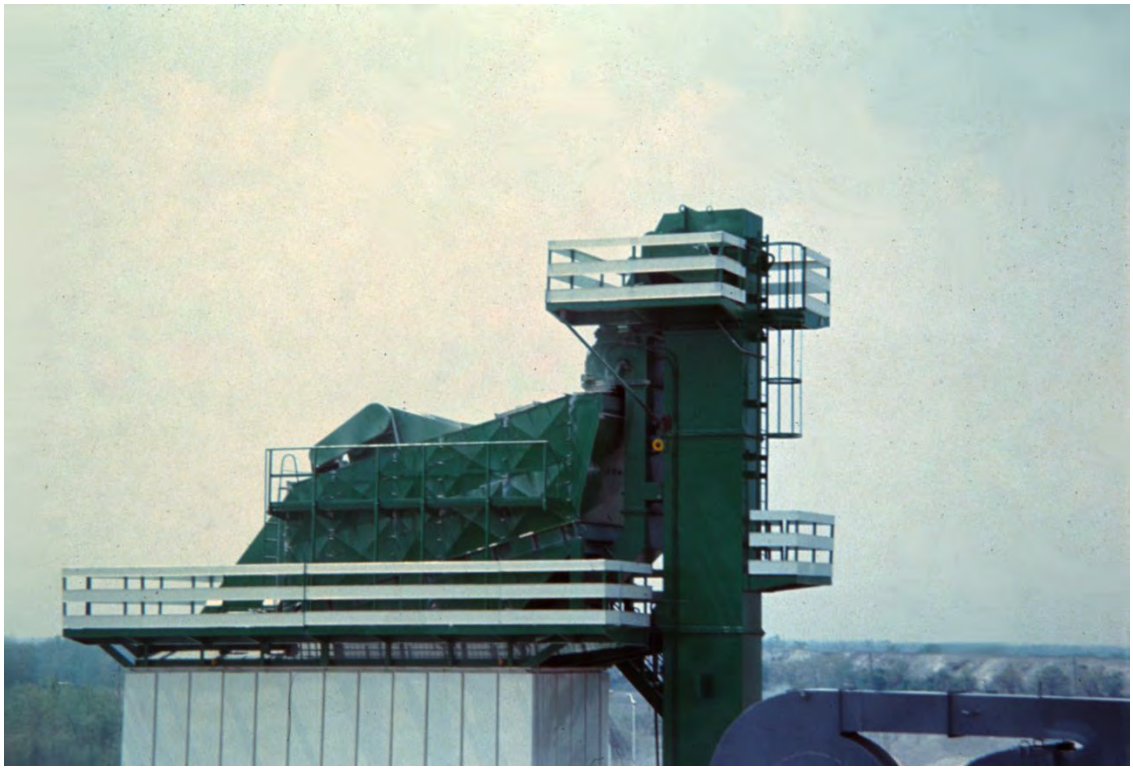


Slide 12

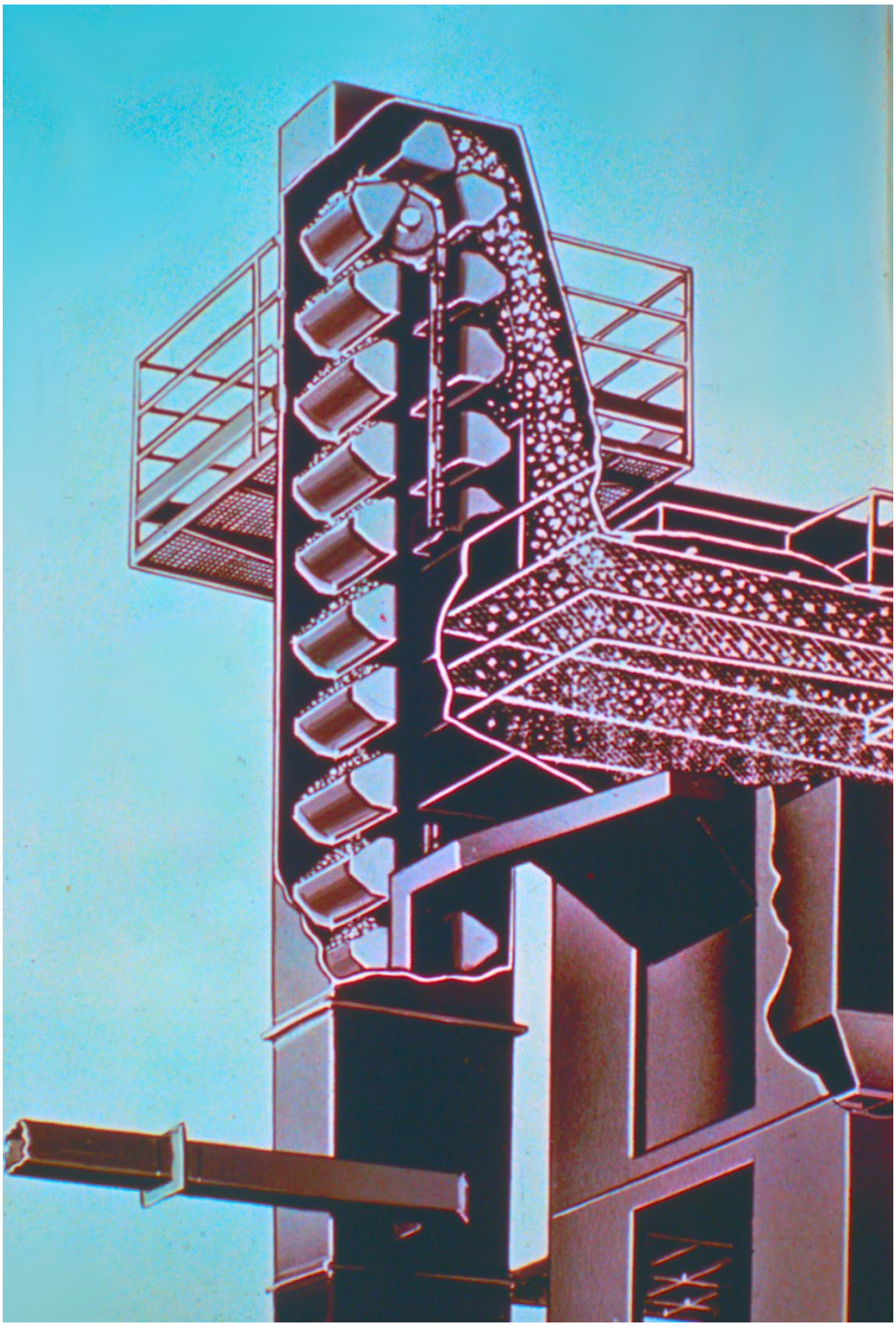


Slide 13

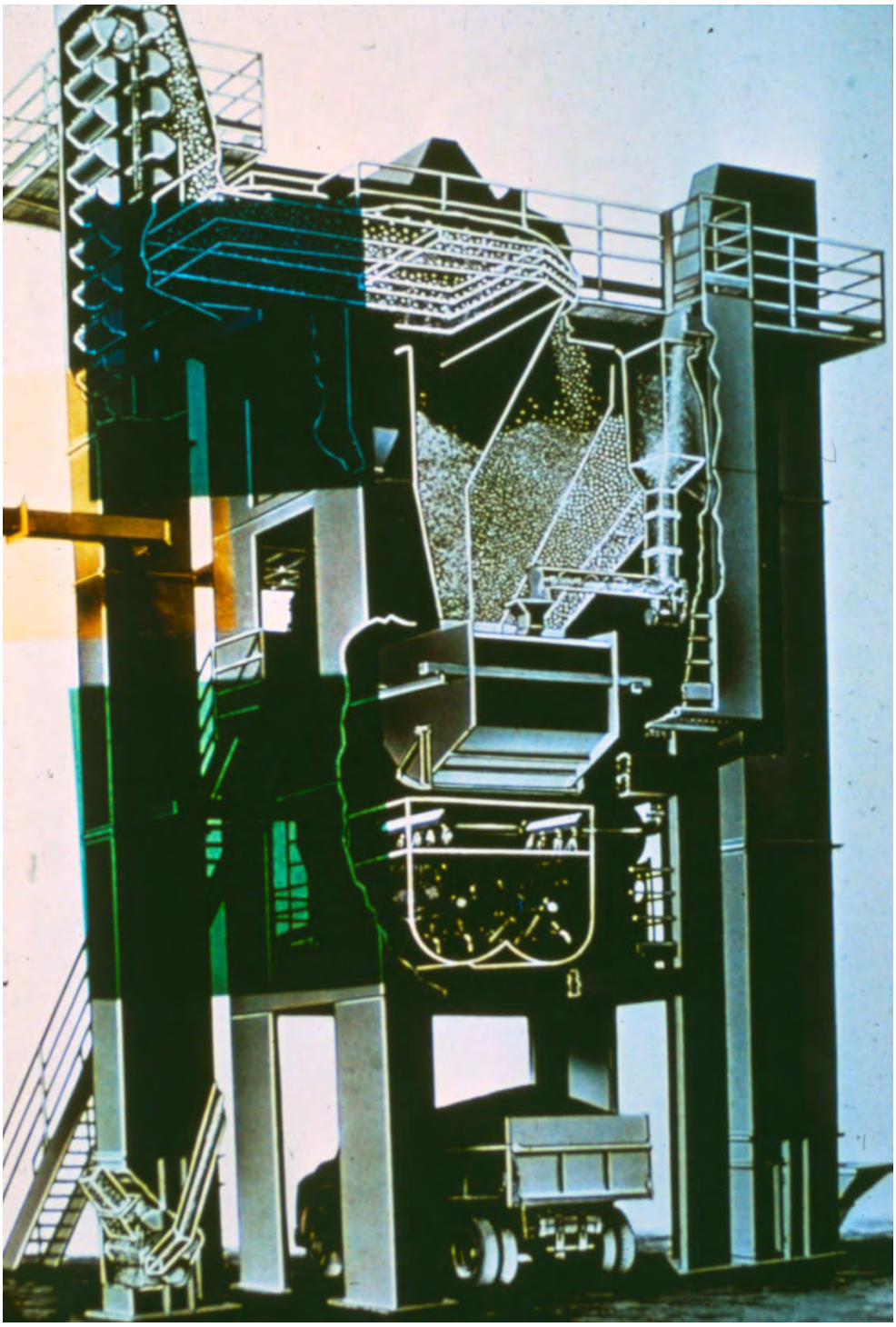
Slide 14



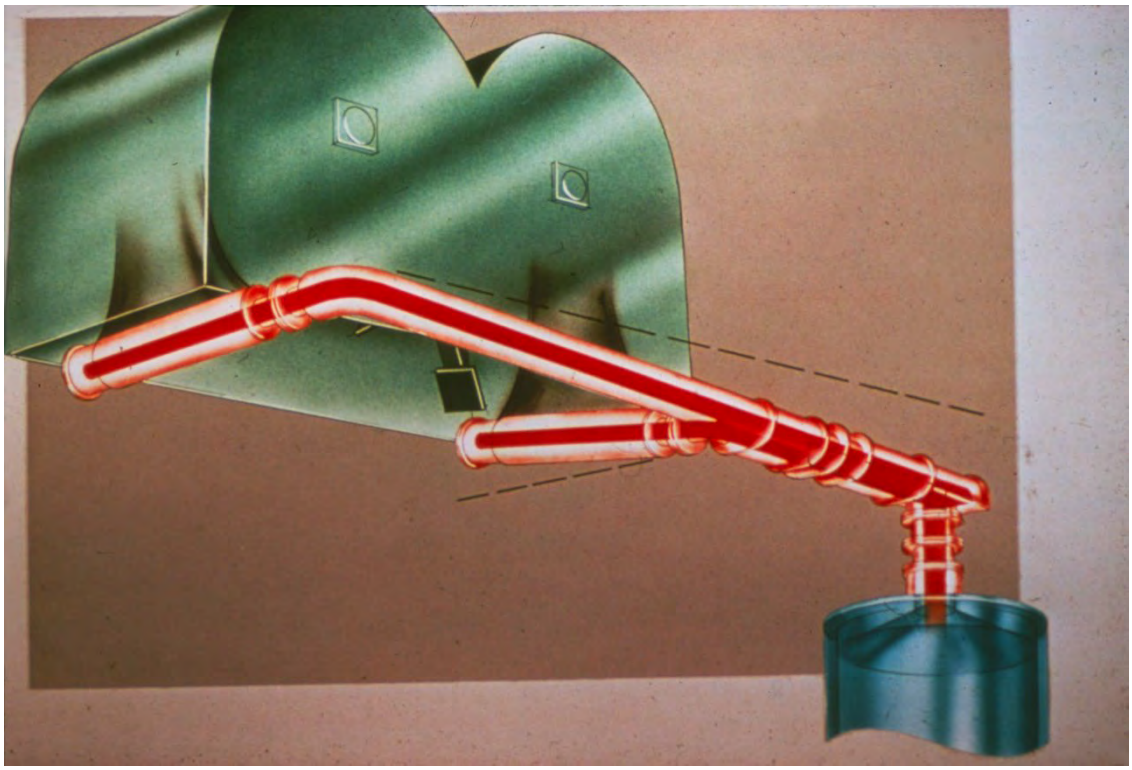
Slide 15



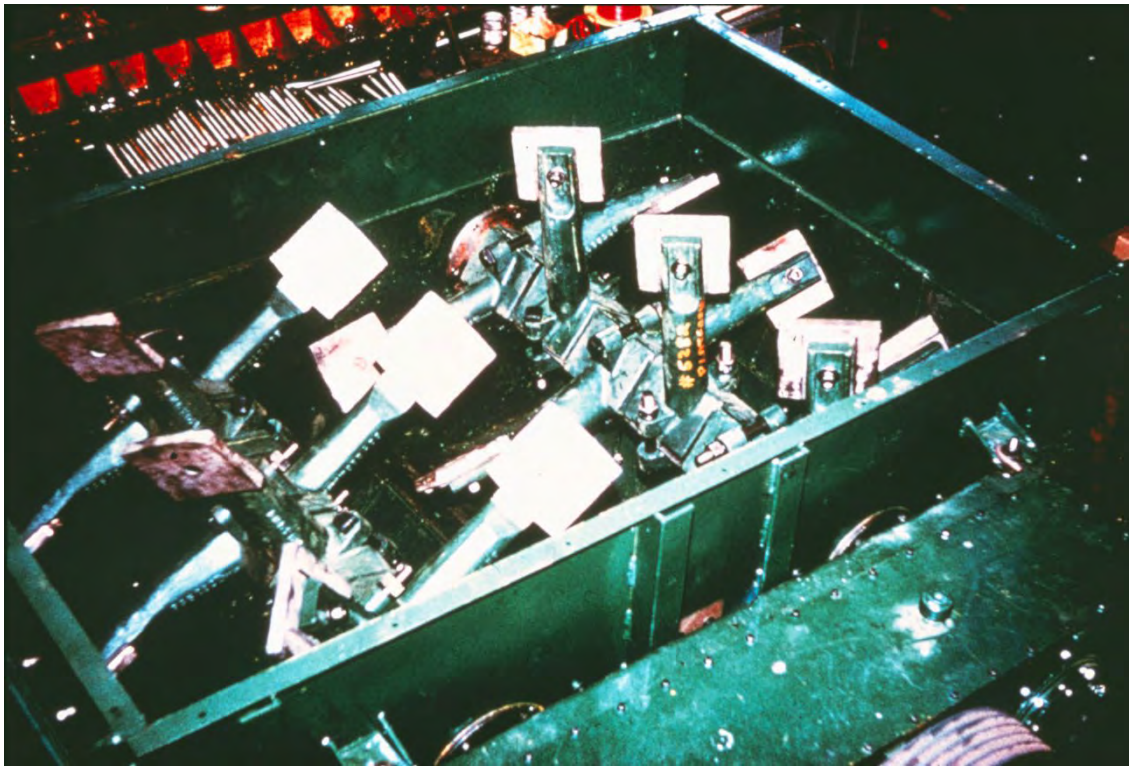
Slide 16



Slide 17



Slide 18



Slide 19

Slide 20

Slide 21

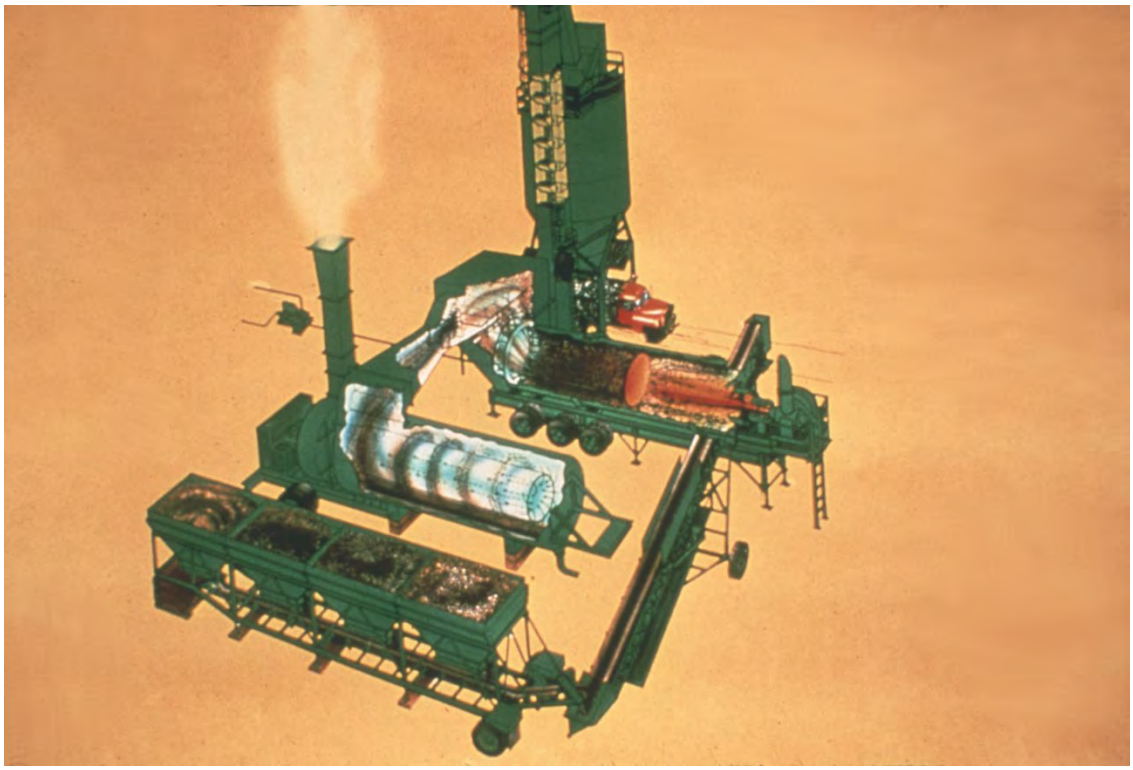
Slide 22. Continuous Mix Plant

Slide 23

Slide 24. Drum Mix Plant

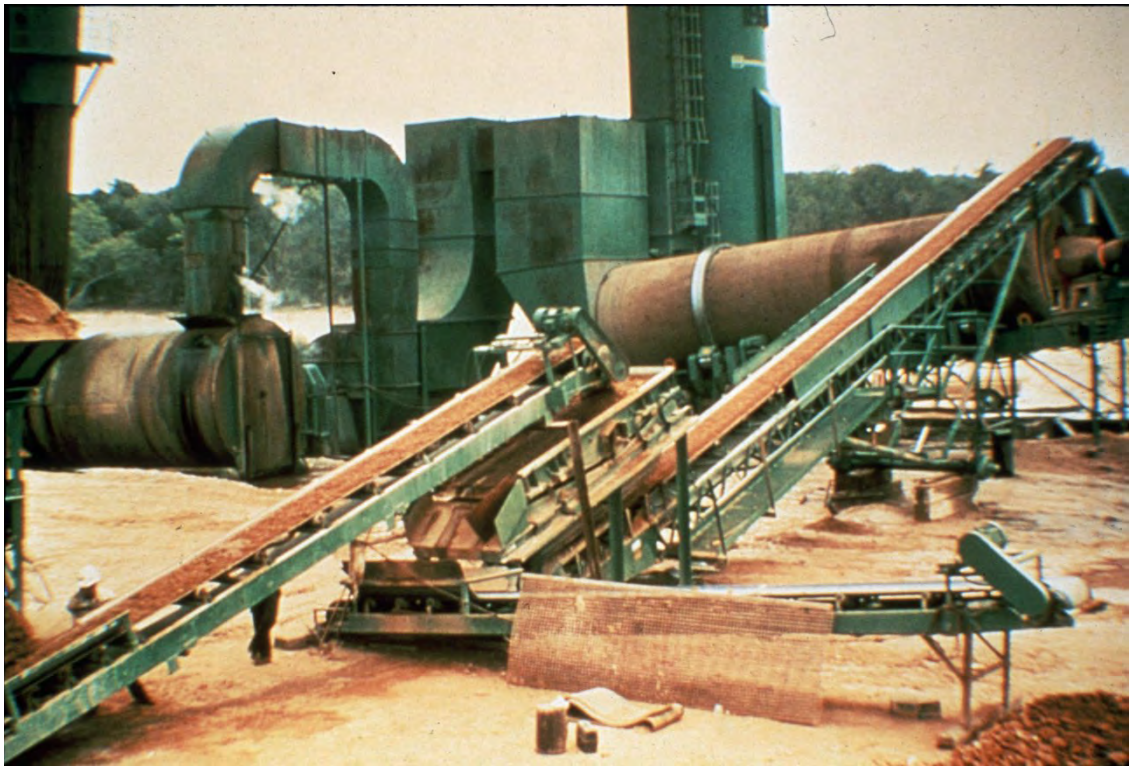
Slide 25

Slide 26. Drum Mix Plants [System Types]

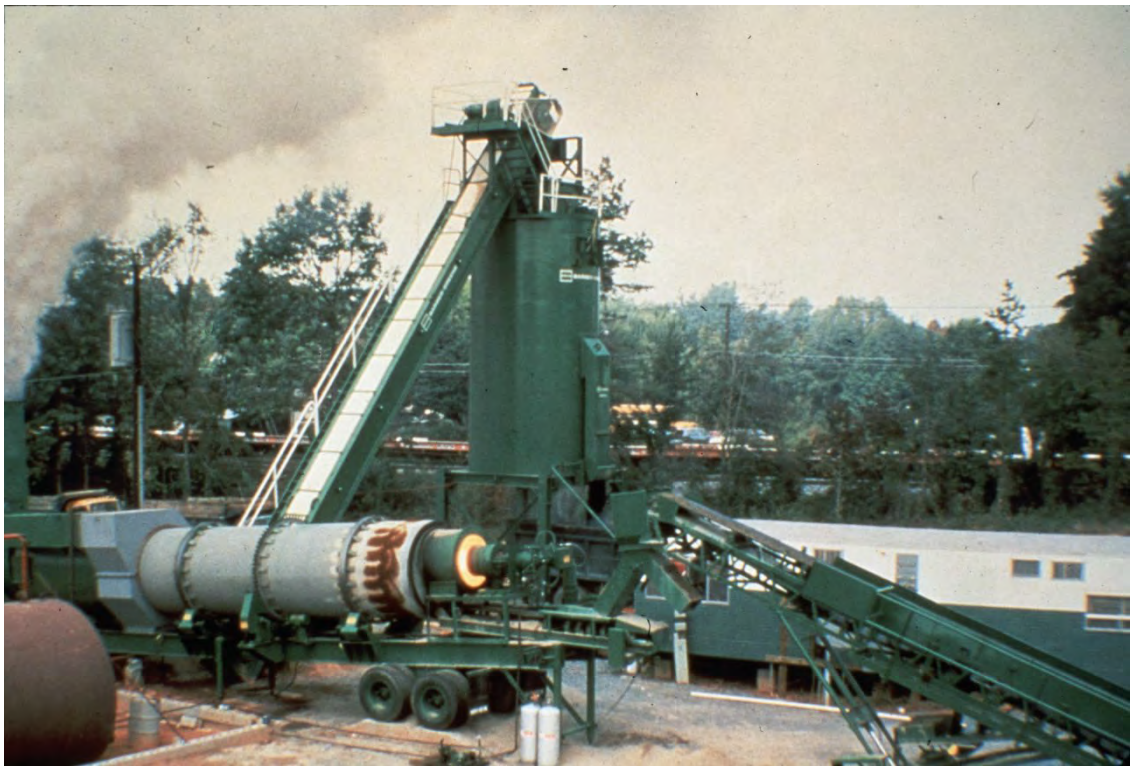


Slide 27

Slide 28

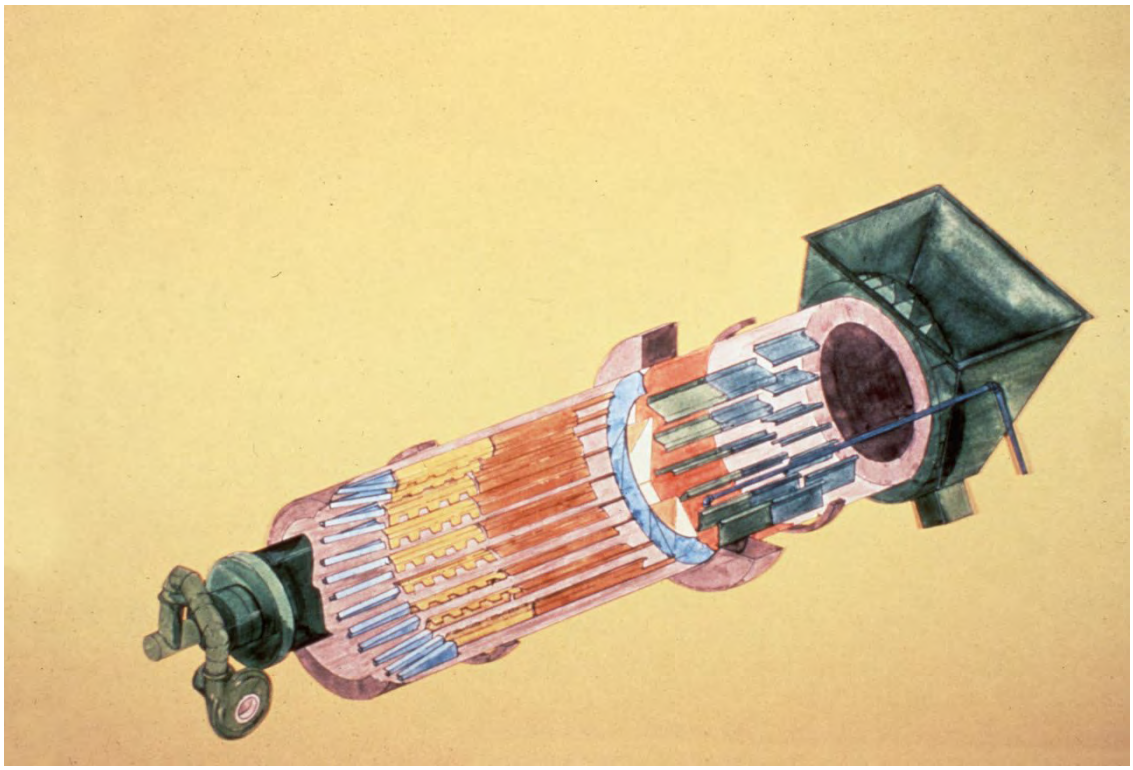


Slide 29



Slide 30

Slide 31



Slide 32

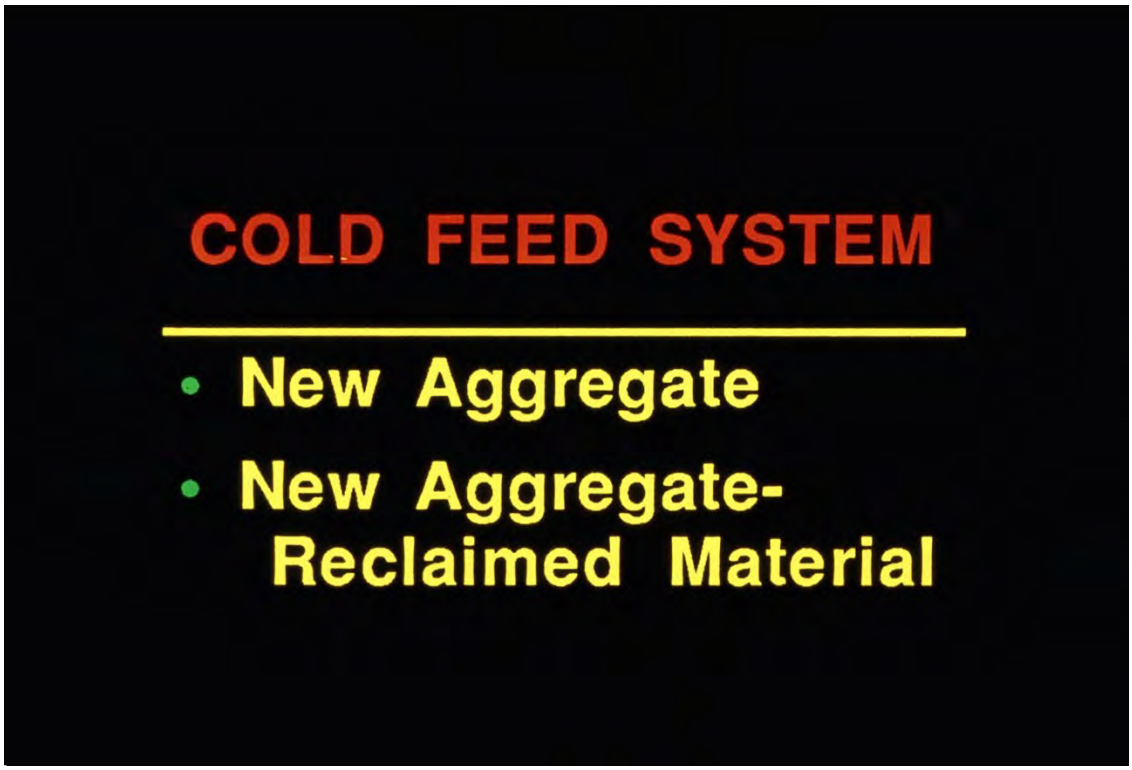
Slide 33

Slide 34

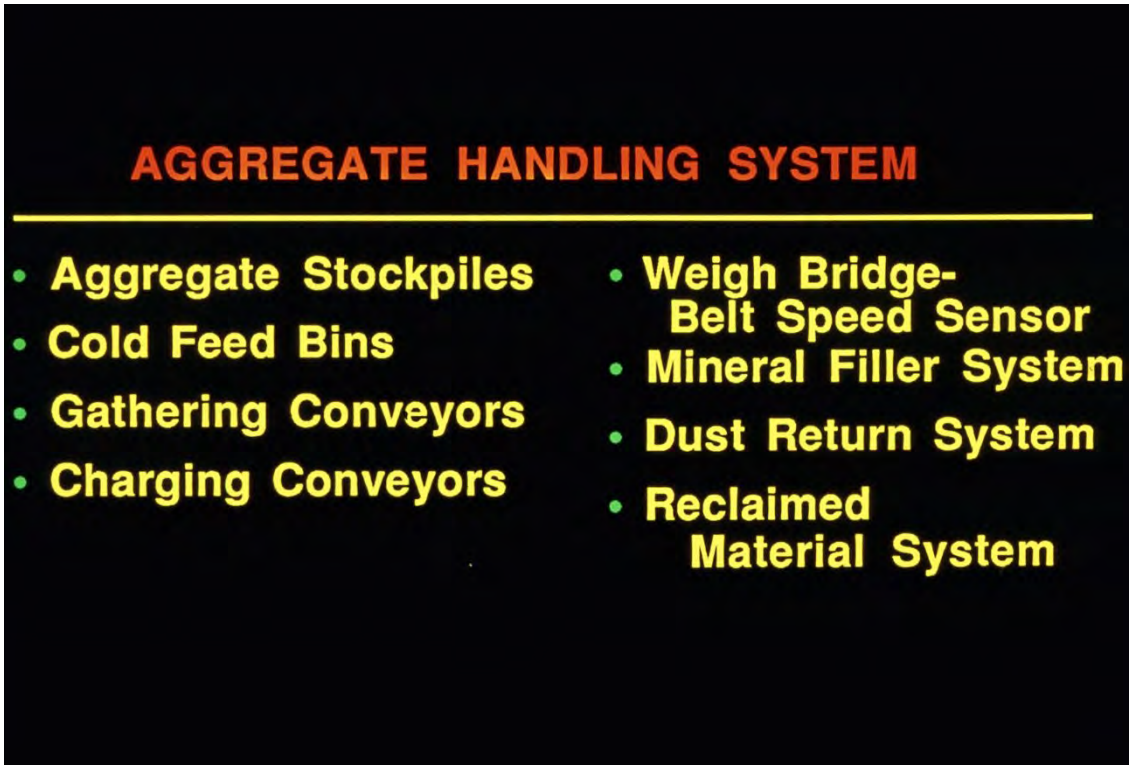
Slide 35

Chapter 4. Cold Feed System

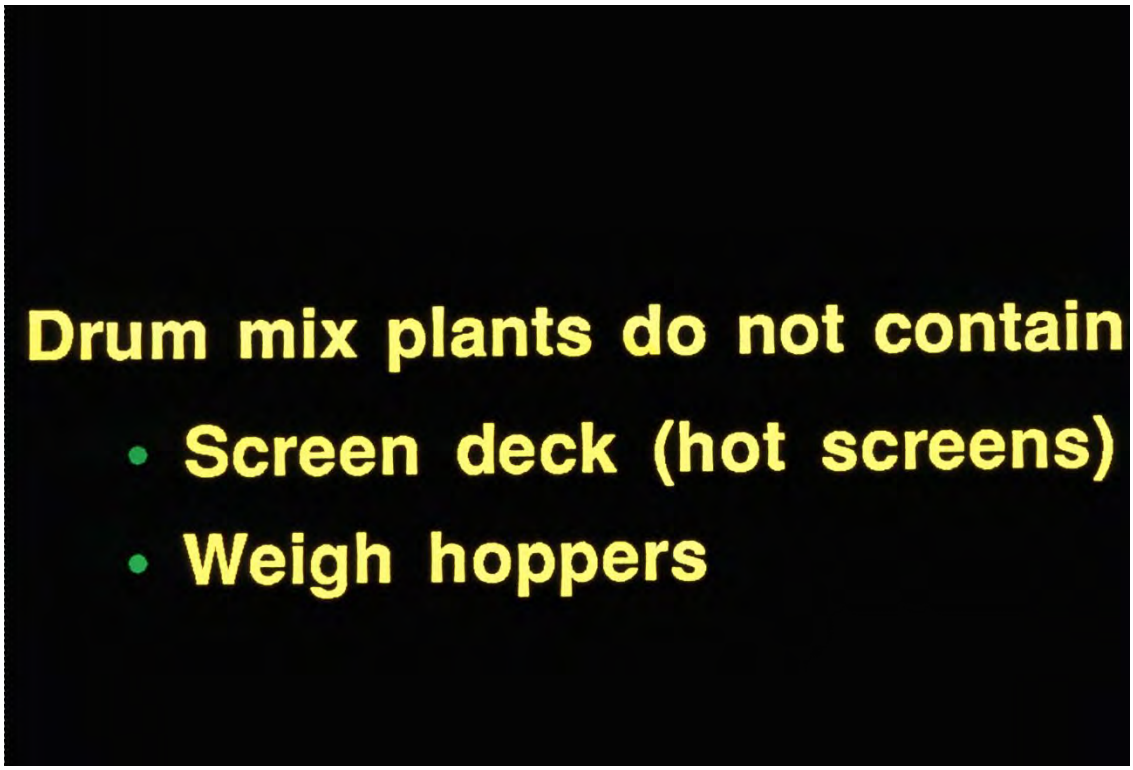
Slide 1



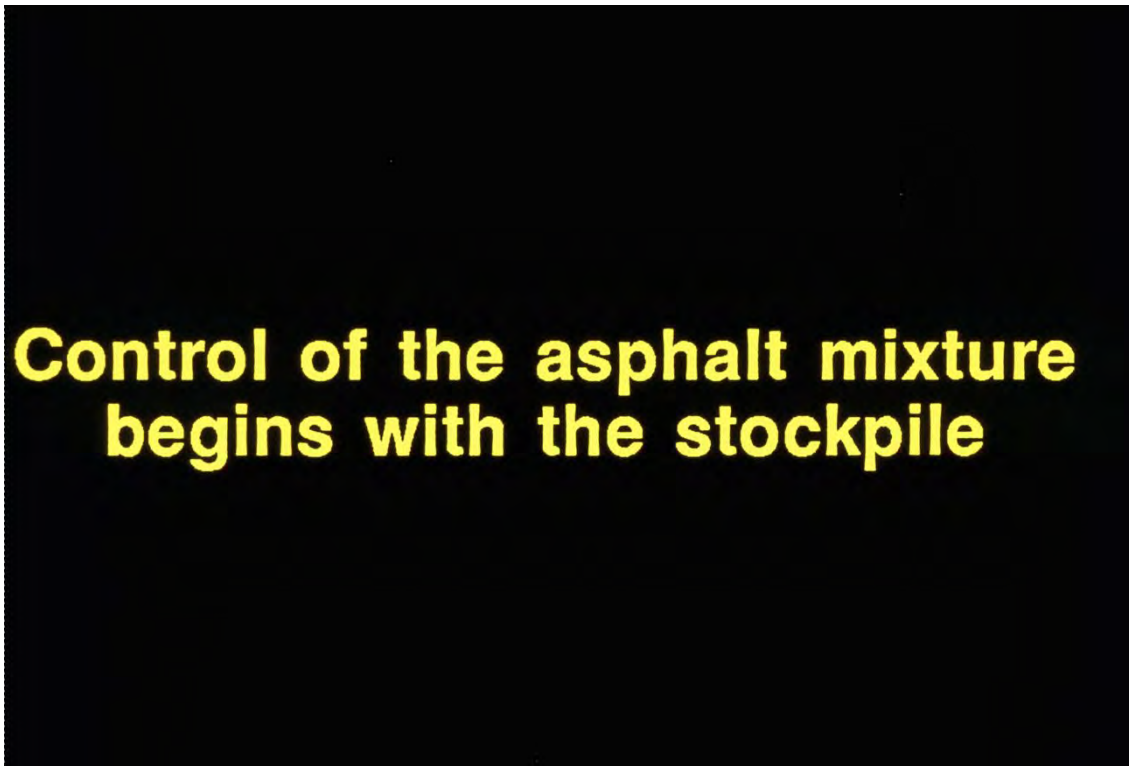
Slide 2. Cold Feed System



Slide 3. Aggregate Handling System



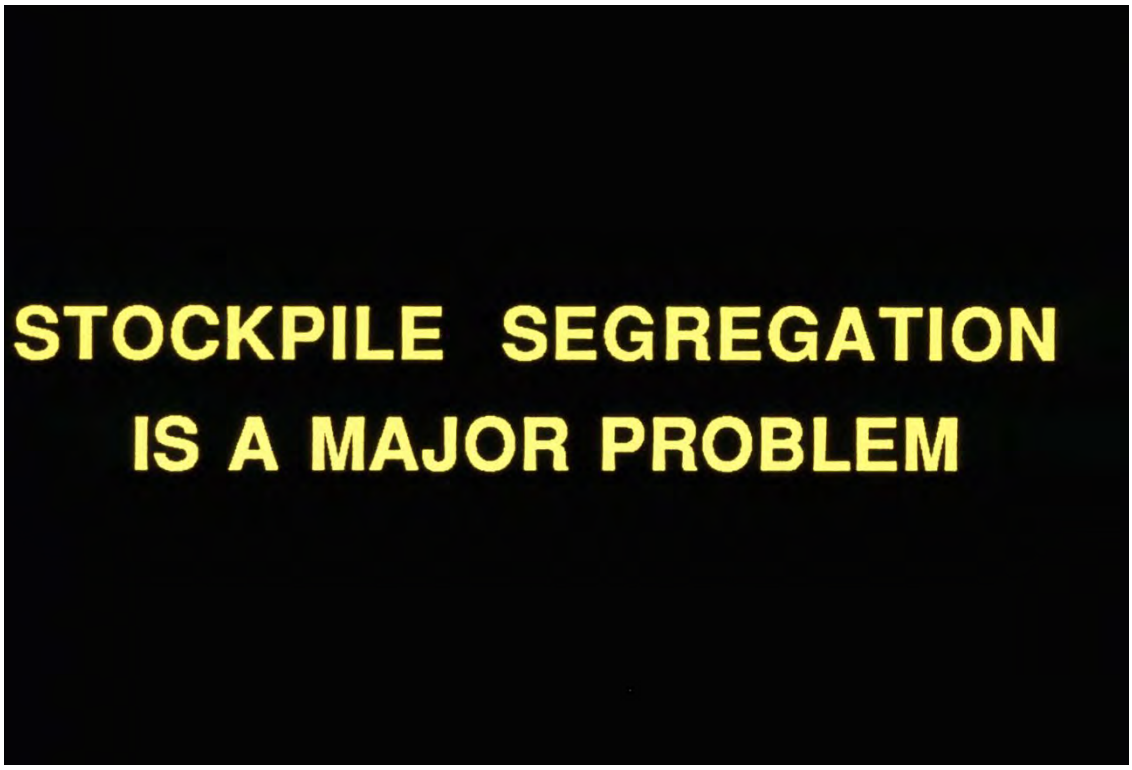
Slide 4



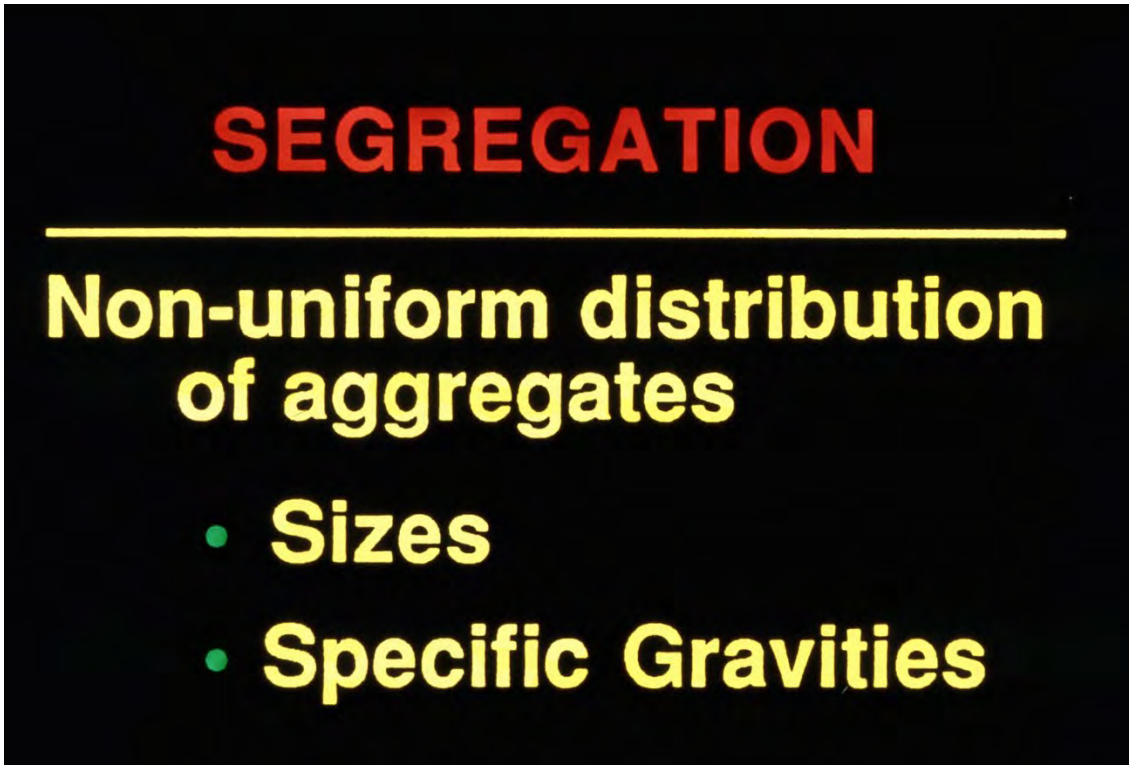
Slide 5

Slide 6. Stockpiling

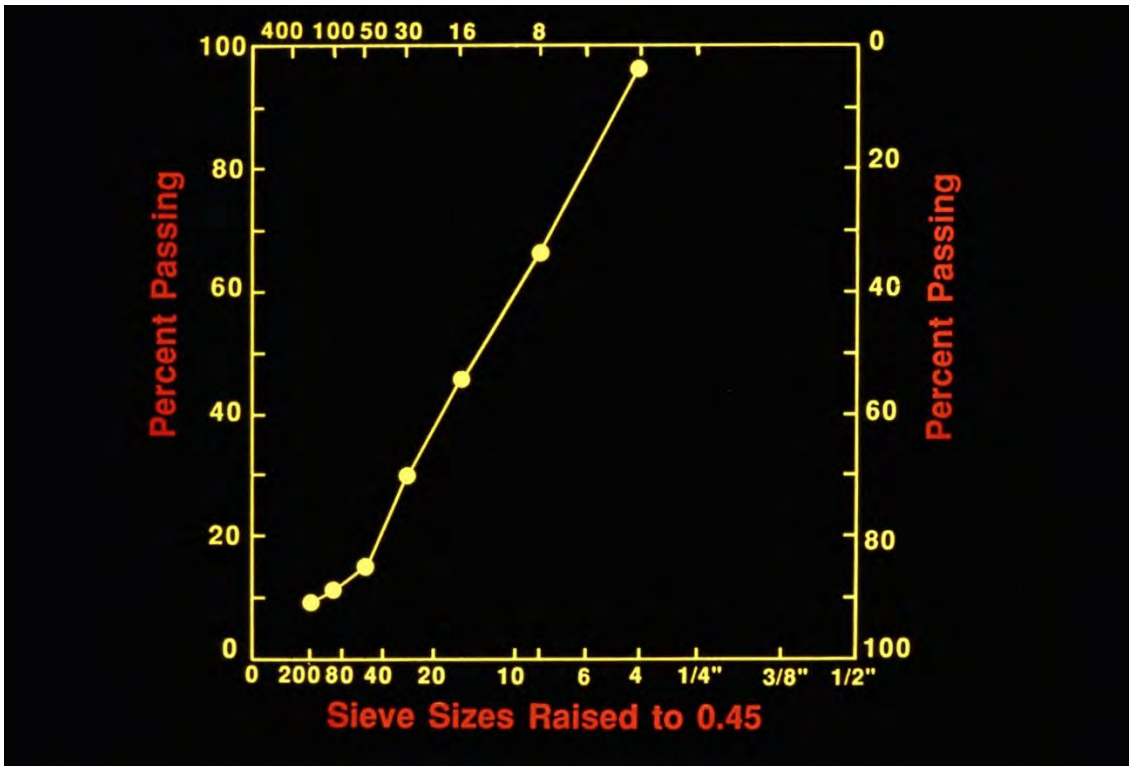
Slide 7. Aggregate Stockpiles



Slide 8



Slide 9. Segregation

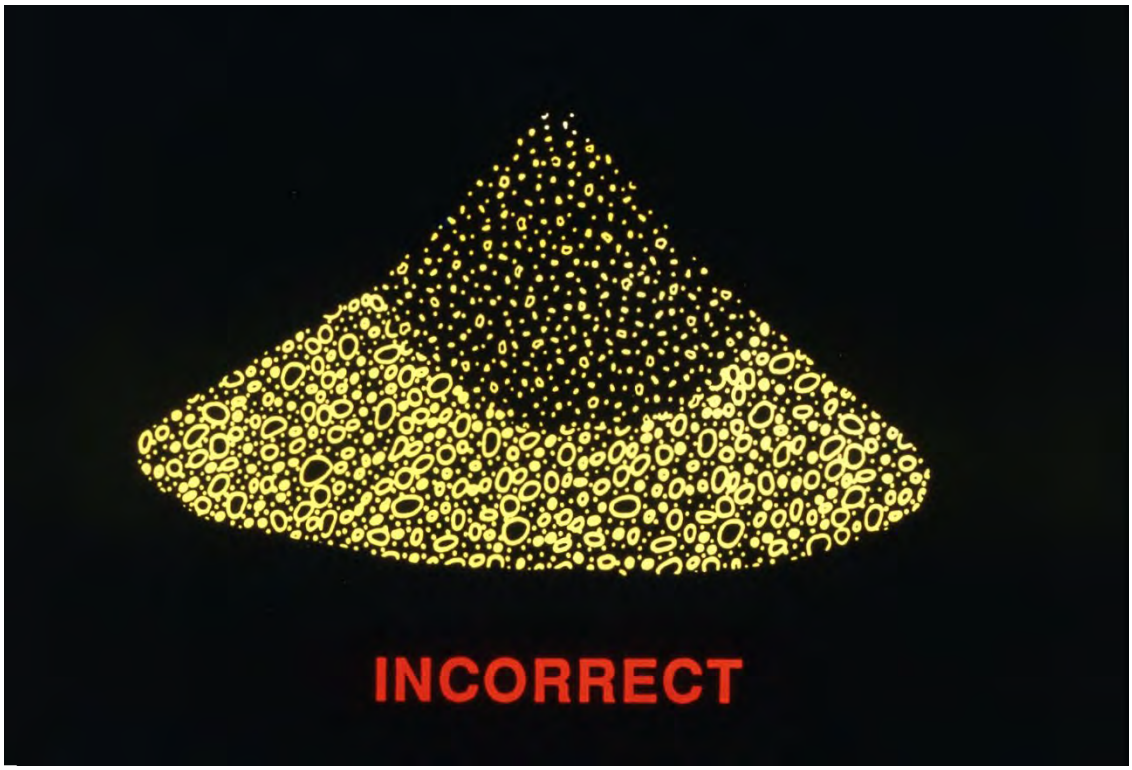


Slide 10

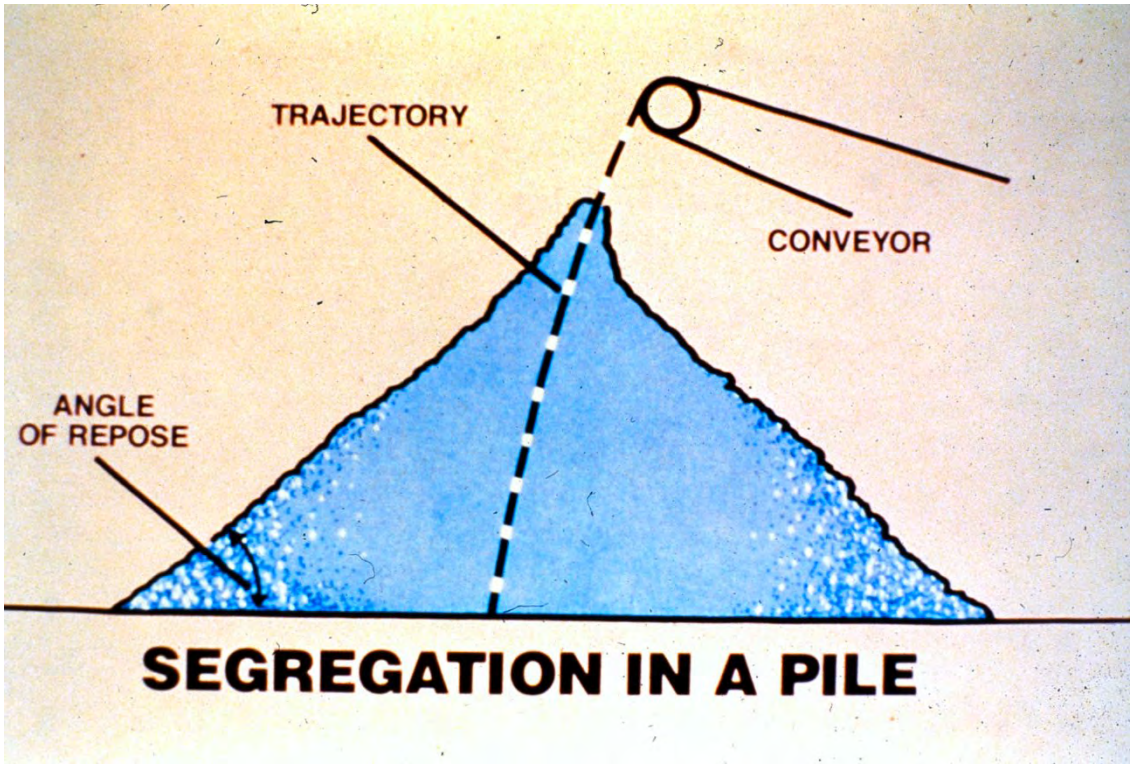
Slide 11

Slide 12. Example of Segregation

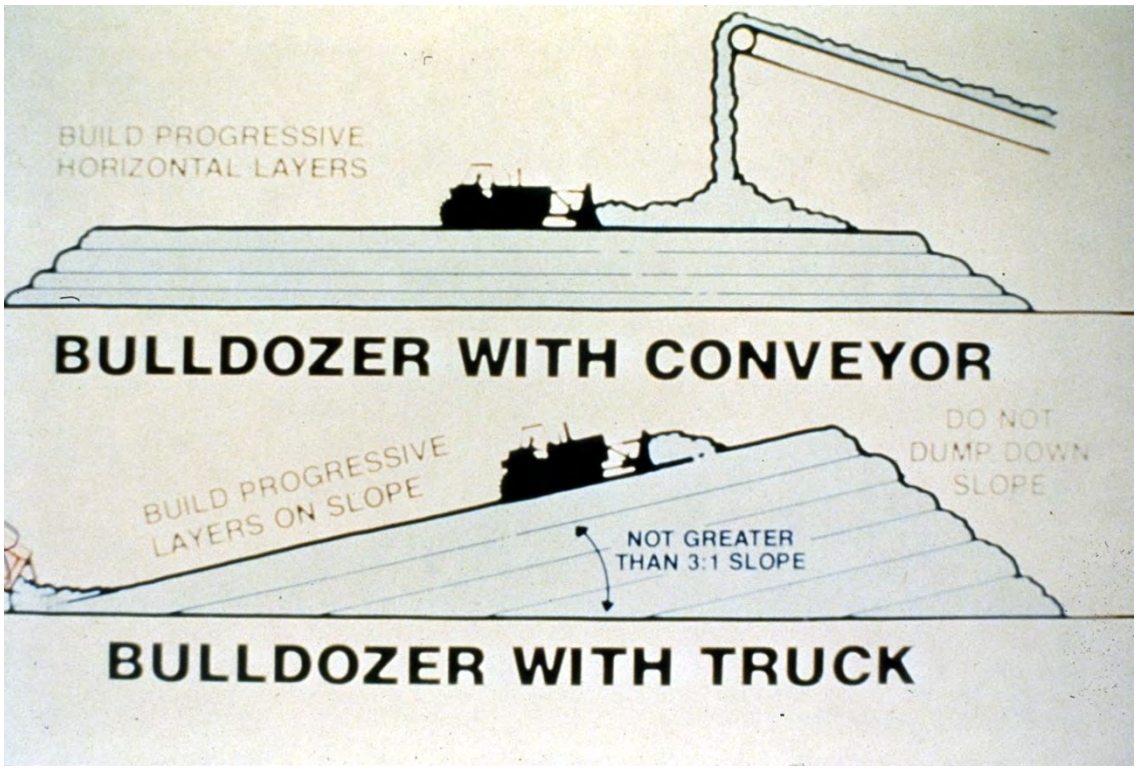
Slide 13. Stockpile Segregation



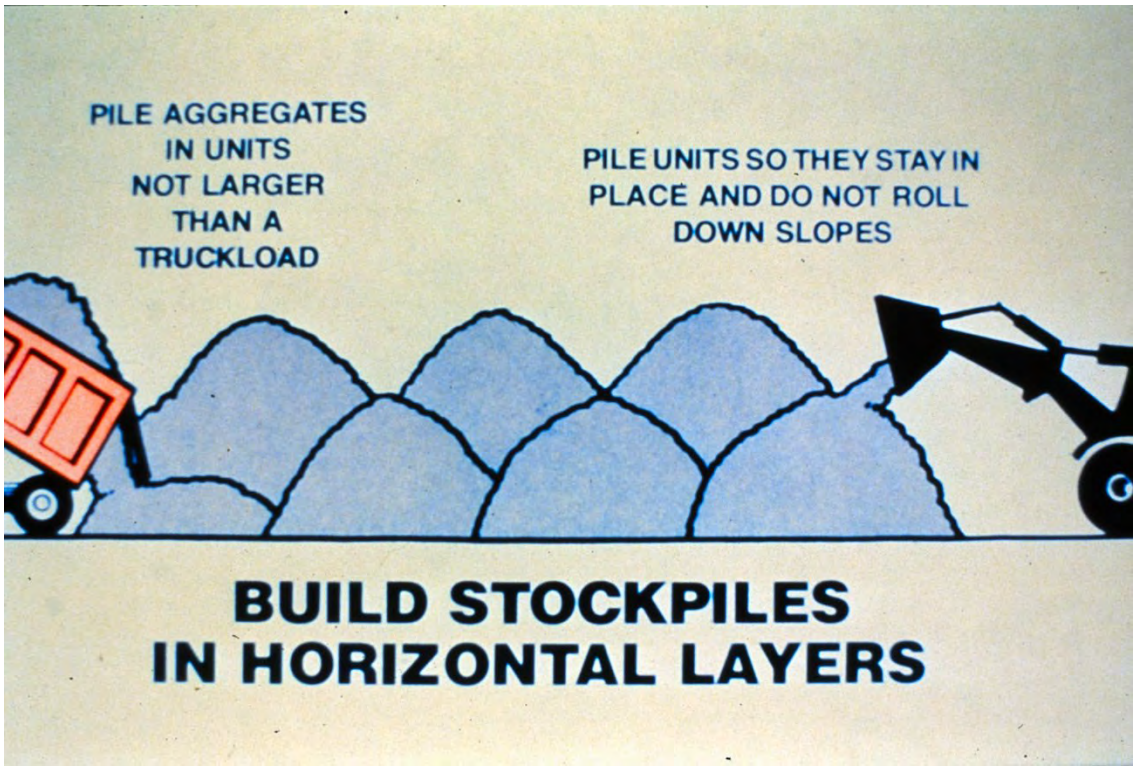
Slide 14



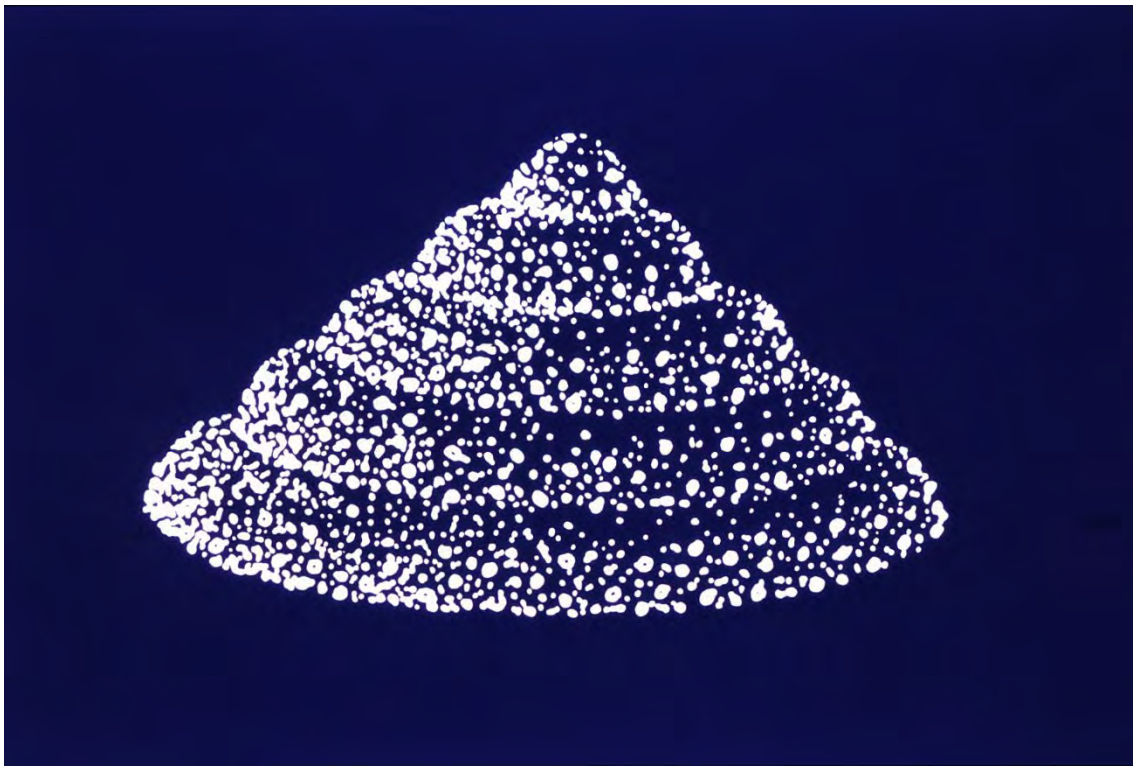
Slide 15. Segregation in a Pile



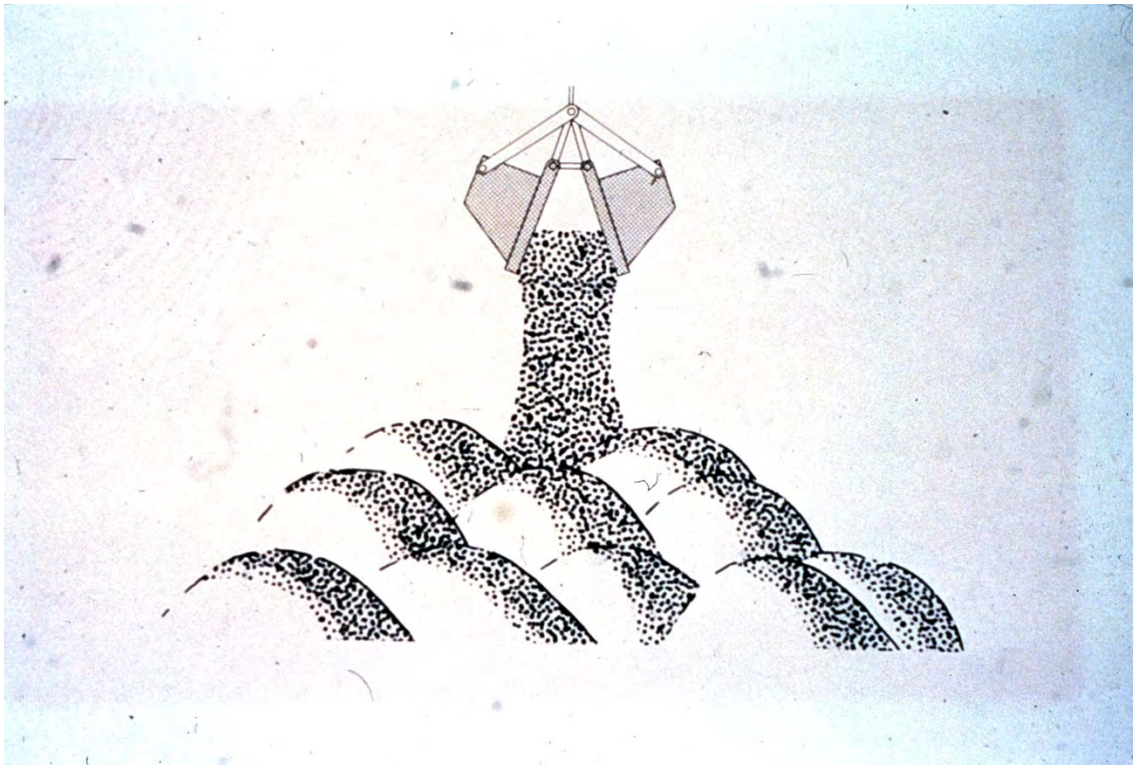
Slide 16



Slide 17. Build Stockpiles in Horizontal Layers



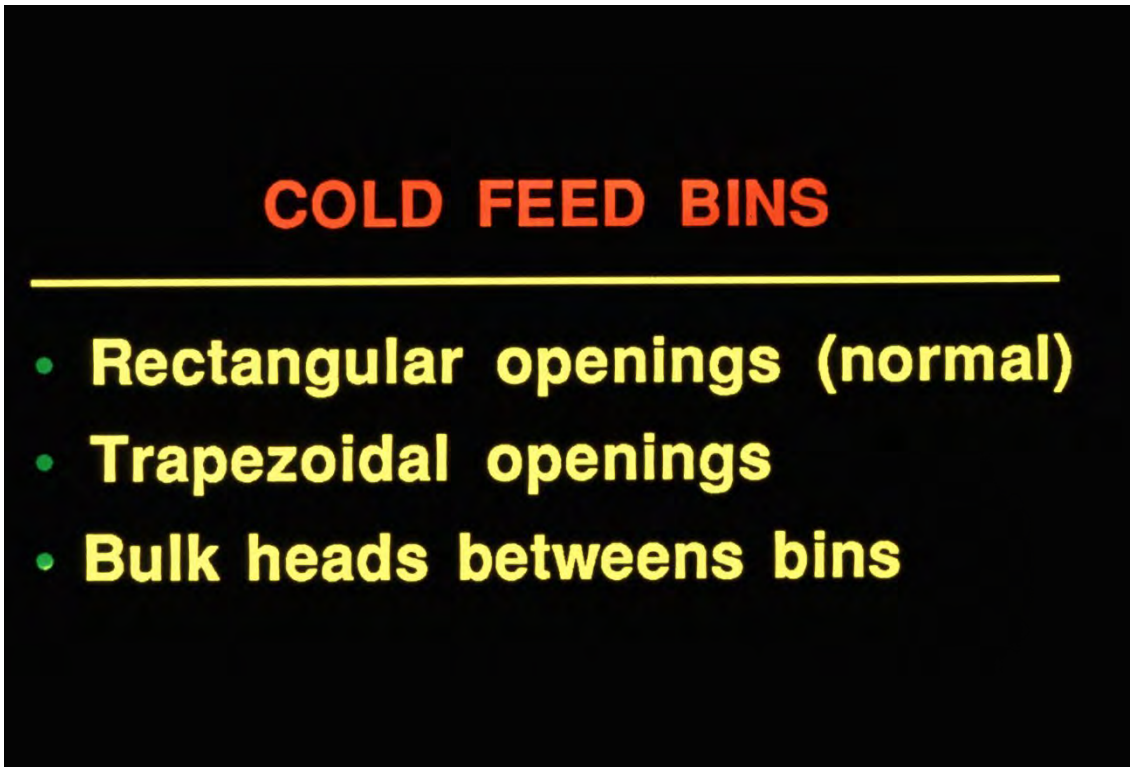
Slide 18



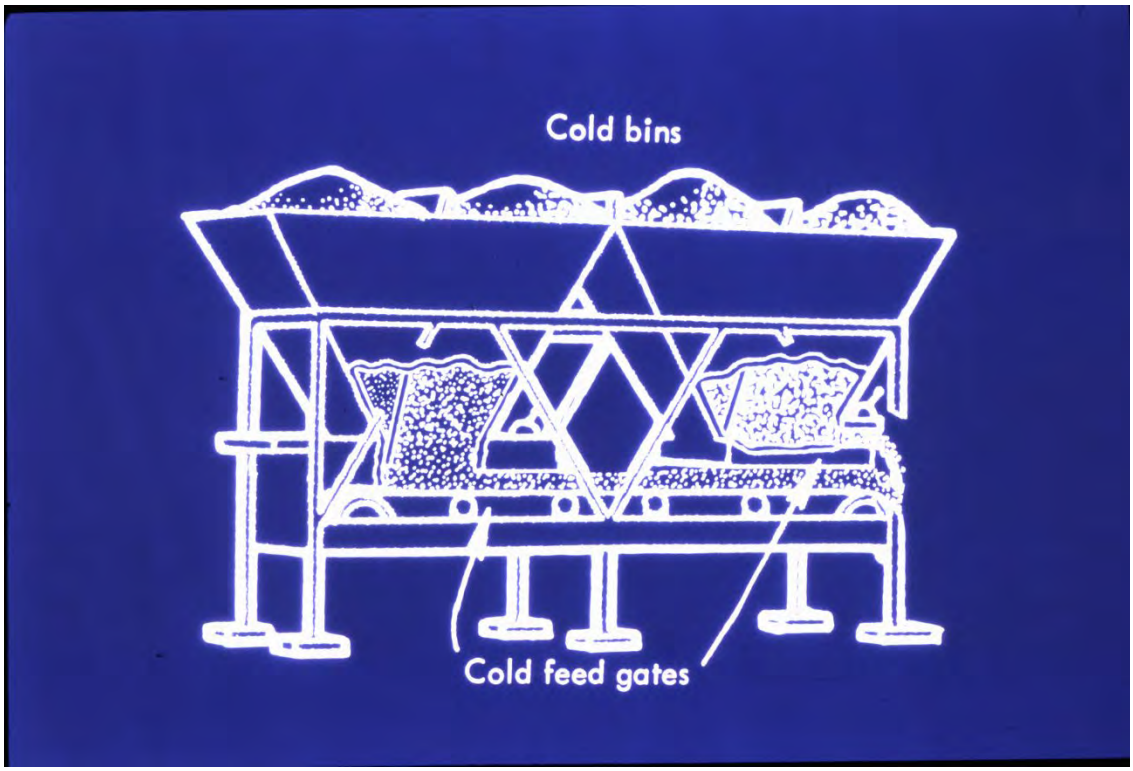
Slide 19

Slide 20. Removal of Aggregate

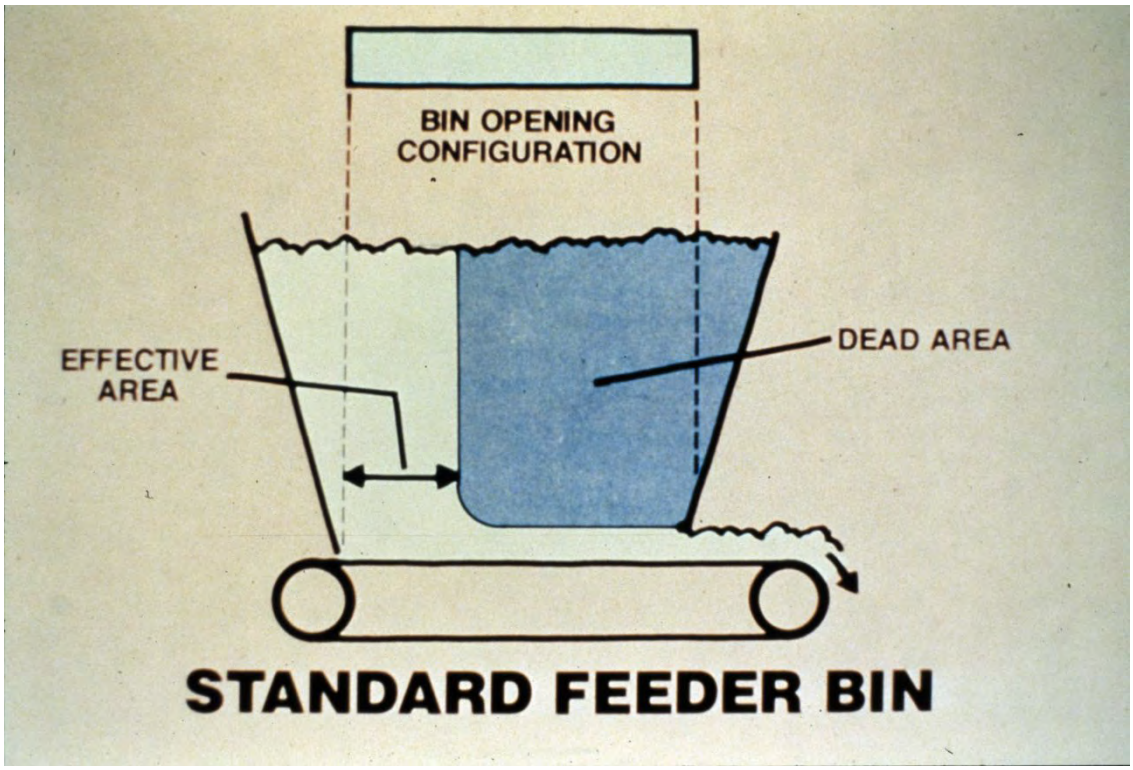
Slide 21



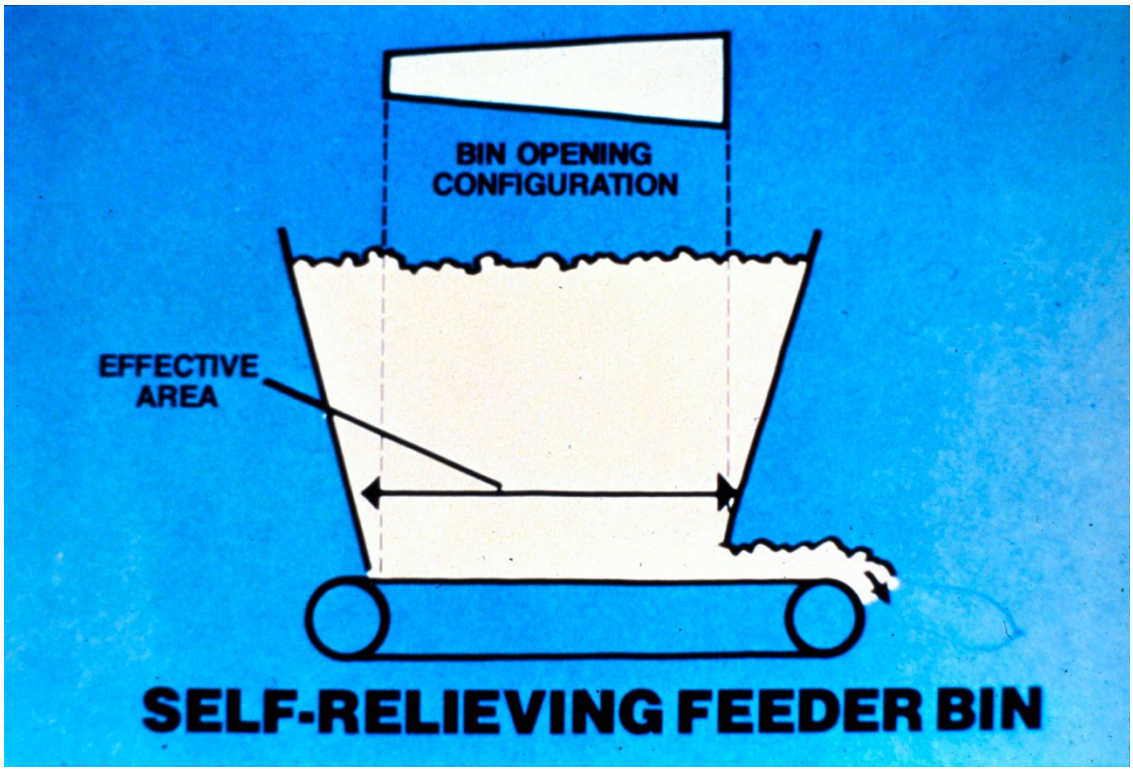
Slide 22. Cold Feed Bins



Slide 23



Slide 24. Standard Feeder Bin



Slide 25. Self-Relieving Feeder Bin

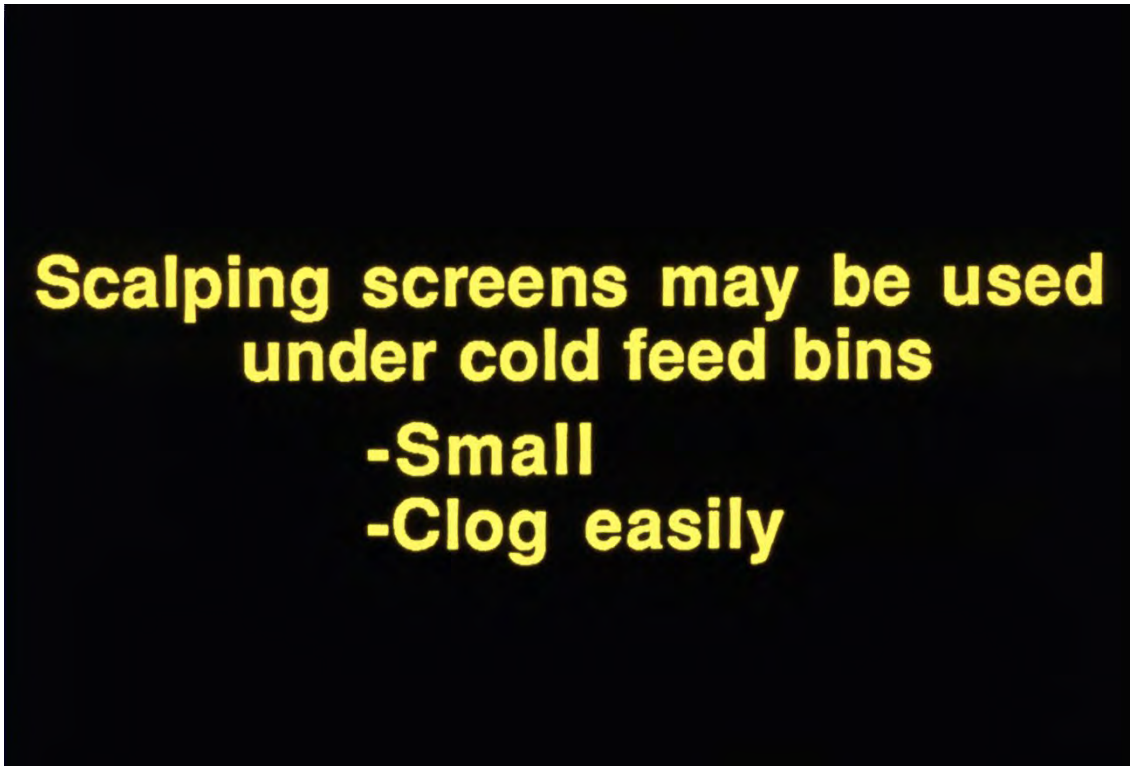
Slide 26

Slide 27

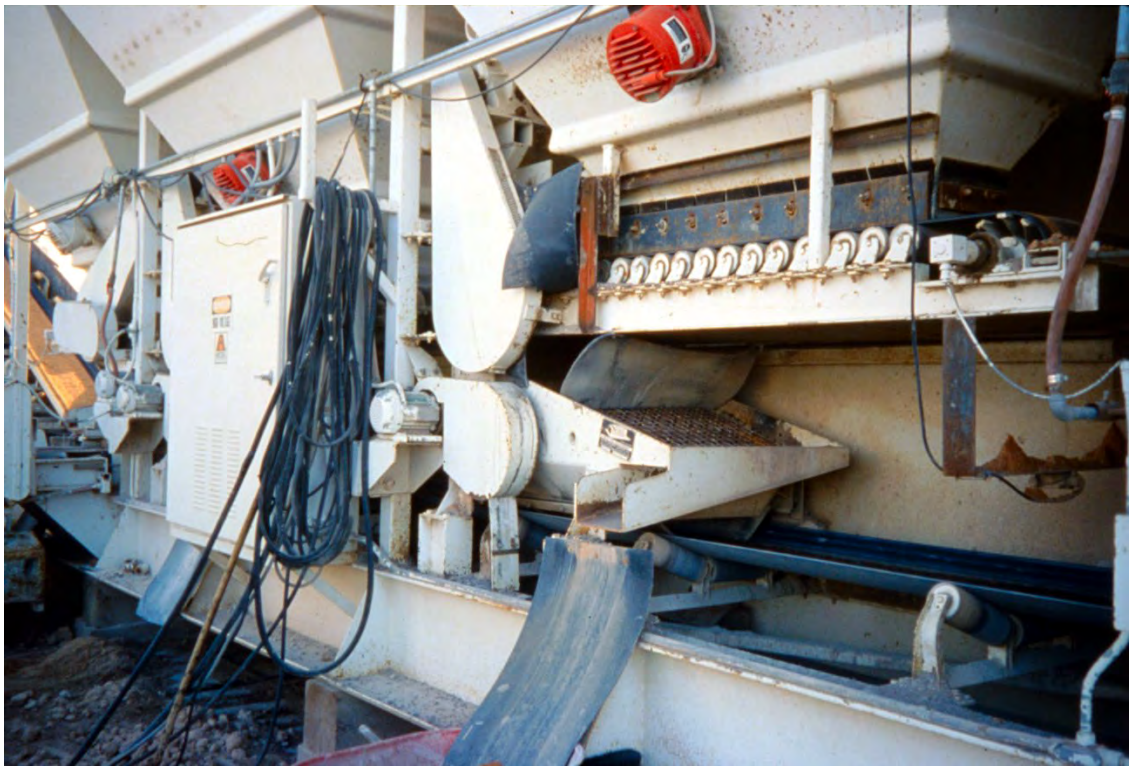
Slide 28

Slide 29

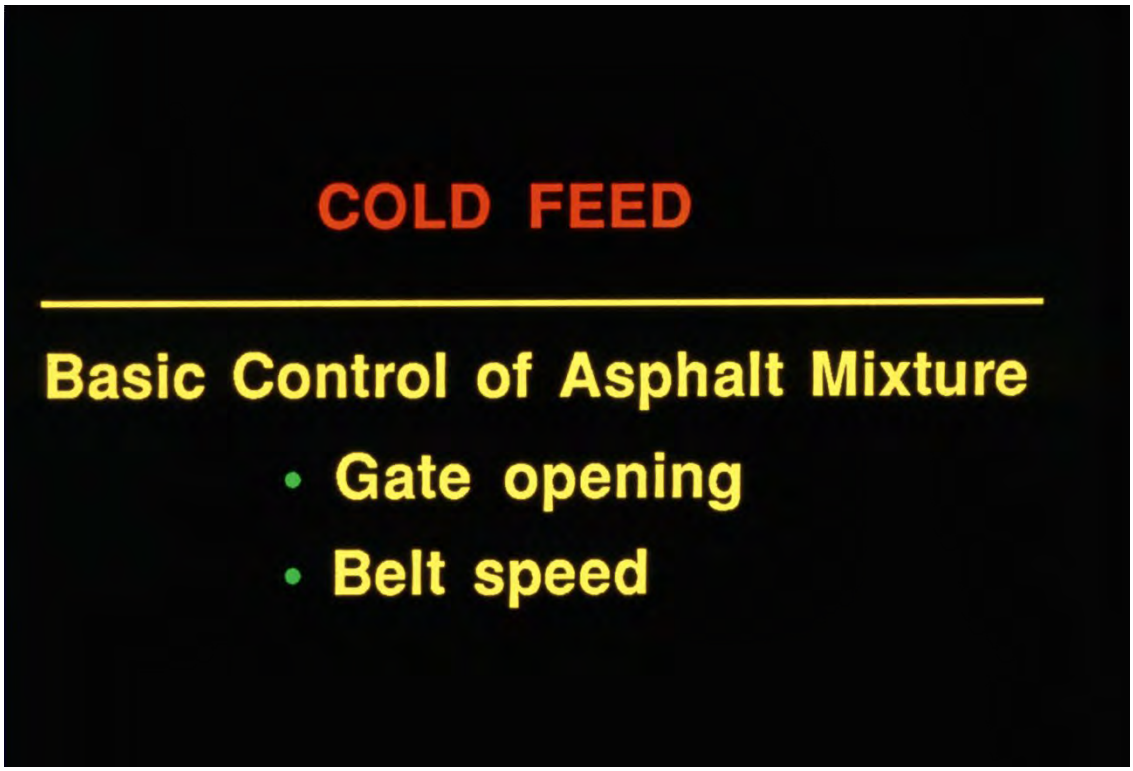
Slide 30



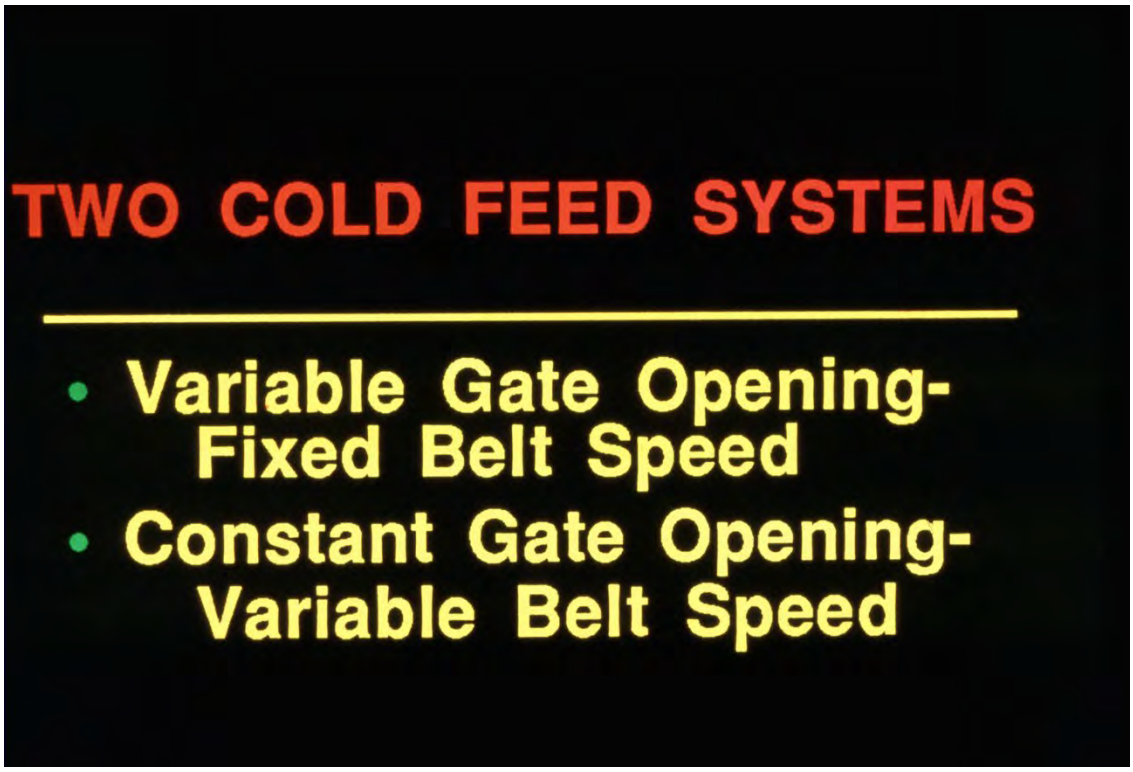
Slide 31



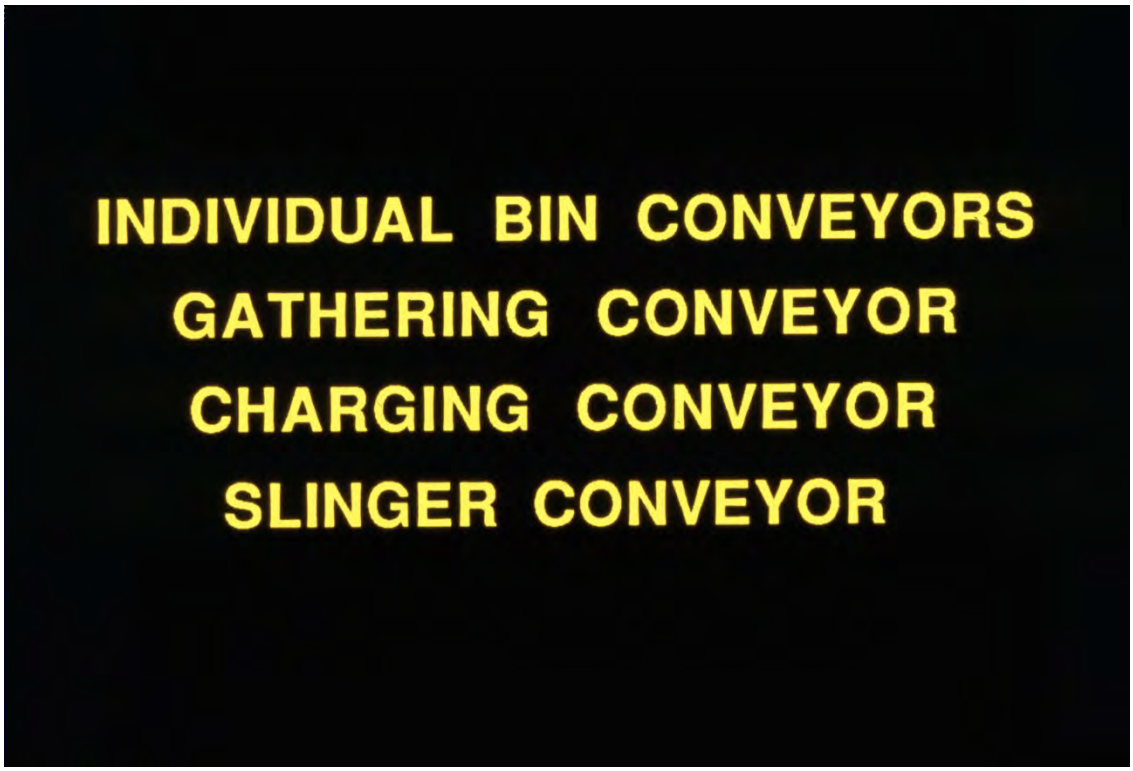
Slide 32



Slide 33. Cold Feed

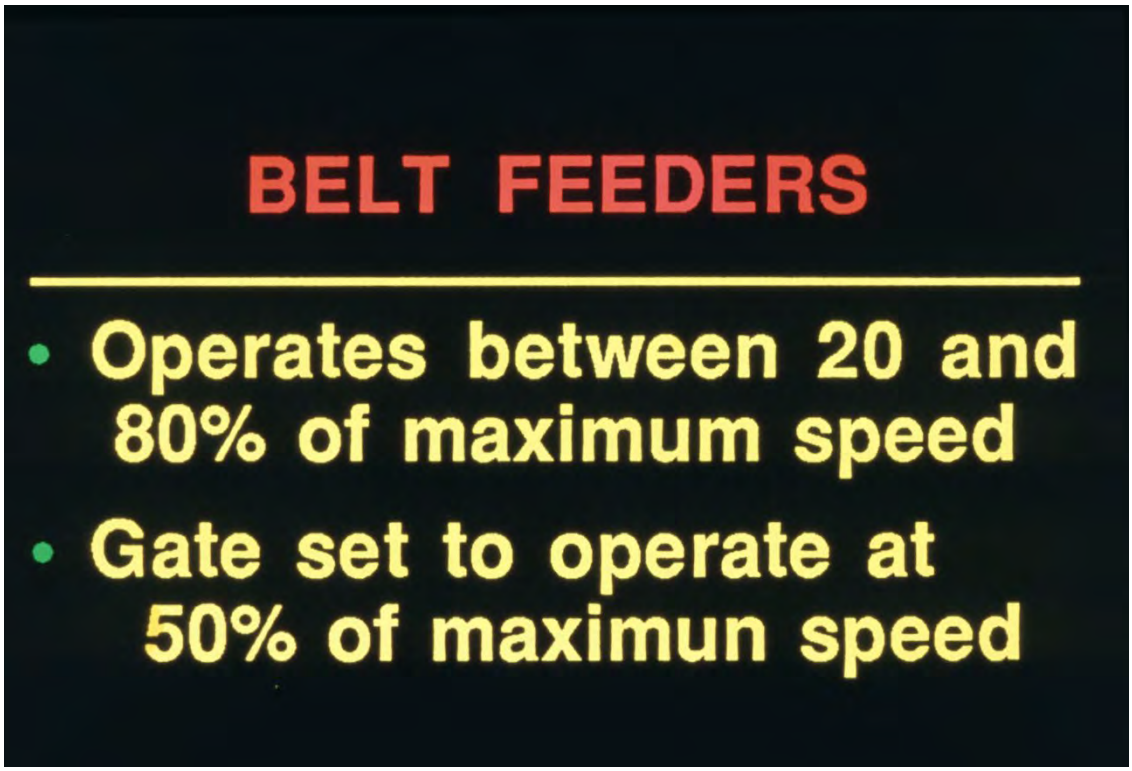


Slide 34. Two Cold Feed Systems

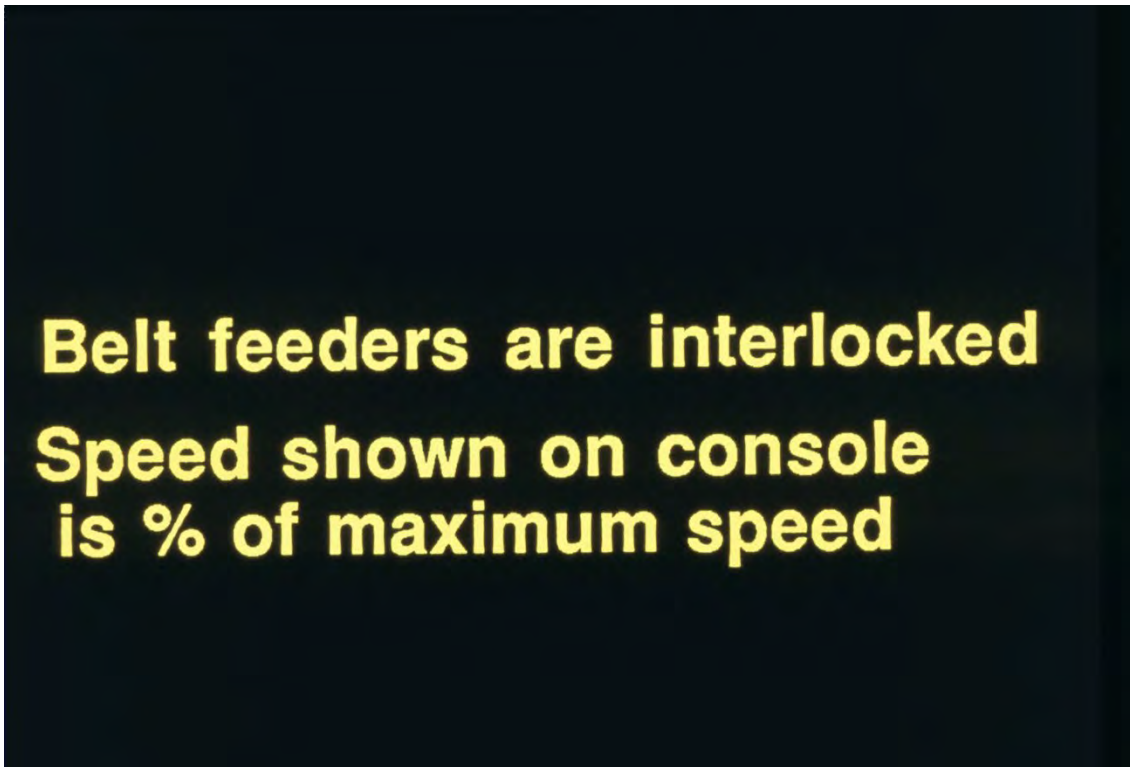


Slide 35

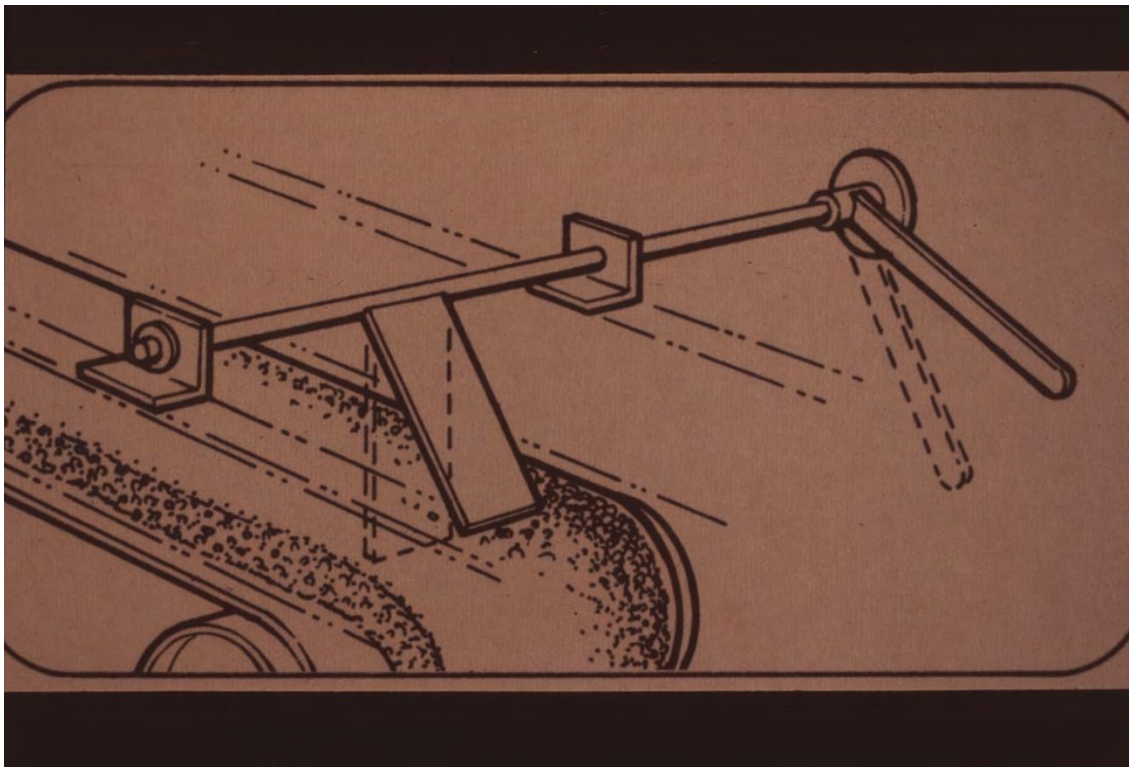
Slide 36



Slide 37. Belt Feeders

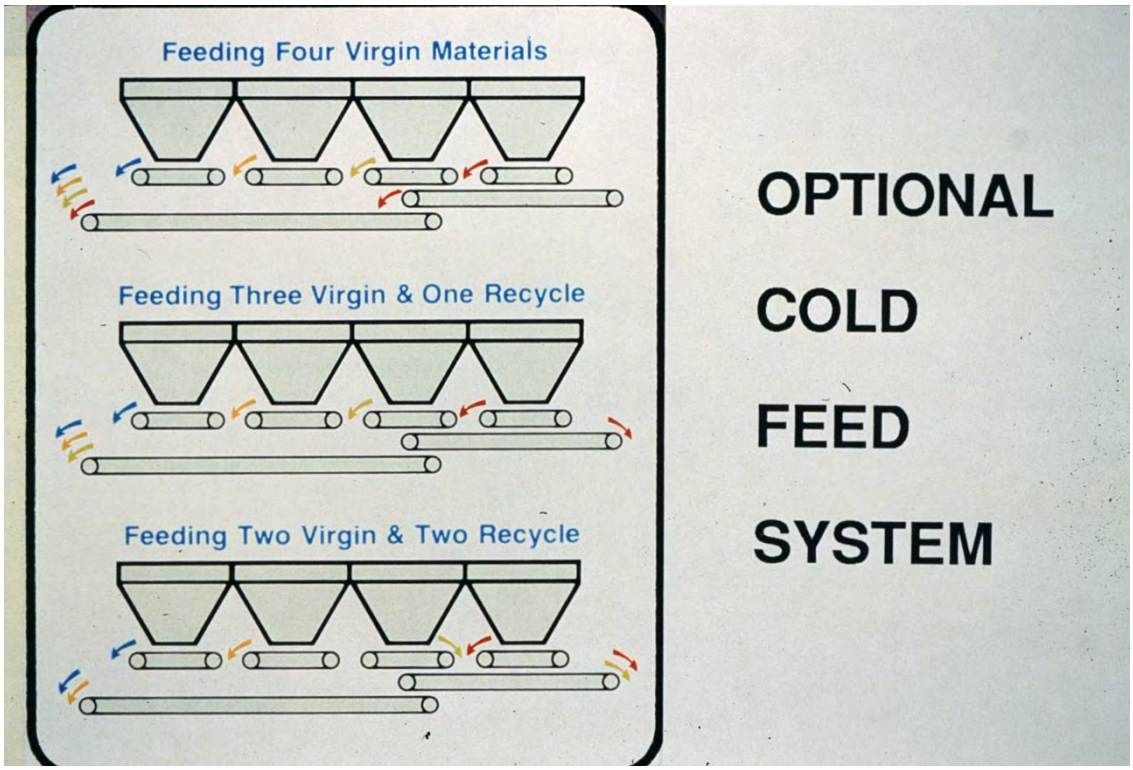


Slide 38



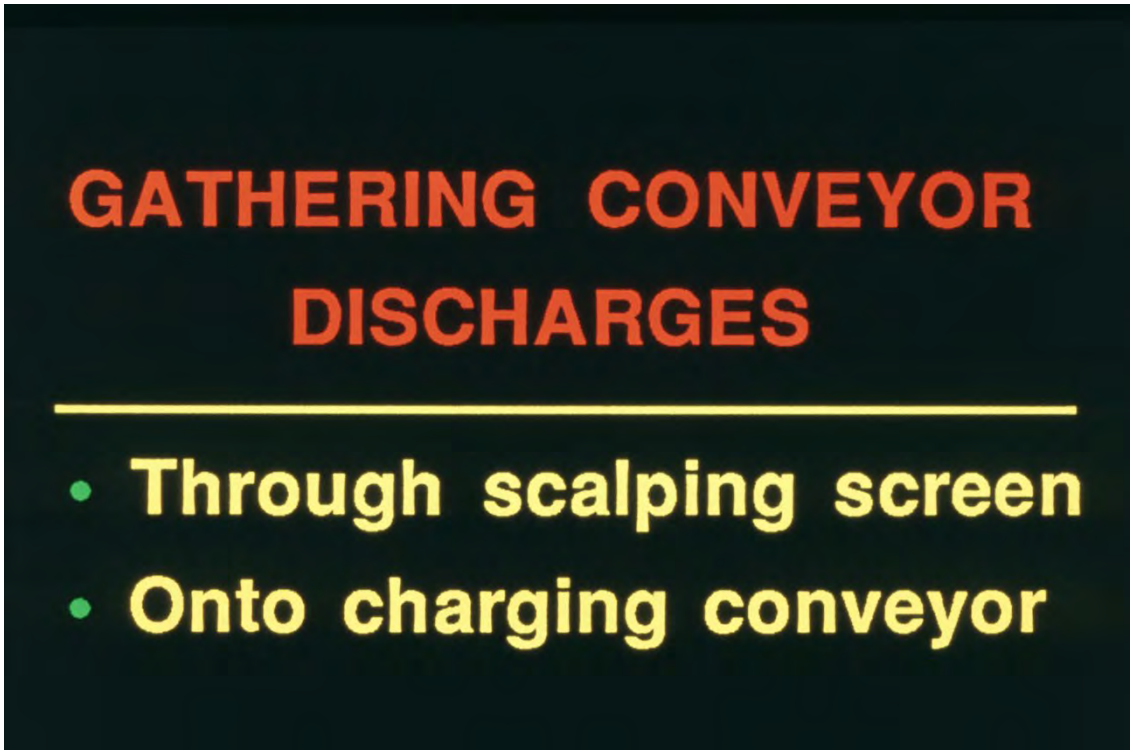
Slide 39

Slide 40

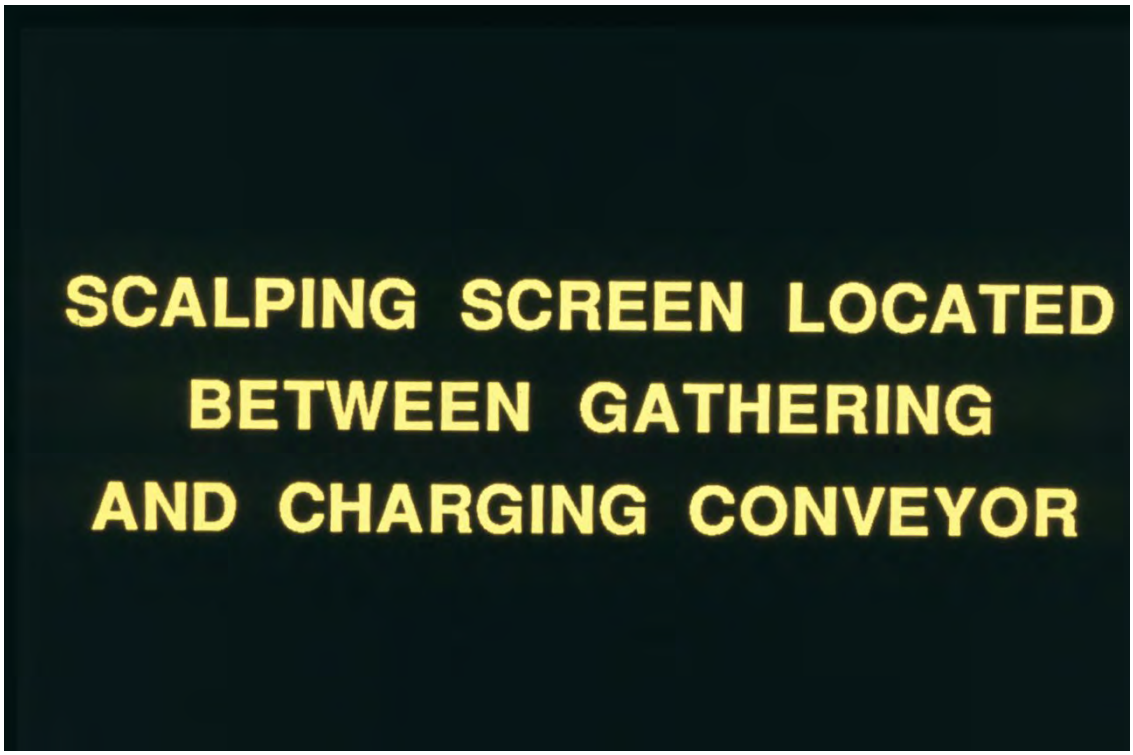


Slide 41. Optional Cold Feed System

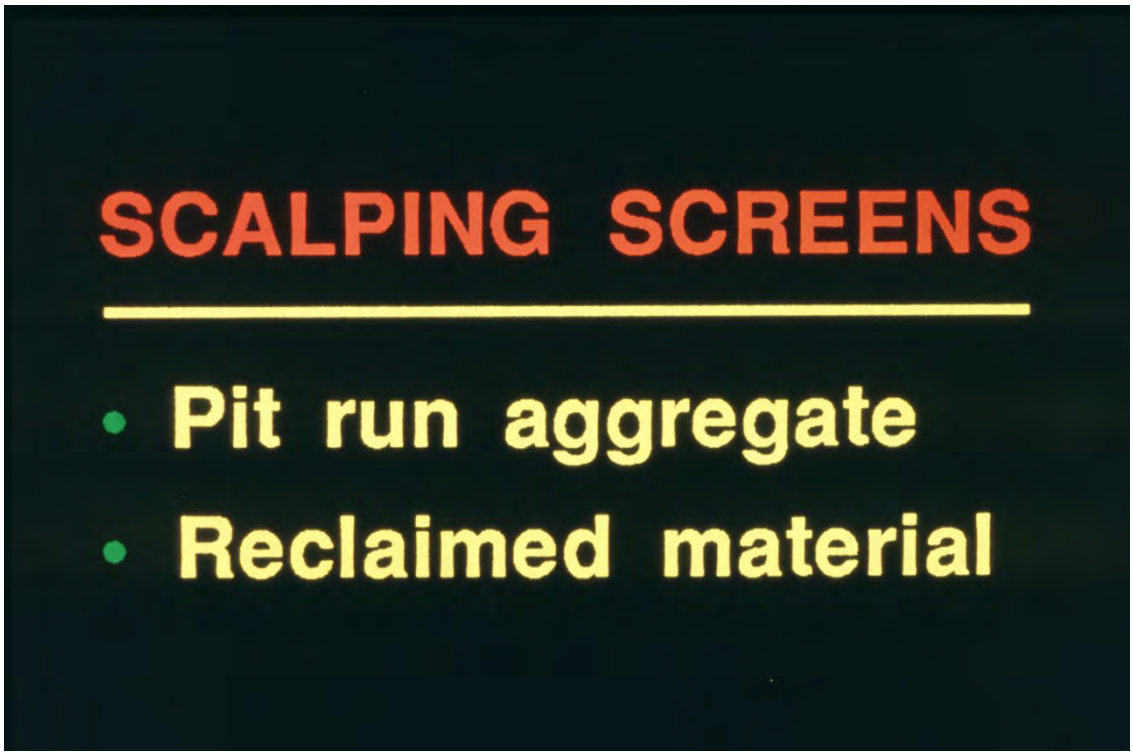
Slide 42



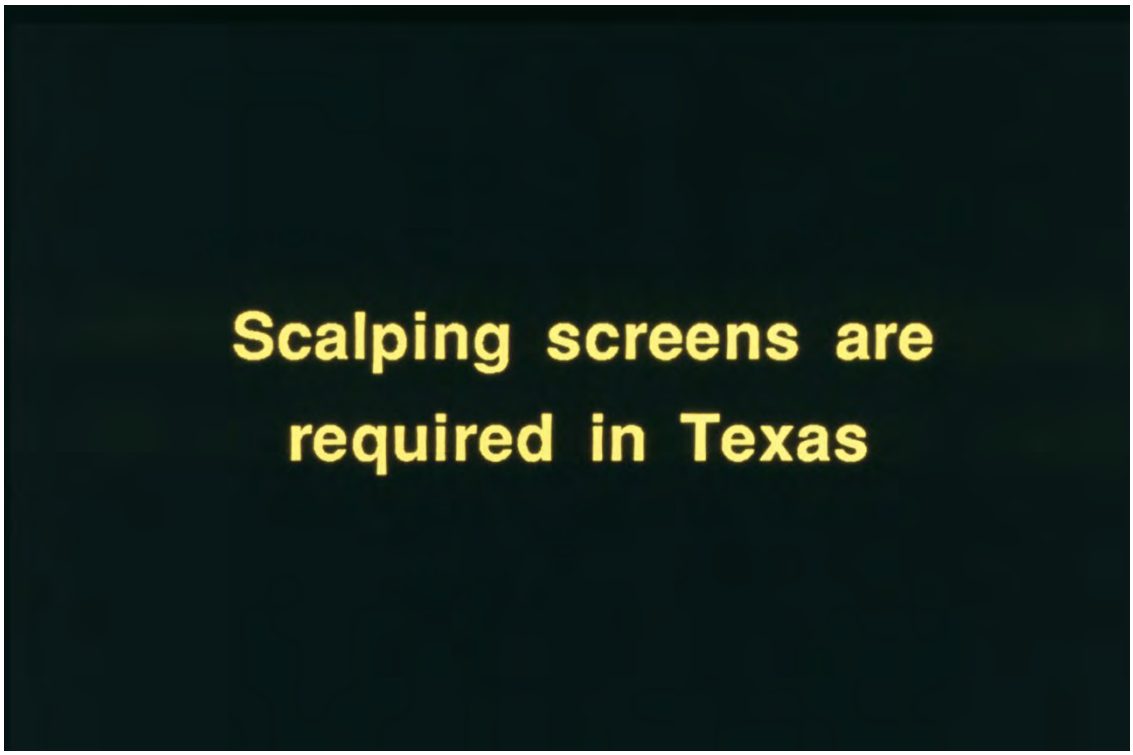
Slide 43. Gathering Conveyor Discharges



Slide 44

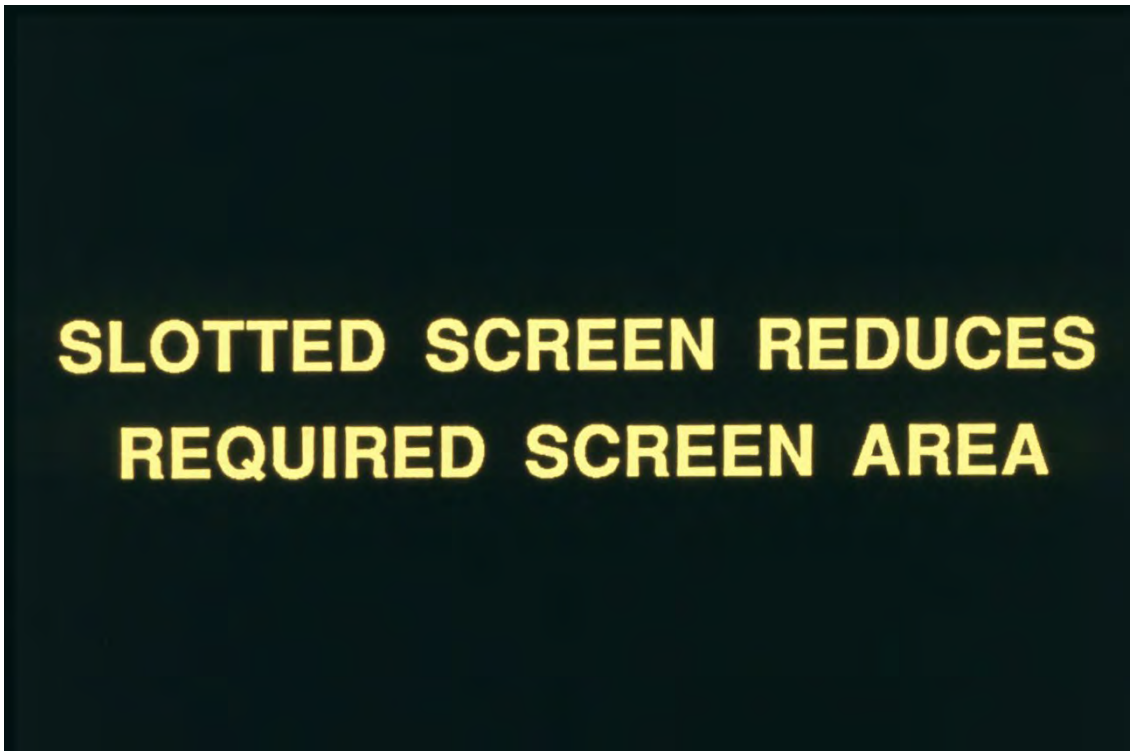


Slide 45. Scalping Screens



Slide 46

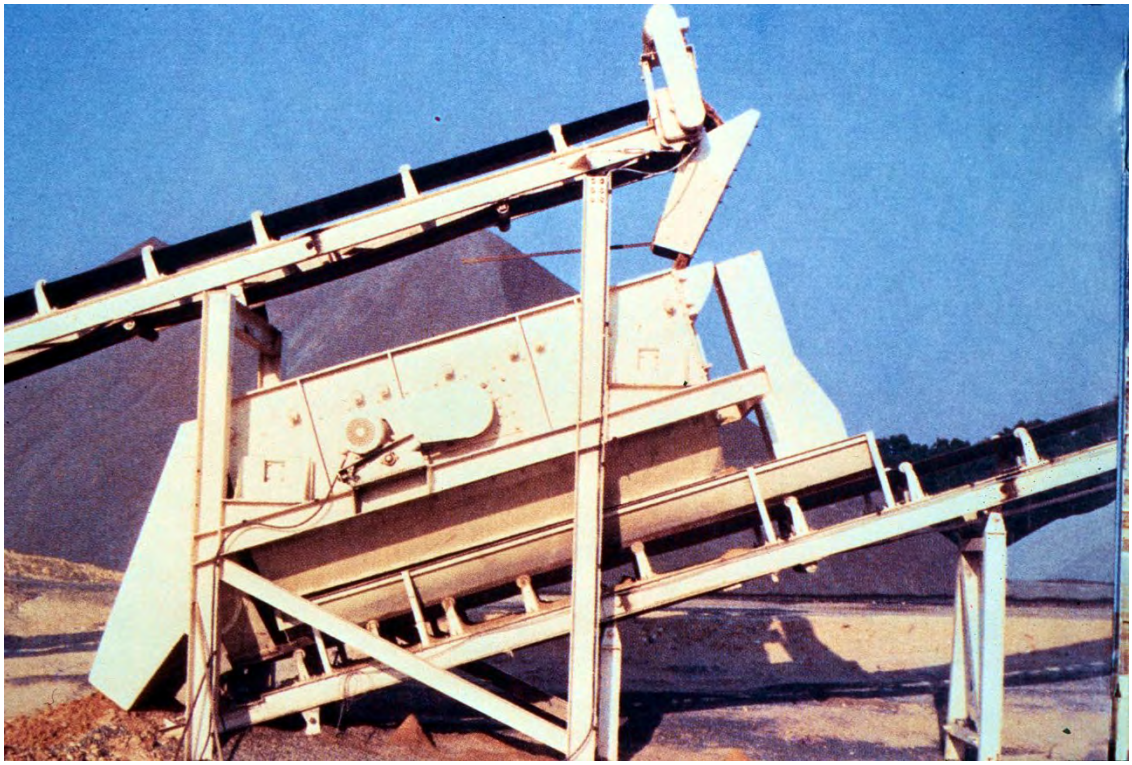
Slide 47. Scalping Screens [Types]



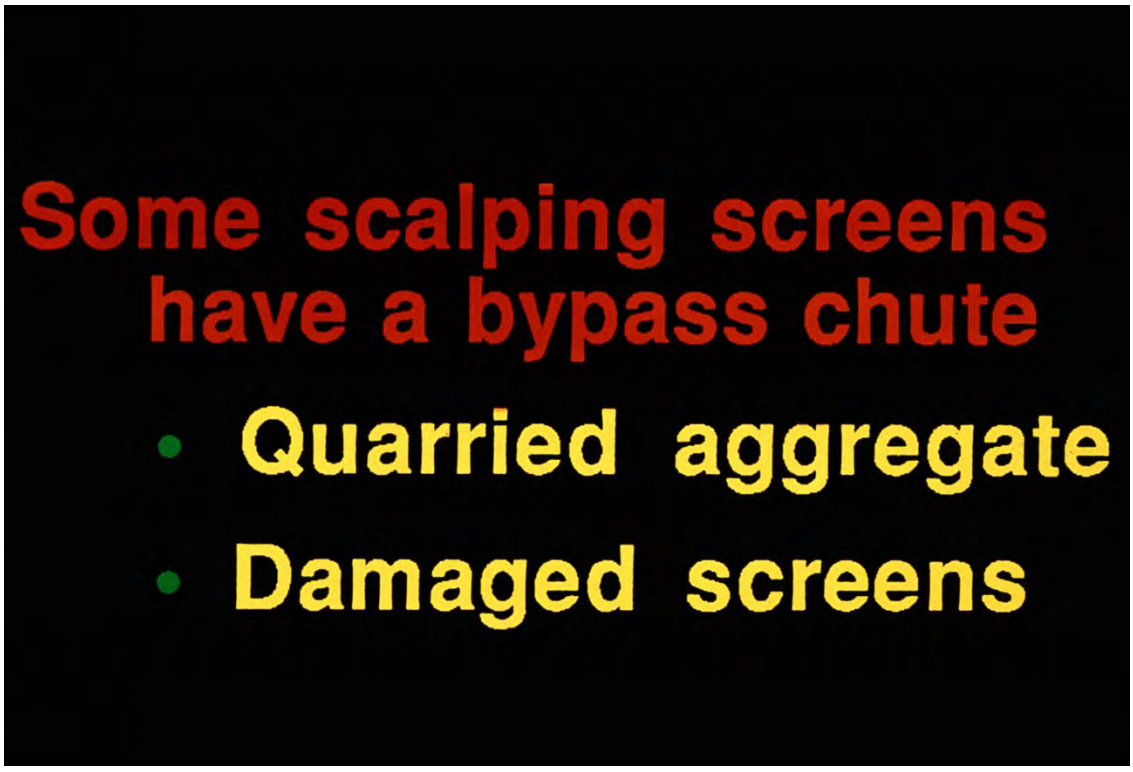
Slide 48

Slide 49

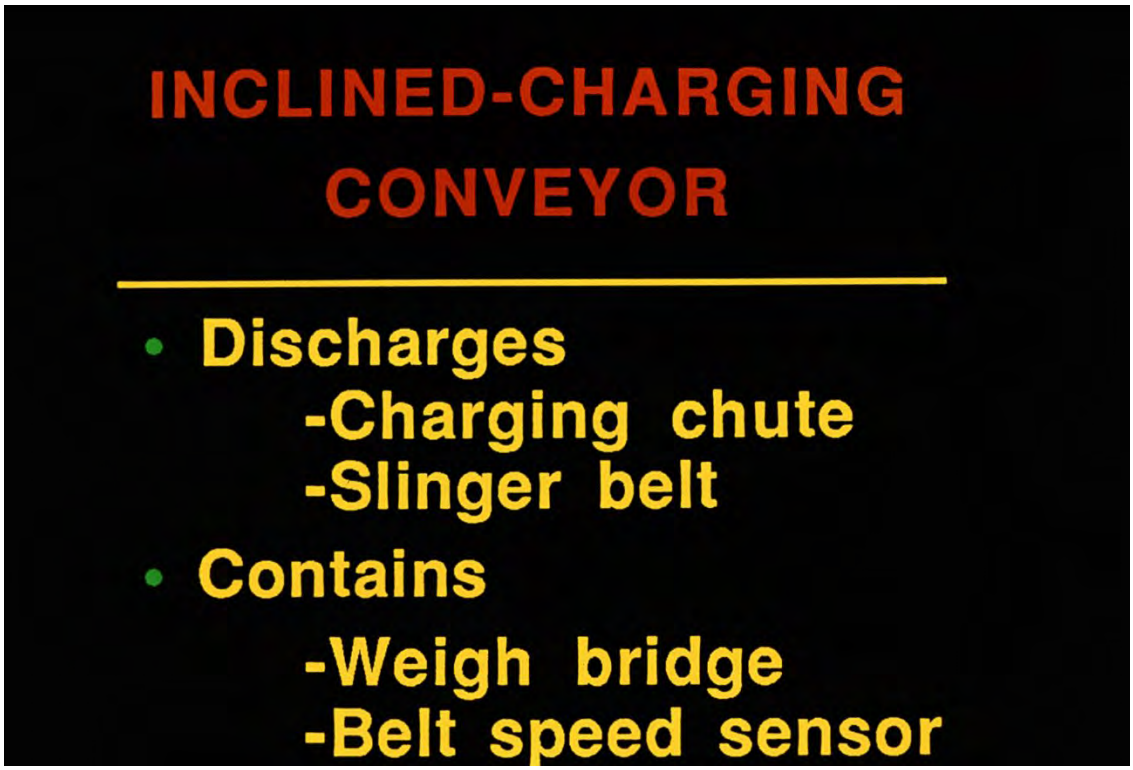
Slide 50



Slide 51

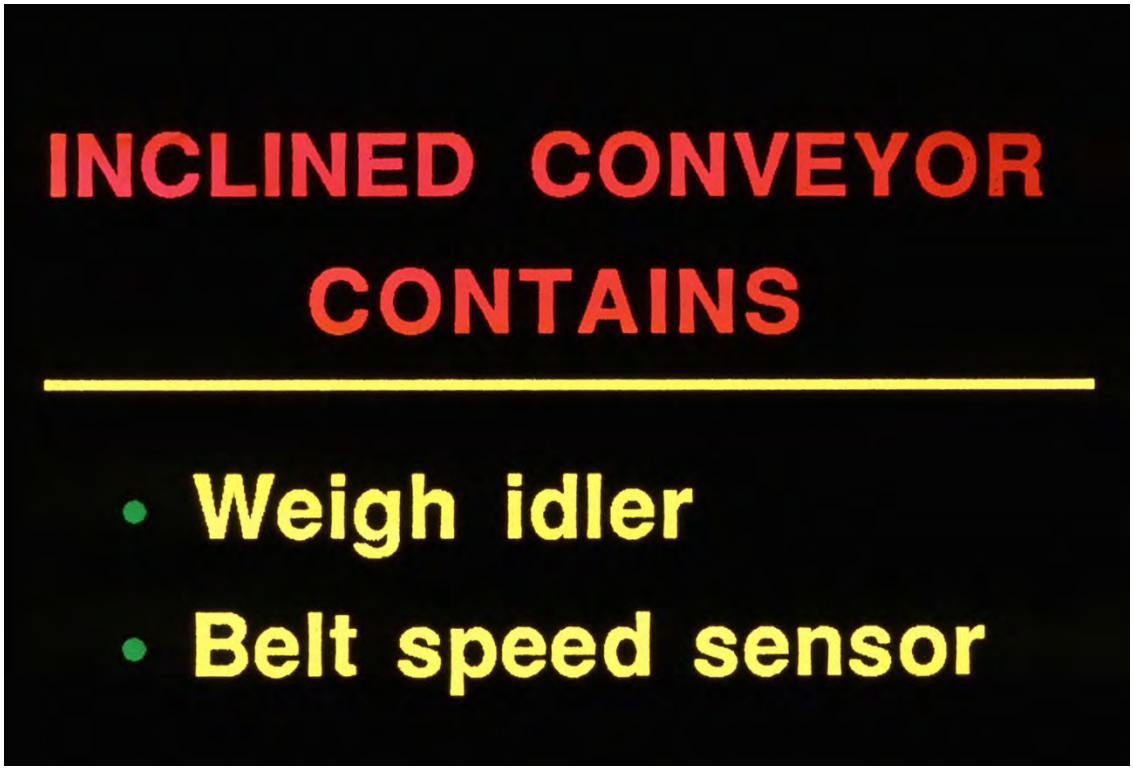


Slide 52. Some Scalping Screens have a Bypass Chute

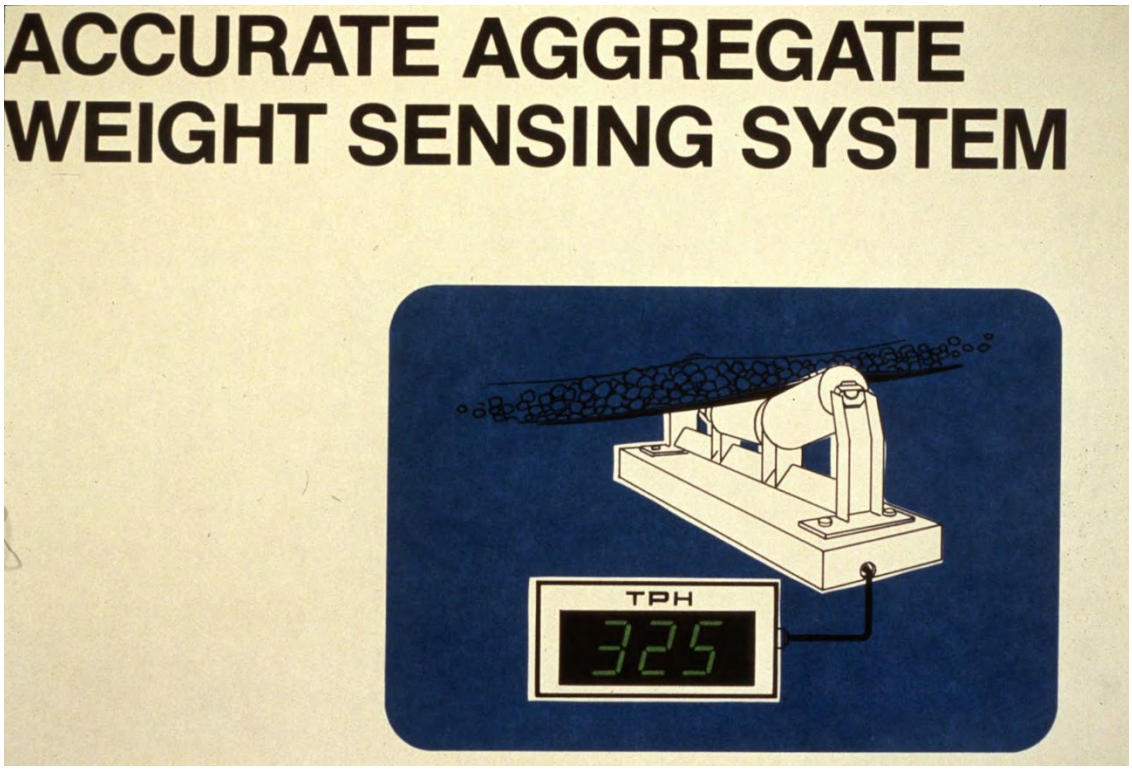


Slide 53. Inclined-Charging Conveyor

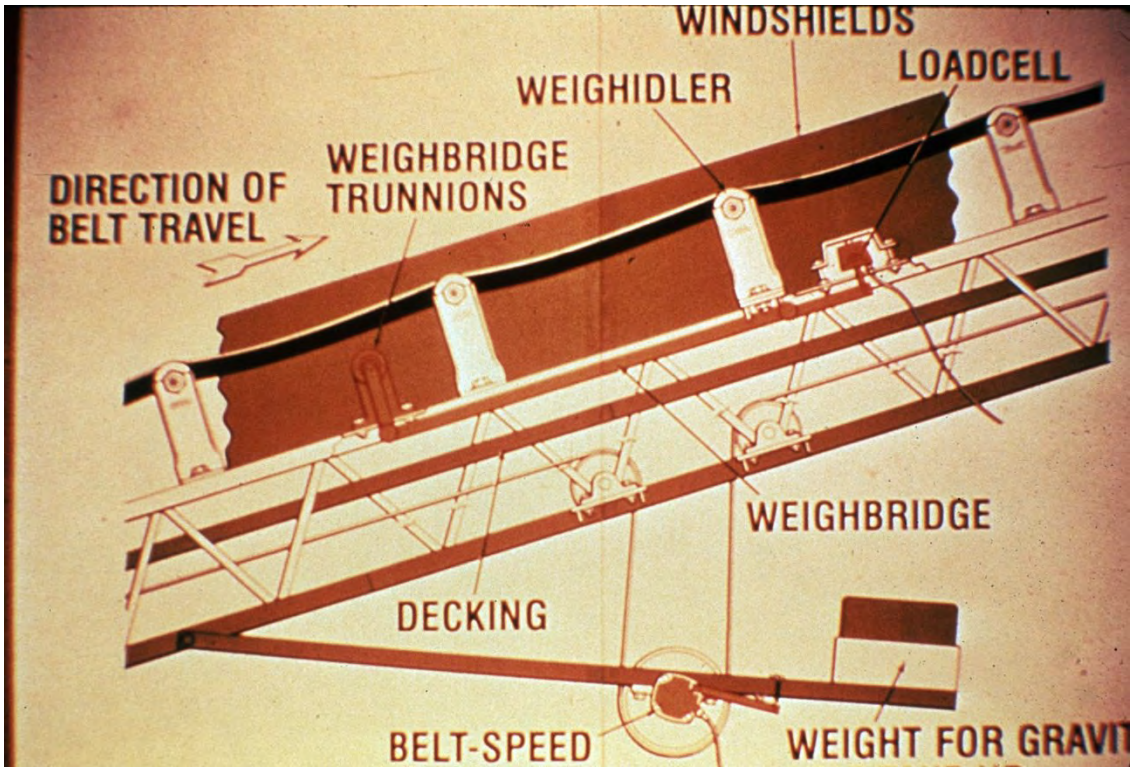
Slide 54



Slide 55. Inclined Conveyor Contains



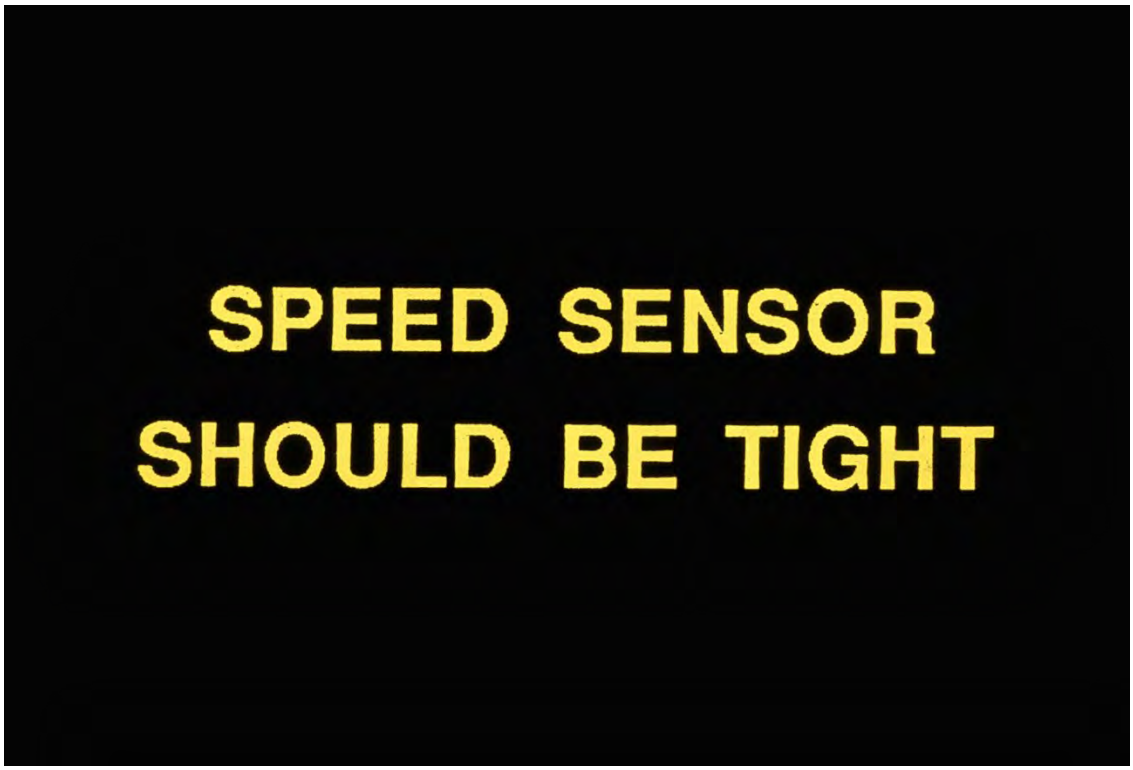
Slide 56. Accurate Aggregate Weight Sensing System



Slide 57

Slide 58

Slide 59



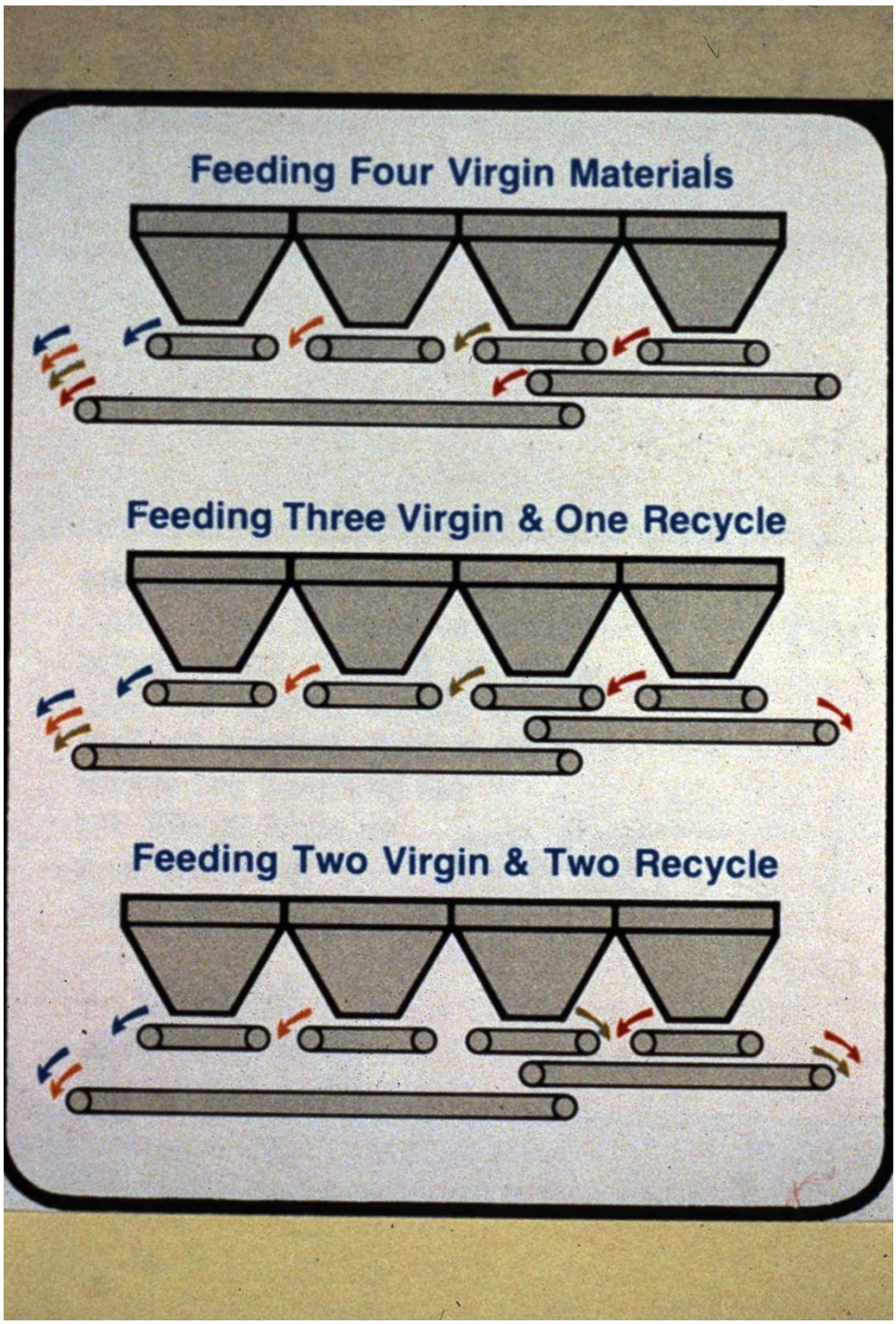
Slide 60

Slide 61

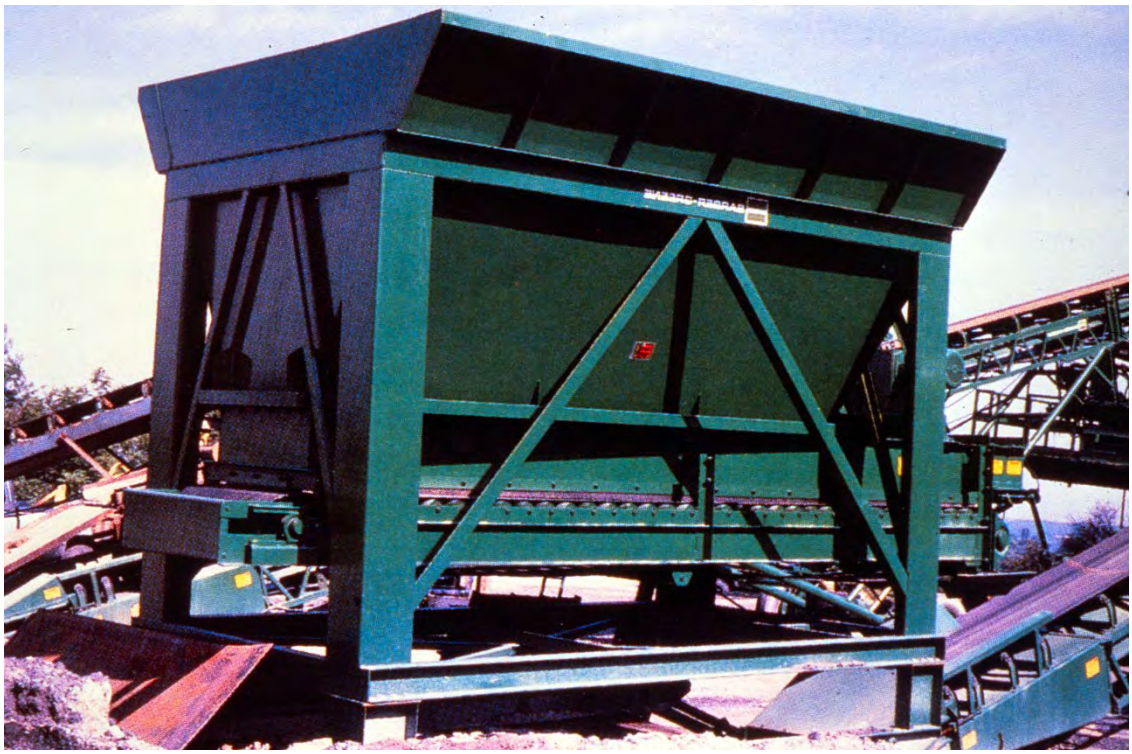
Slide 62. Reclaimed Material Cold Feed

Slide 63. Reclaimed Material Cold Feed Bins

Slide 64


Feeding Four Virgin Materials
Feeding Three Virgin & One Recycle
Feeding Two Virgin & Two Recycle

Slide 65



Slide 66

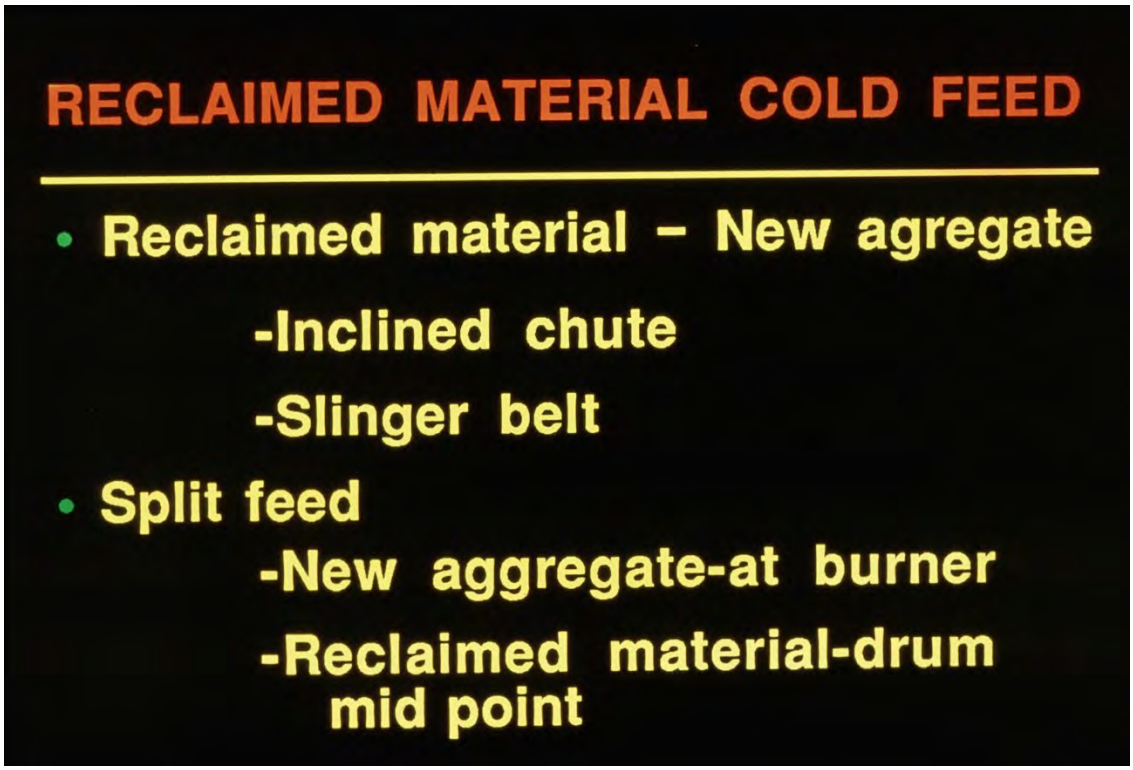
Slide 67

Slide 68

Slide 69

Slide 70

Slide 71. Reclaimed Material Entry



Slide 72. Reclaimed Material Cold Feed

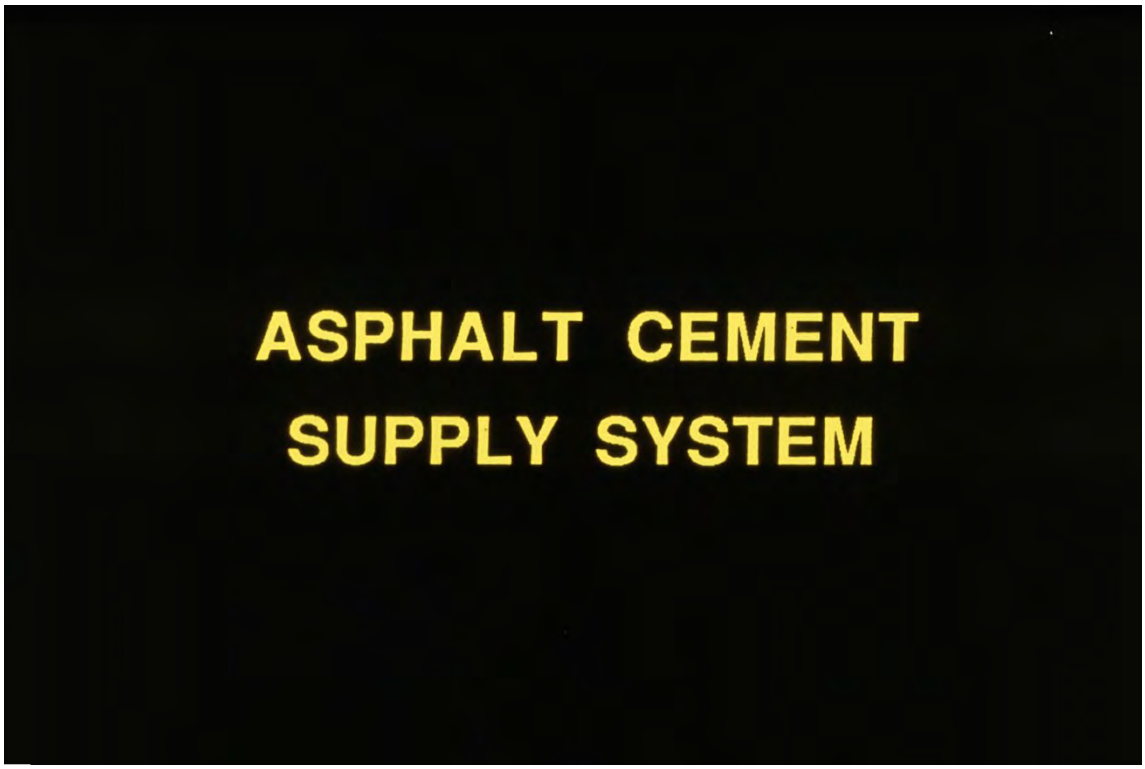
Slide 73

Slide 74

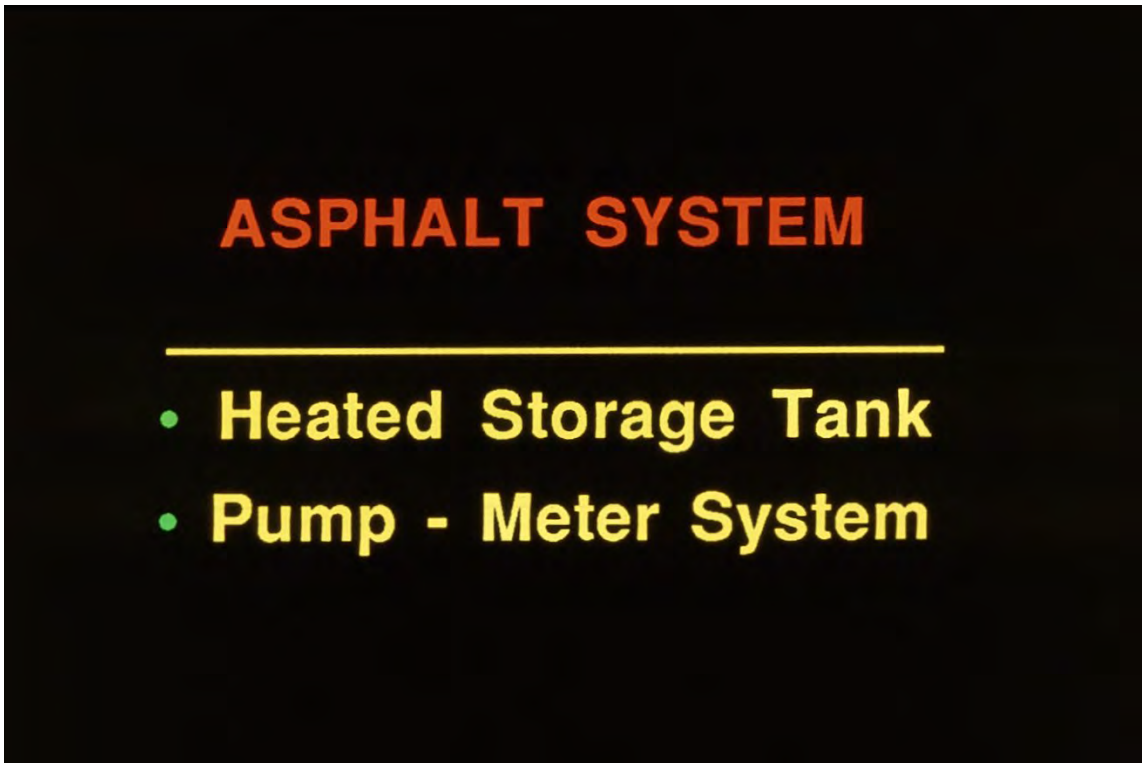
Slide 75

Slide 76

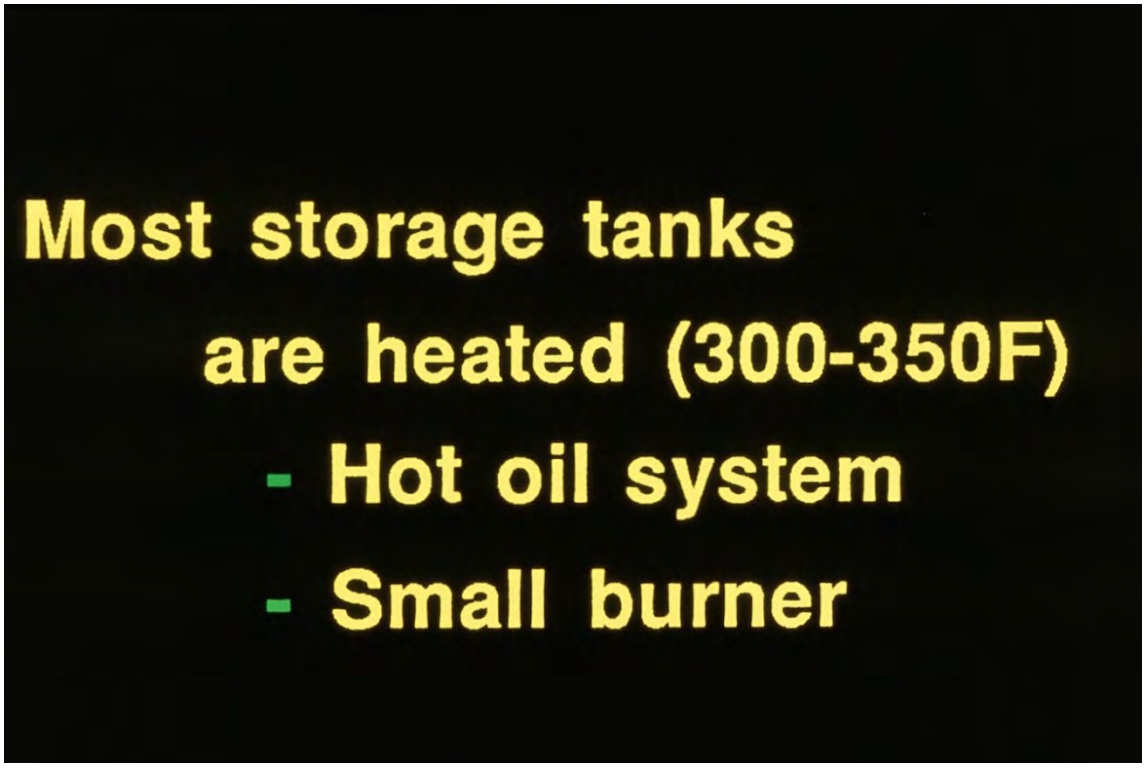
Chapter 5. Asphalt Cement Supply System



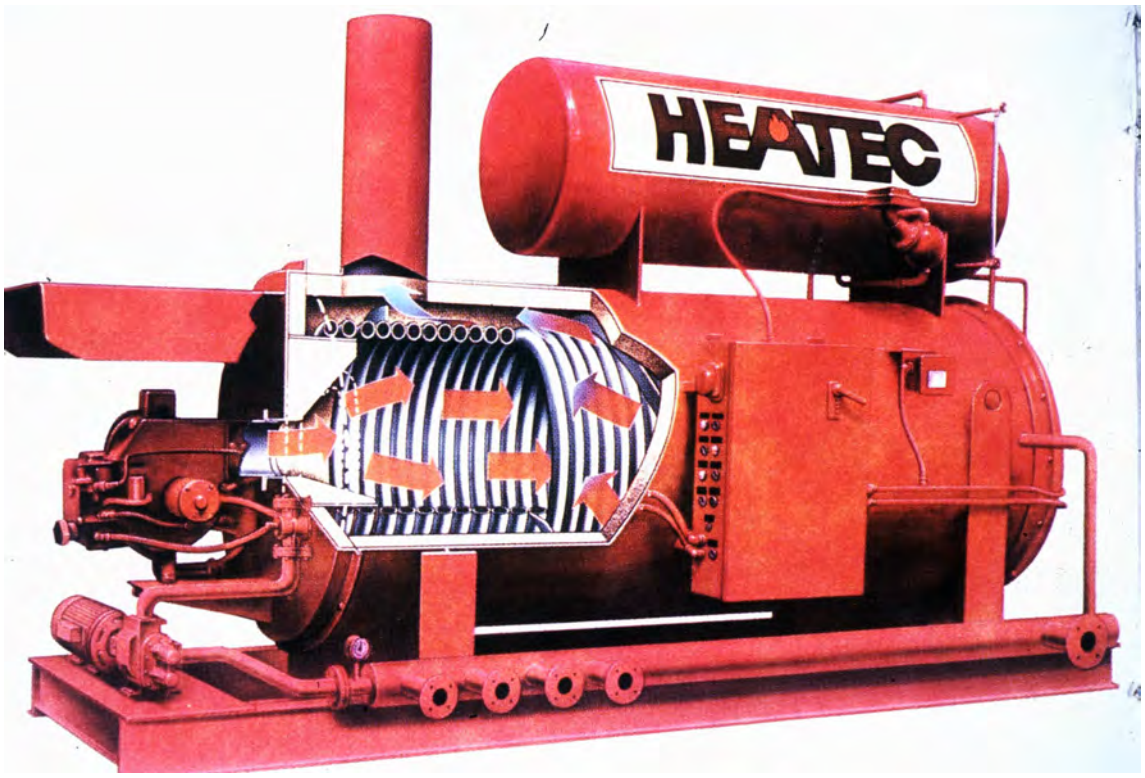
Slide 1



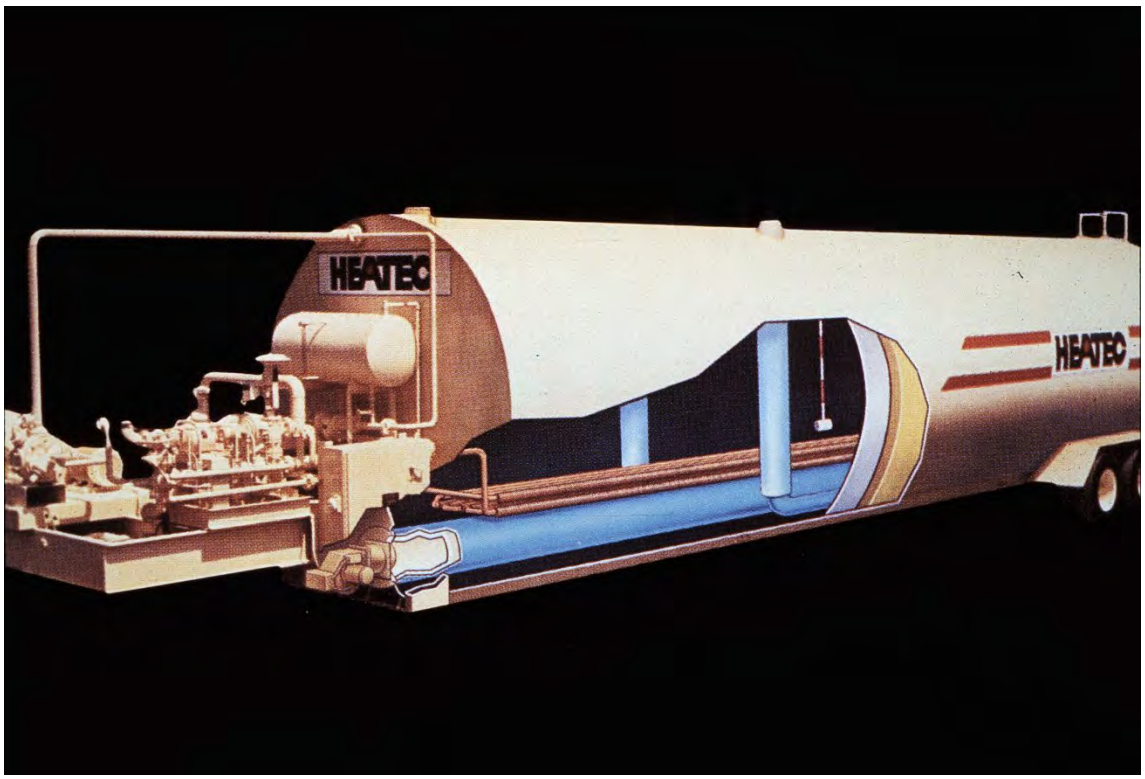
Slide 2. Asphalt System



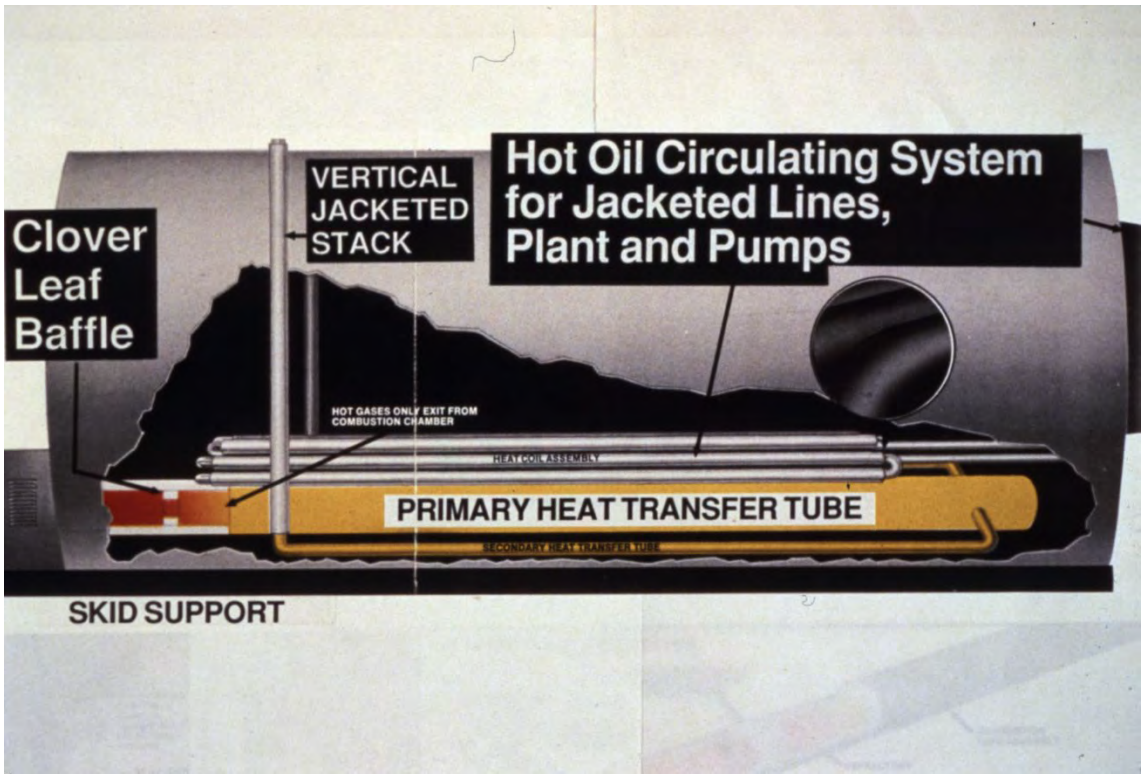
Slide 3



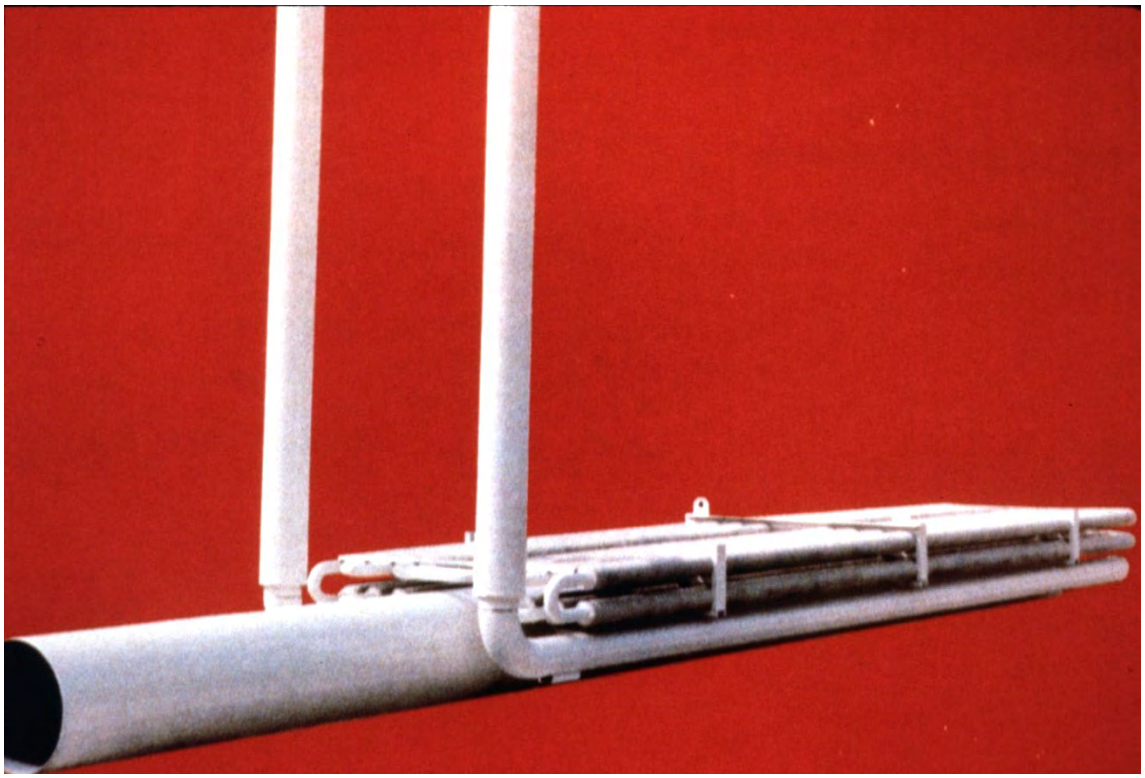
Slide 4



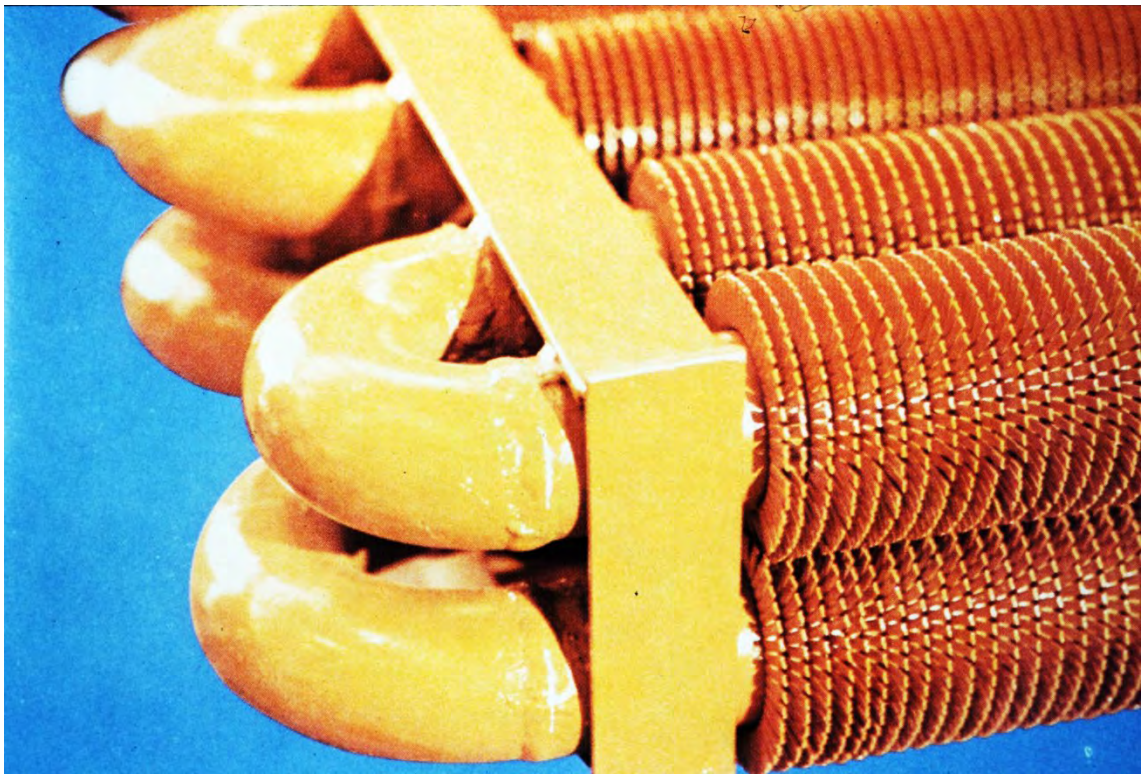
Slide 5



Slide 6

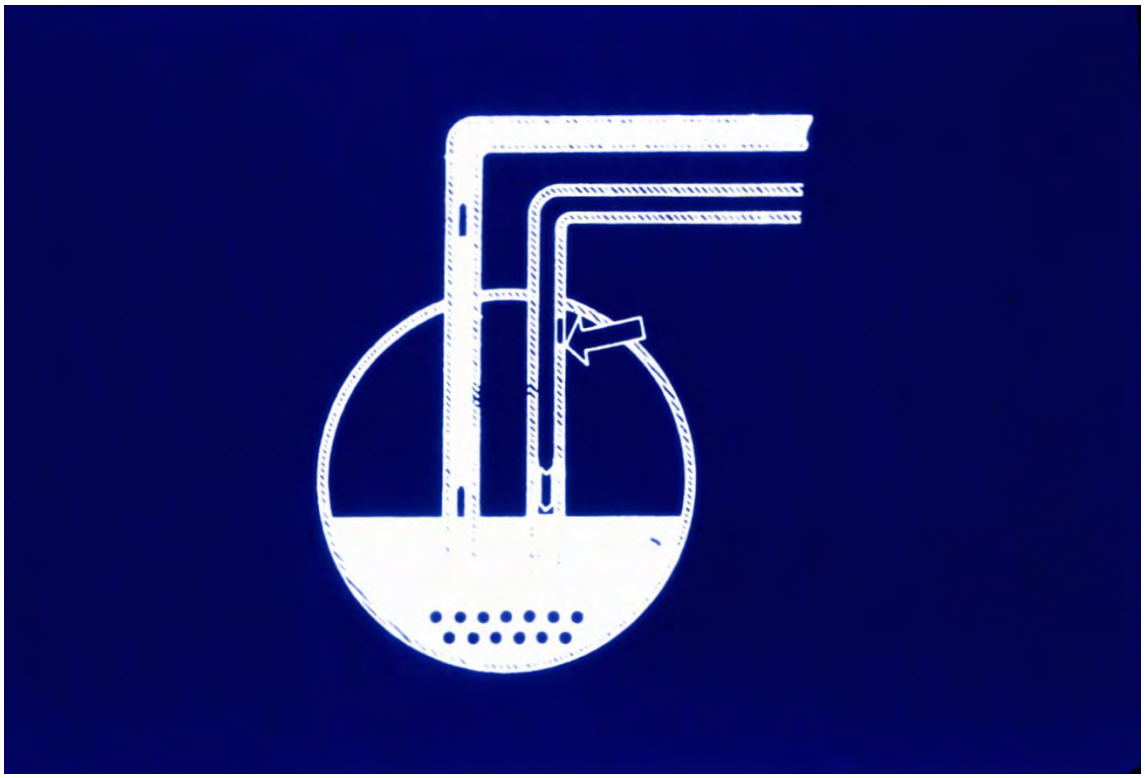


Slide 7

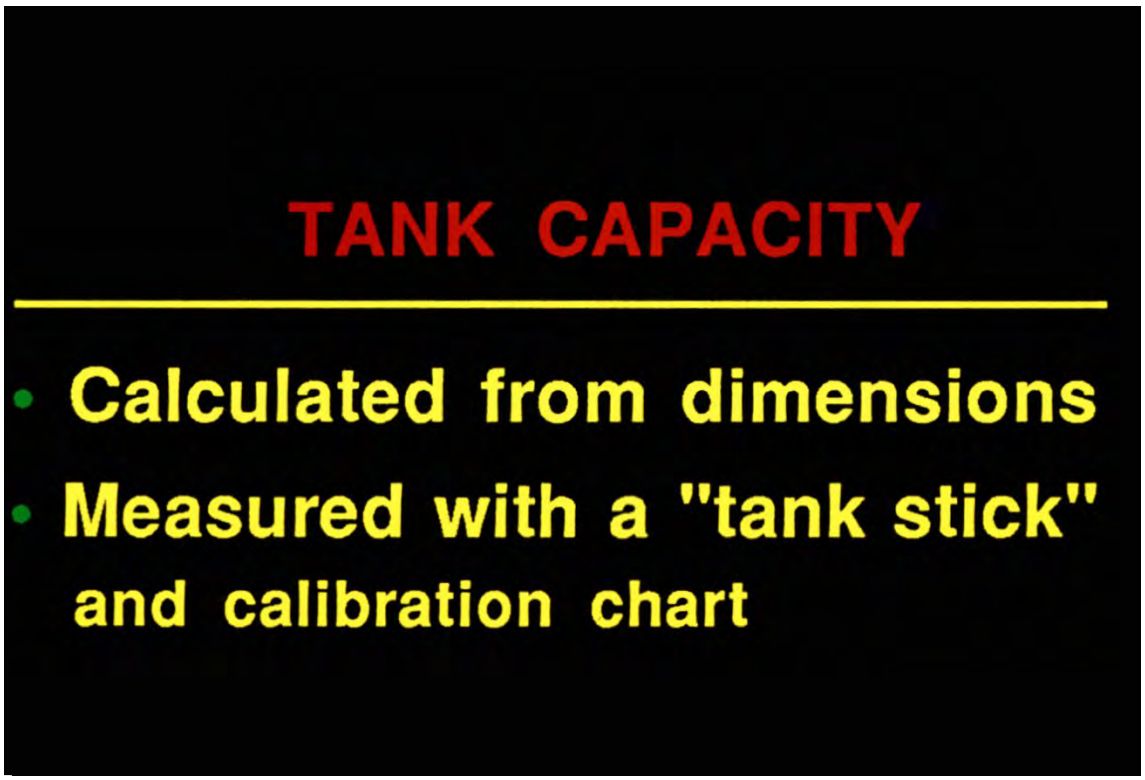


Slide 8

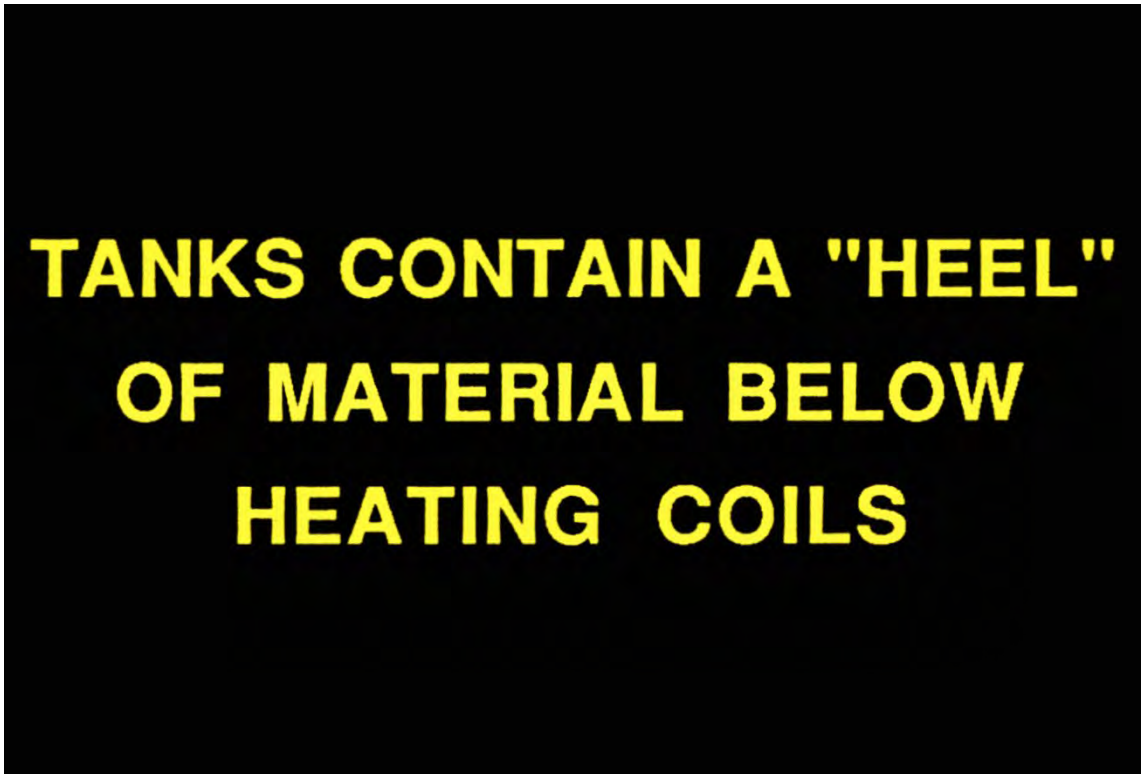
Slide 9



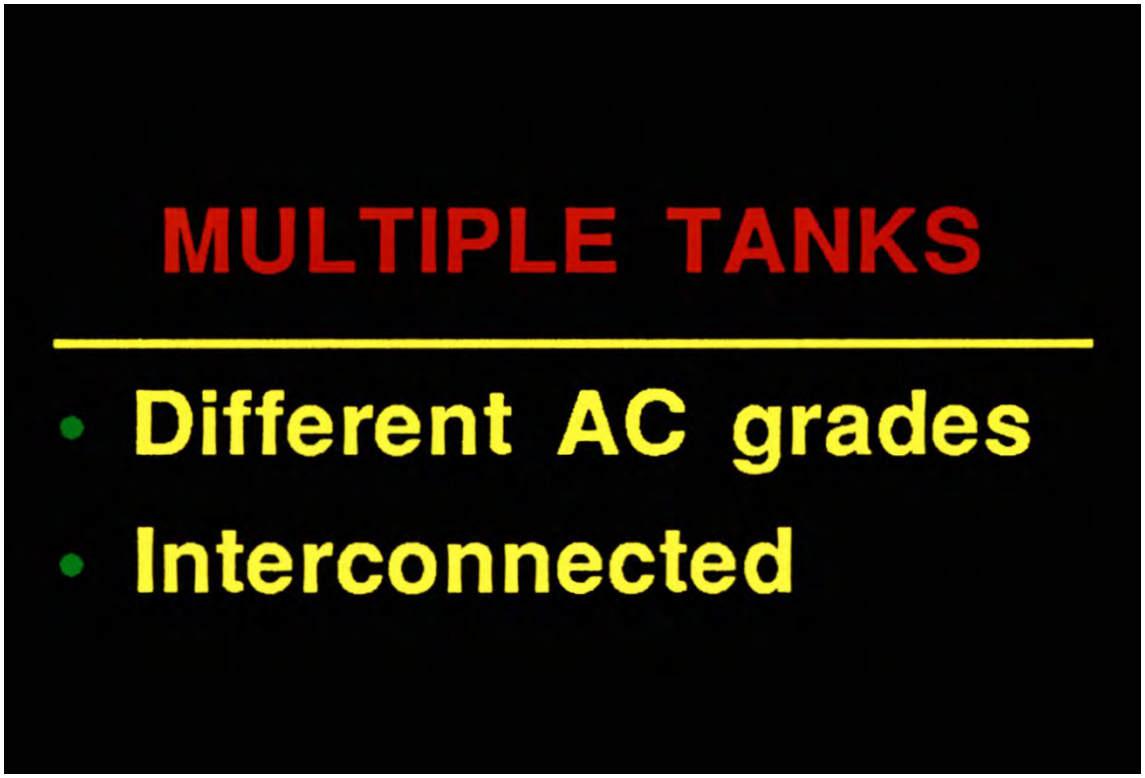
Slide 10



Slide 11. Tank Capacity

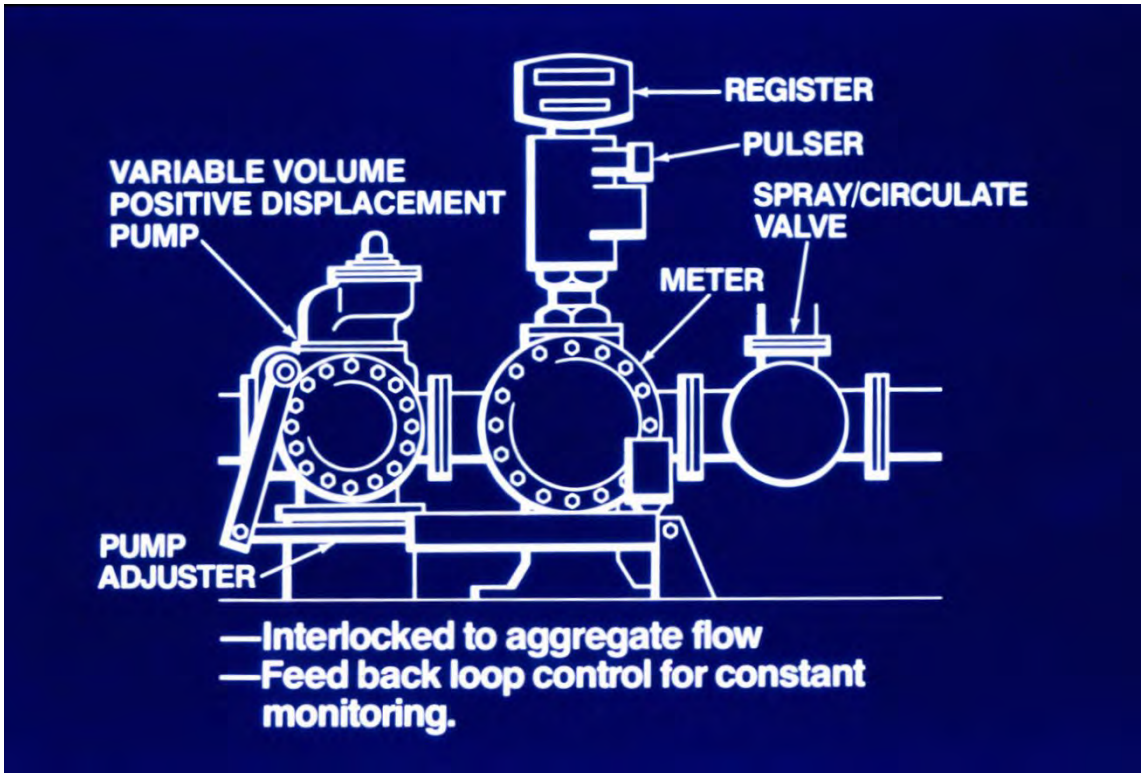


Slide 12

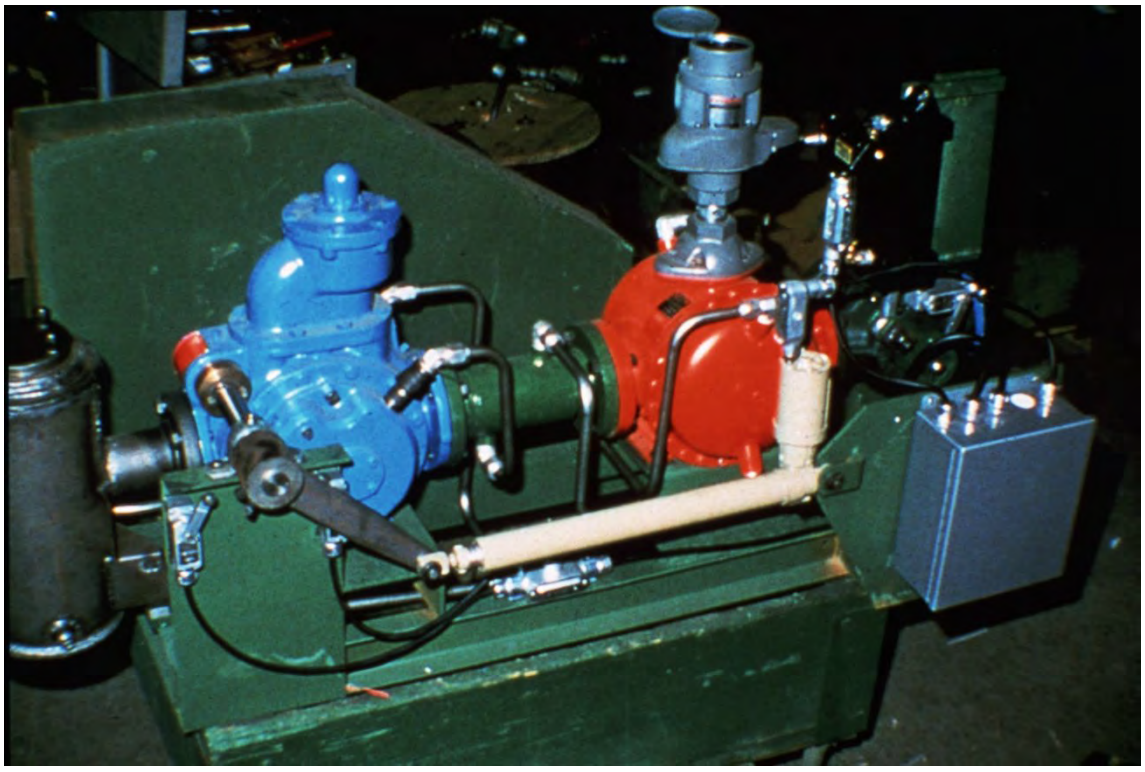


Slide 13. Multiple Tanks

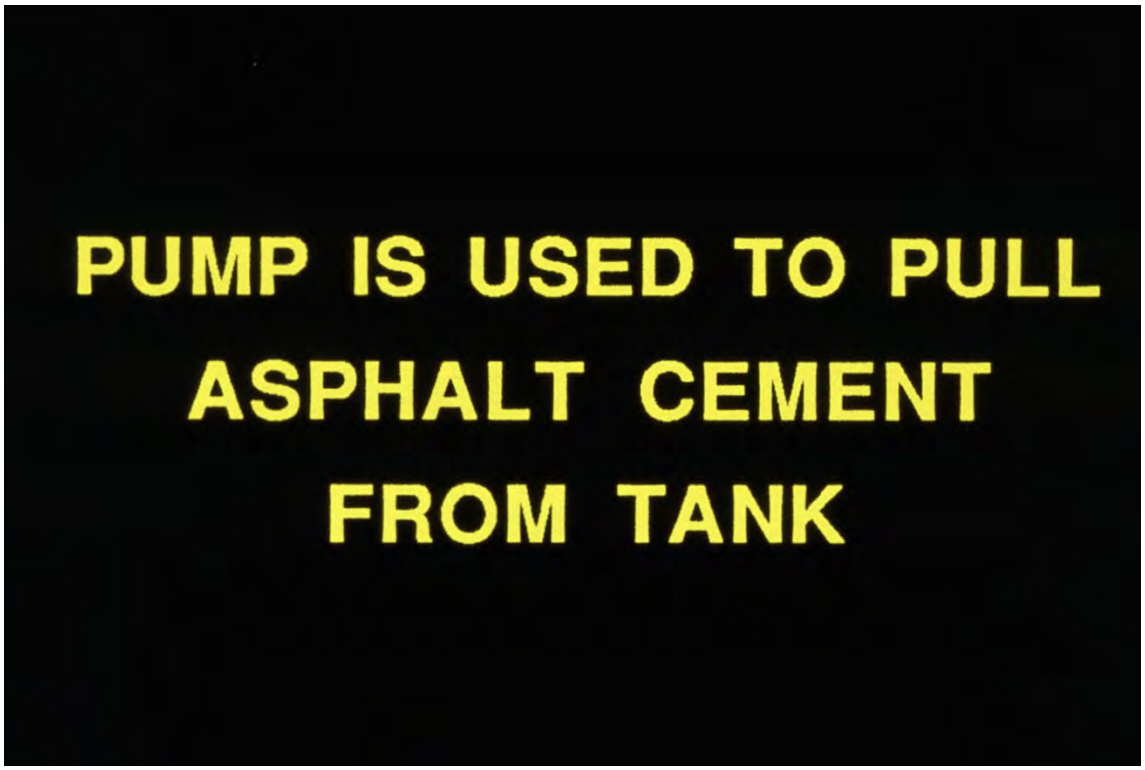
Slide 14. Bitumen Metering System



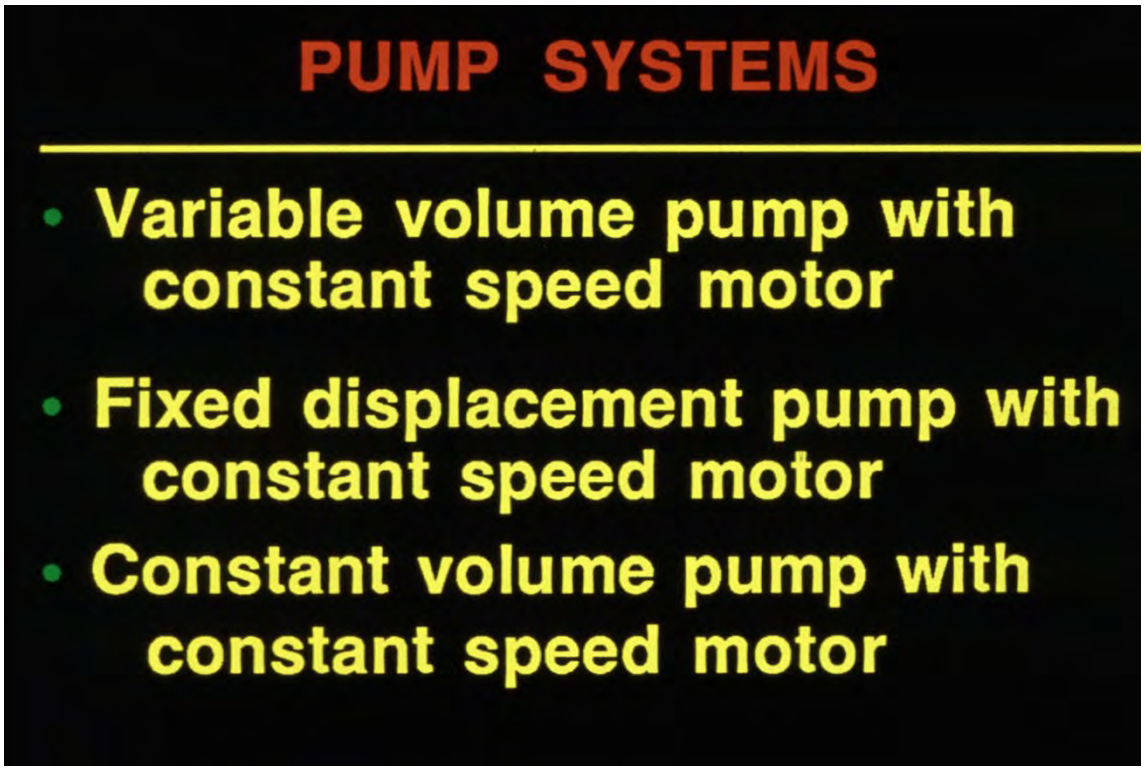
Slide 15



Slide 16

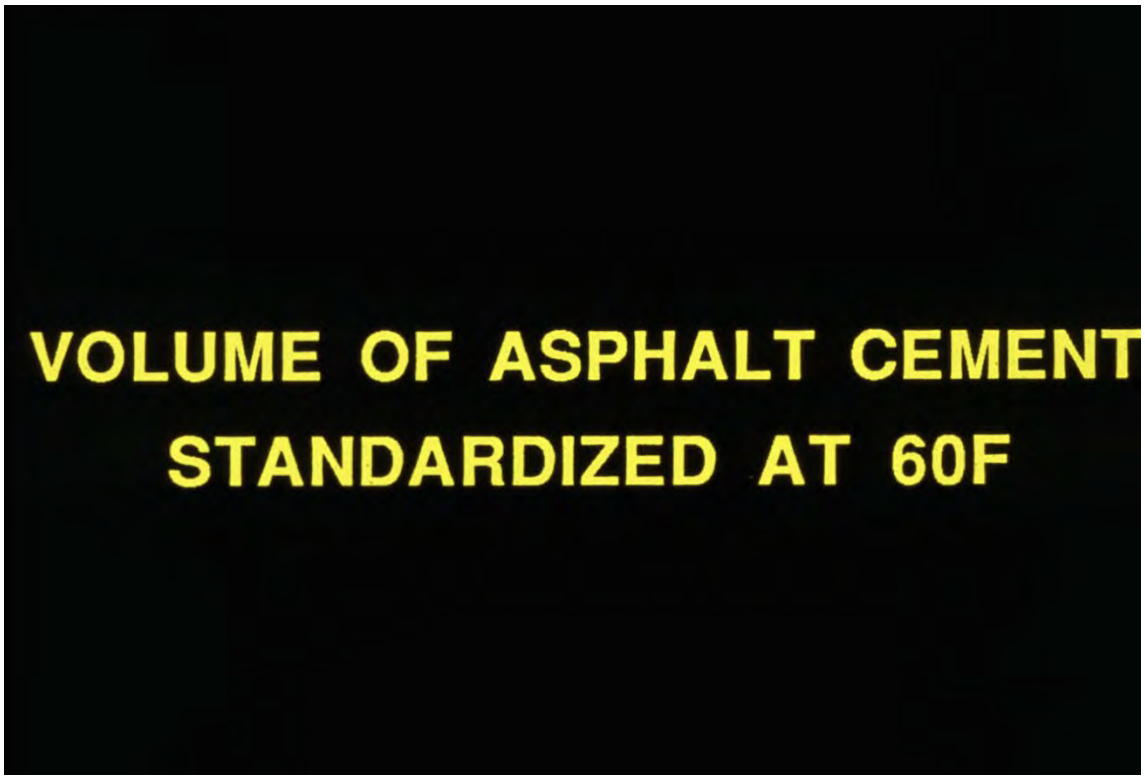


Slide 17

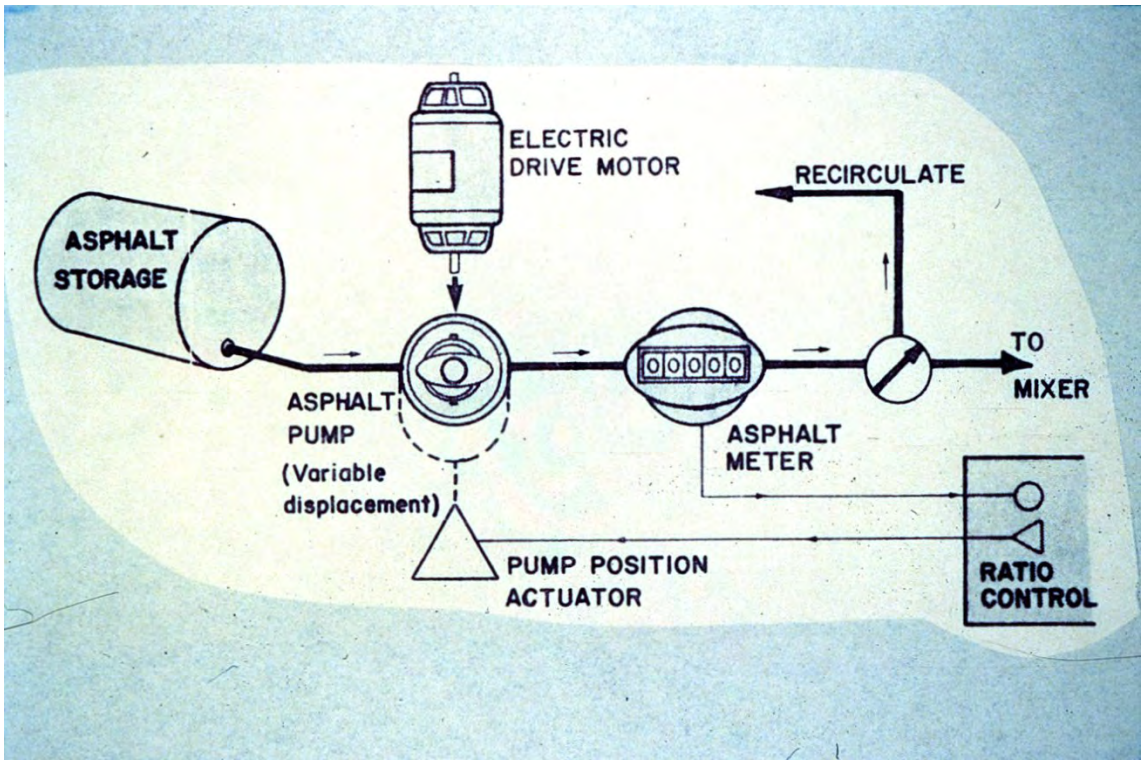


Slide 18. Pump Systems

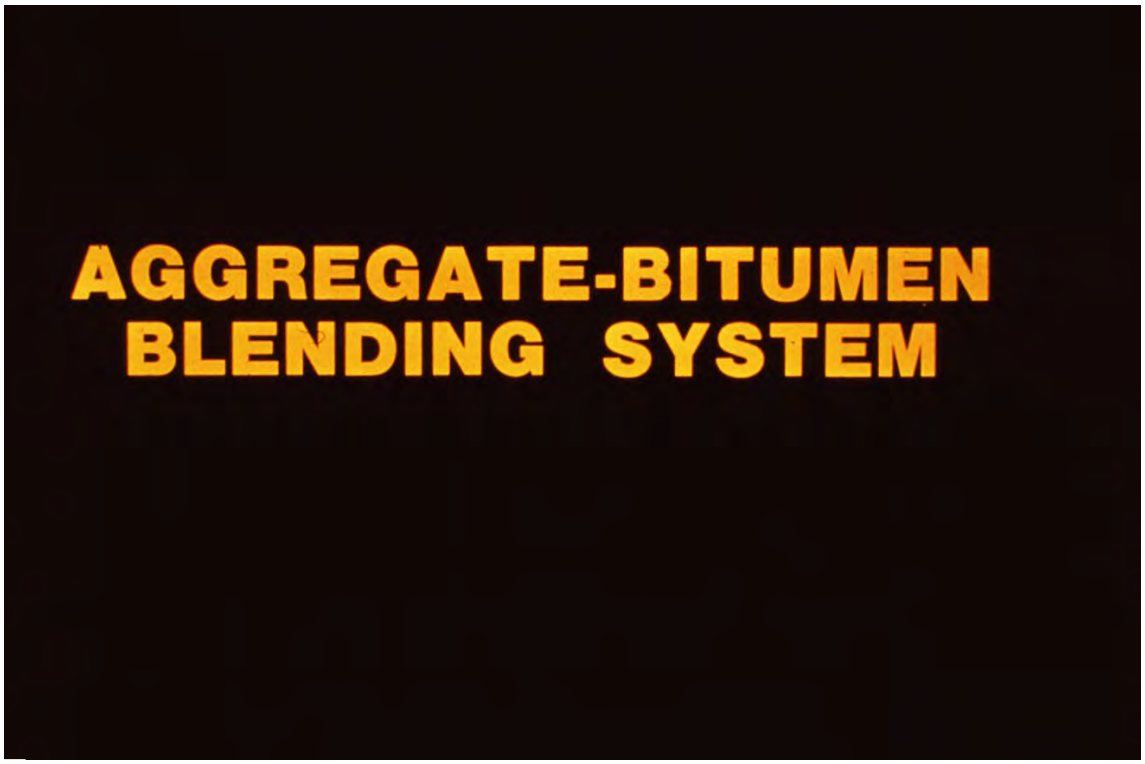
Slide 19. Meters Include



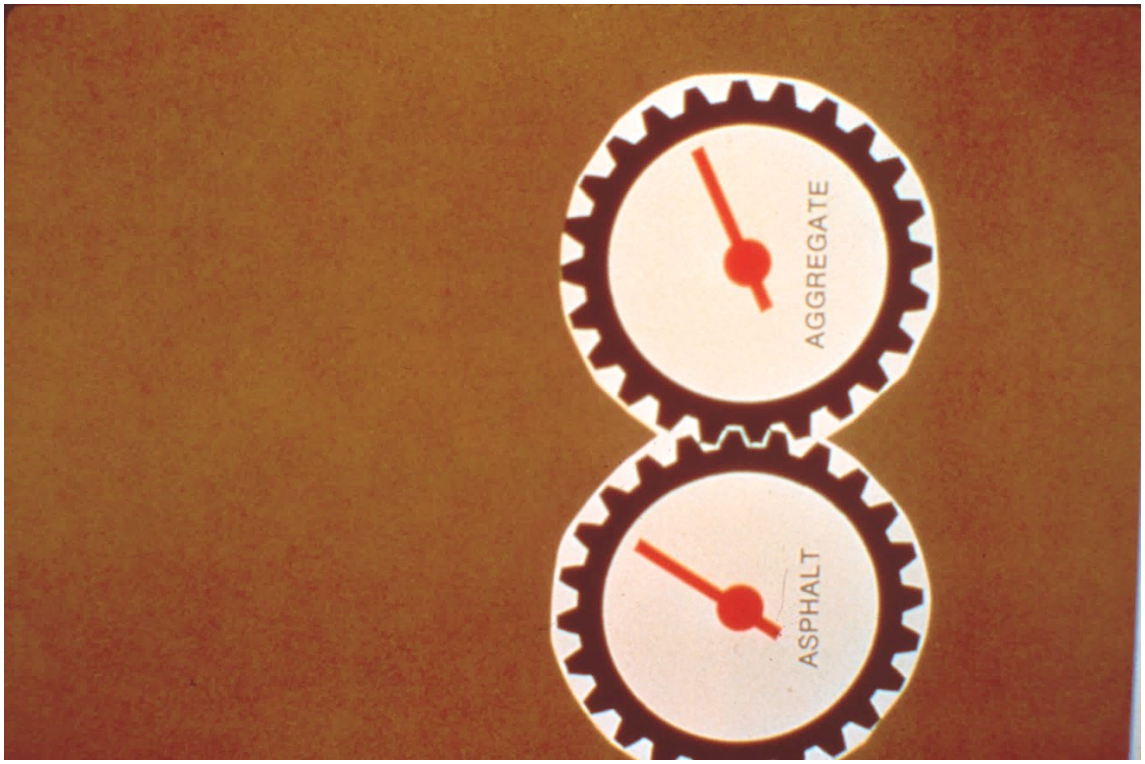
Slide 20



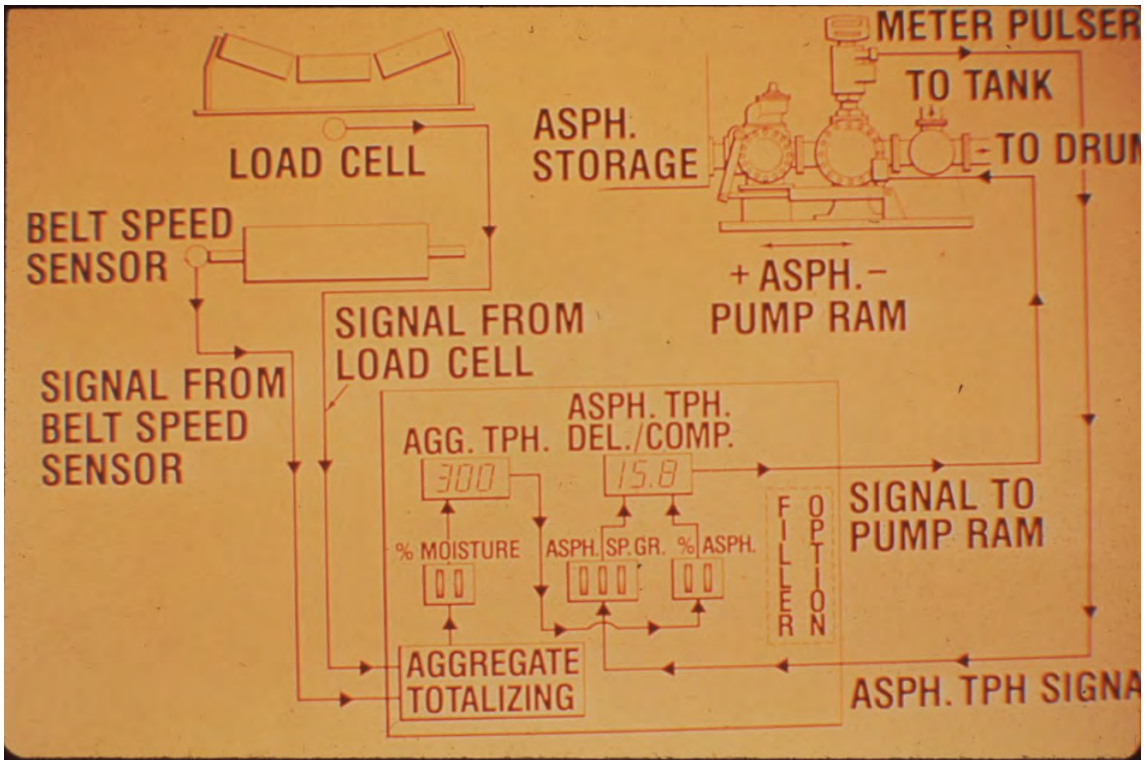
Slide 21



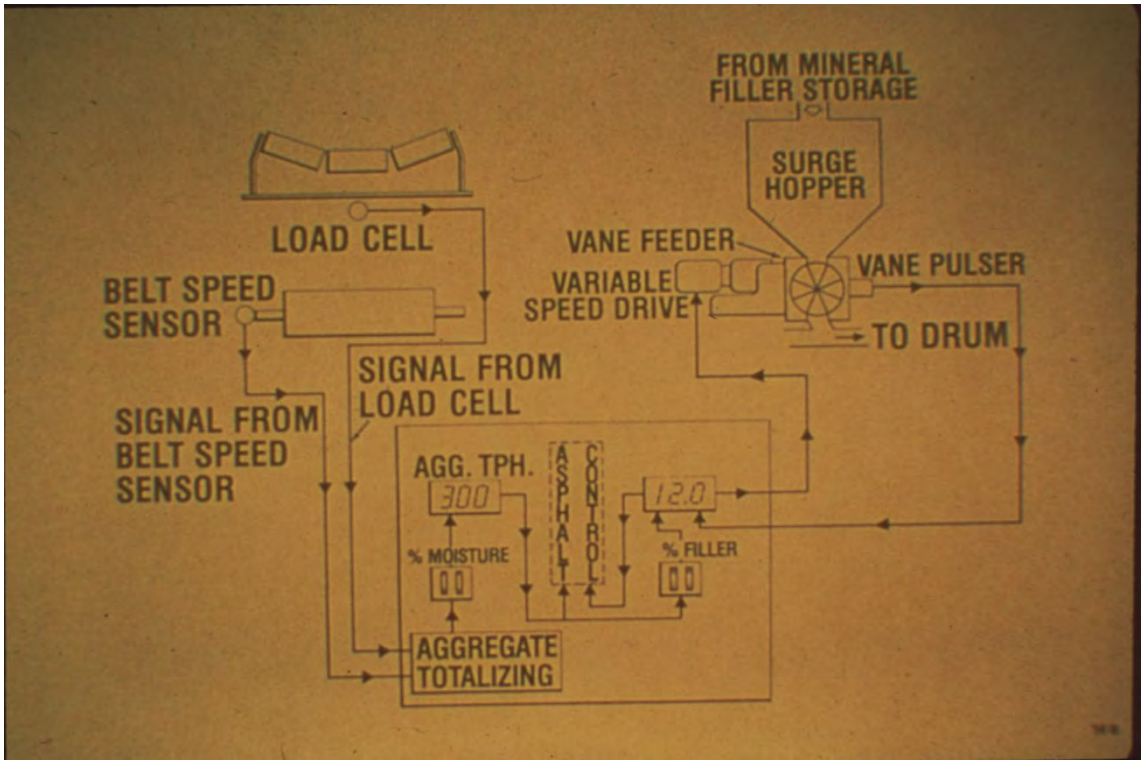
Slide 22. Aggregate-Bitumen Blending System



Slide 23

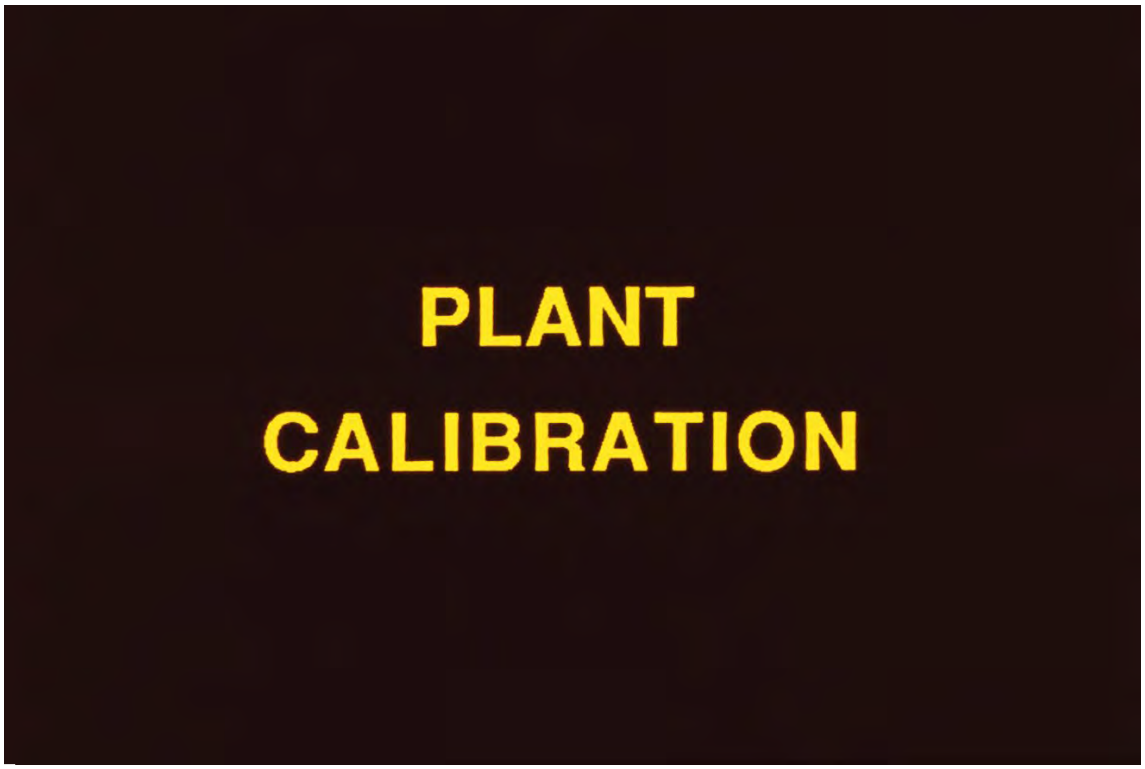


Slide 24



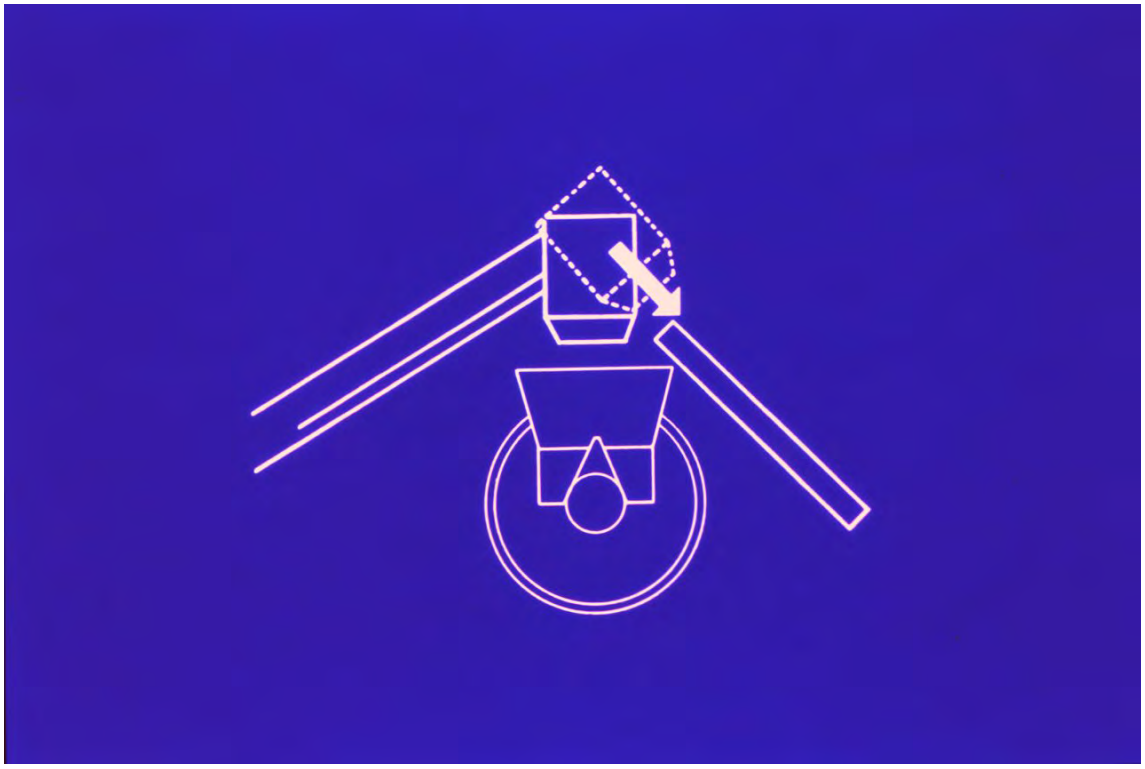
Slide 25

Chapter 6. Plant Calibration



Slide 1

Slide 2. Inclined Conveyor Contains

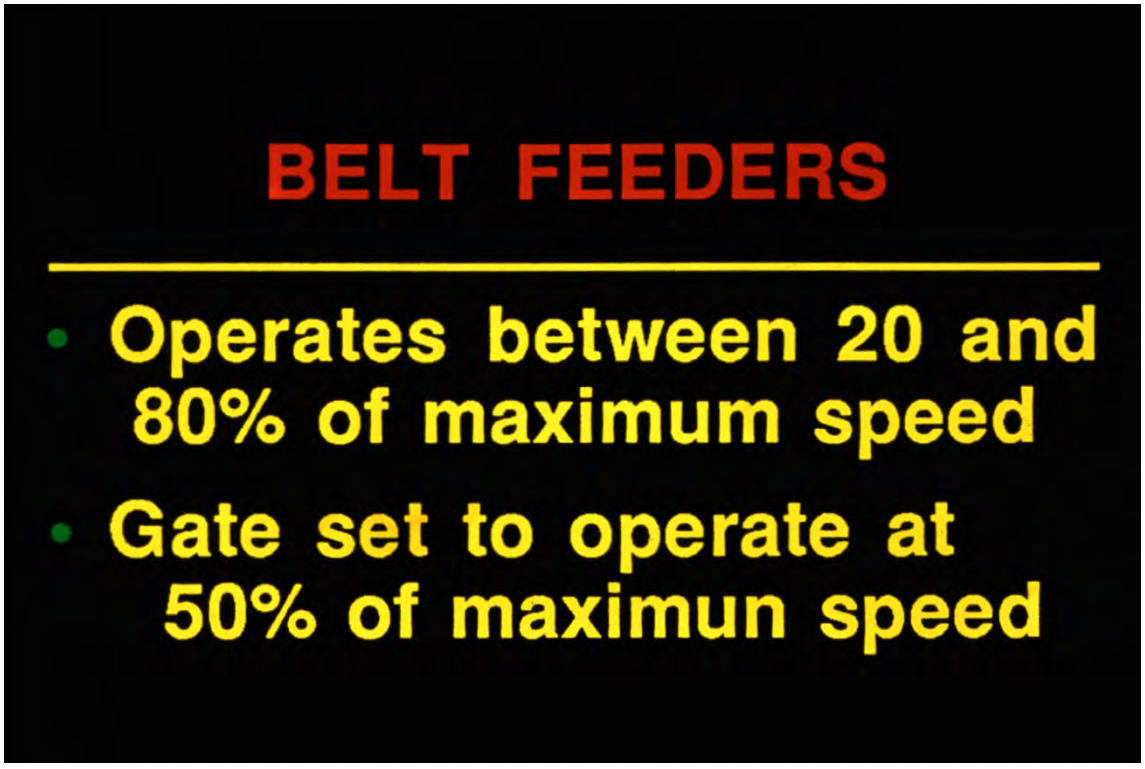


Slide 3

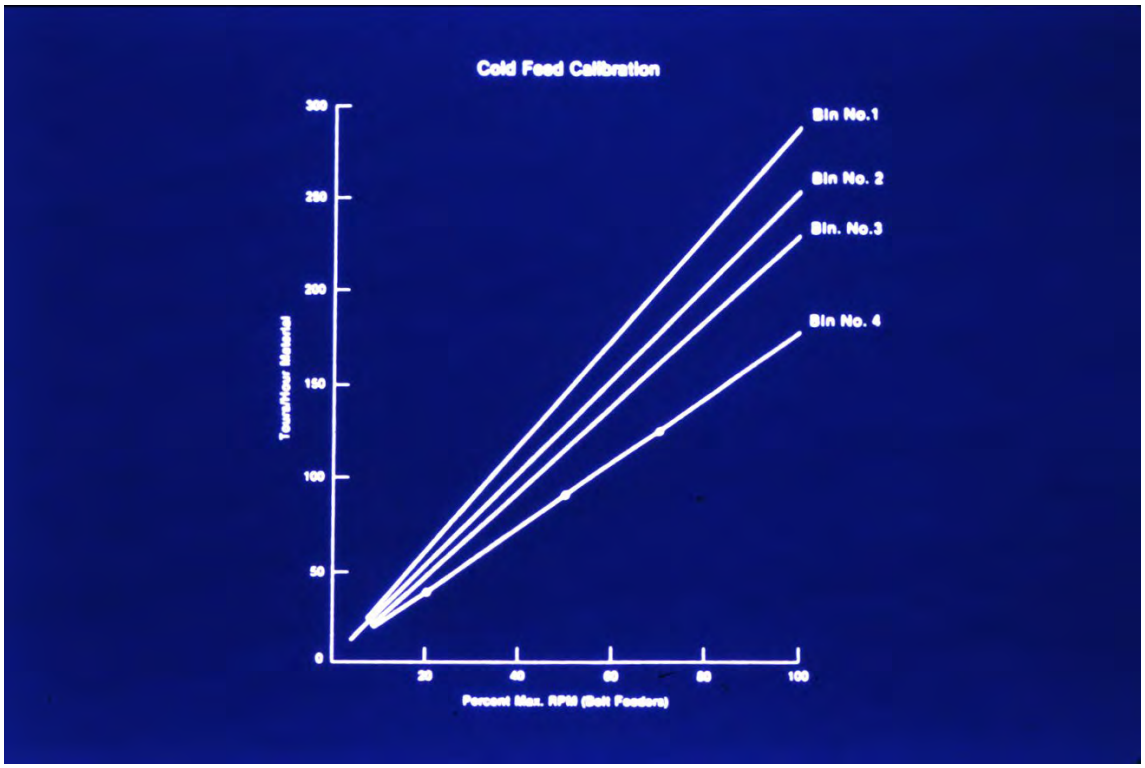
Slide 4

Slide 5. Two Cold Feed Systems

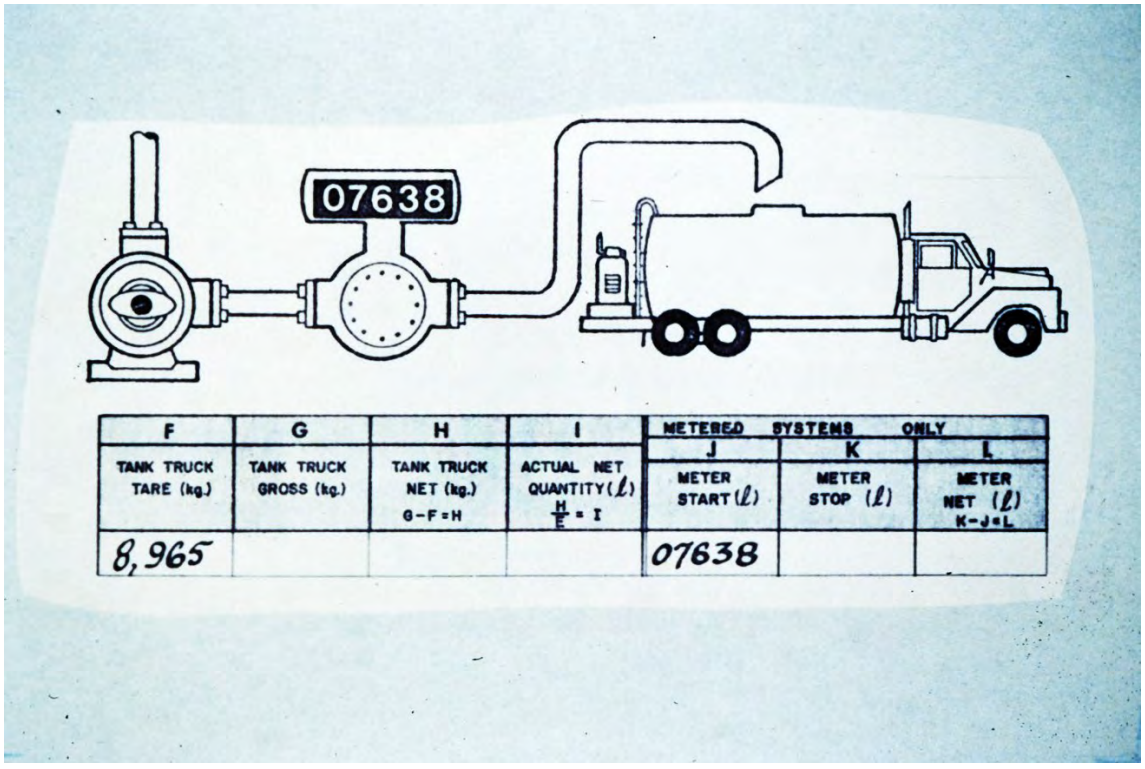
Slide 6. Constant Opening-Variable Speed



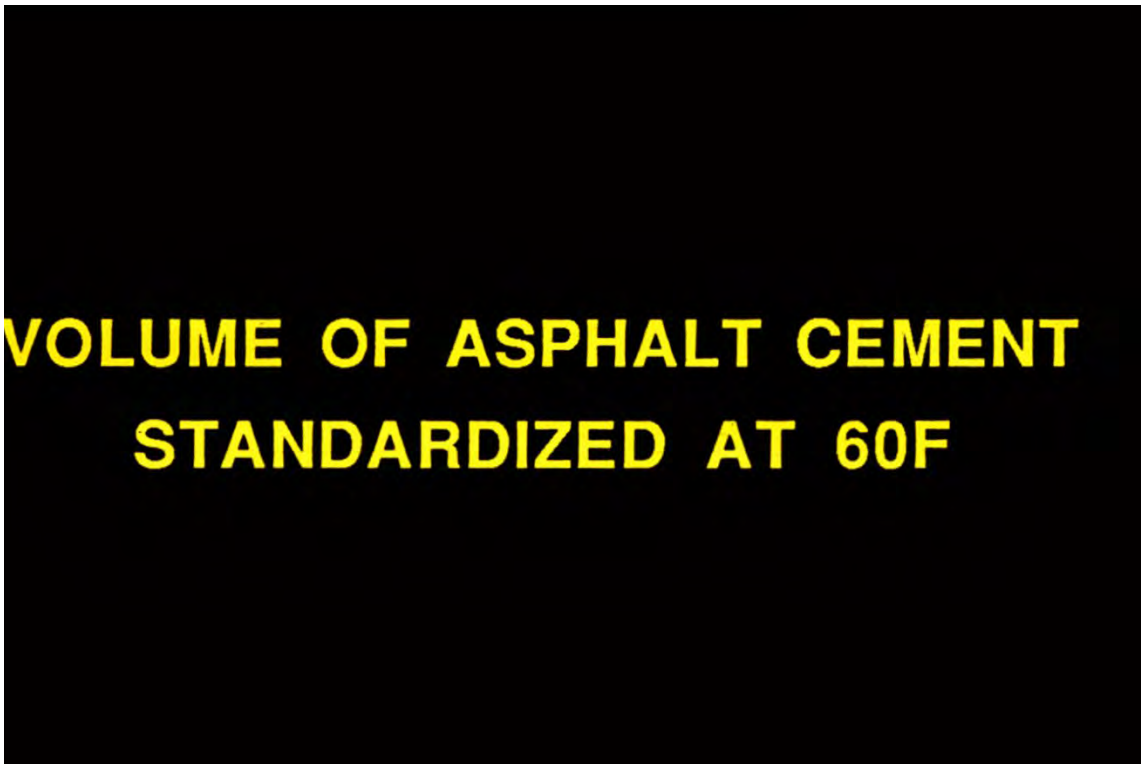
Slide 7. Belt Feeders



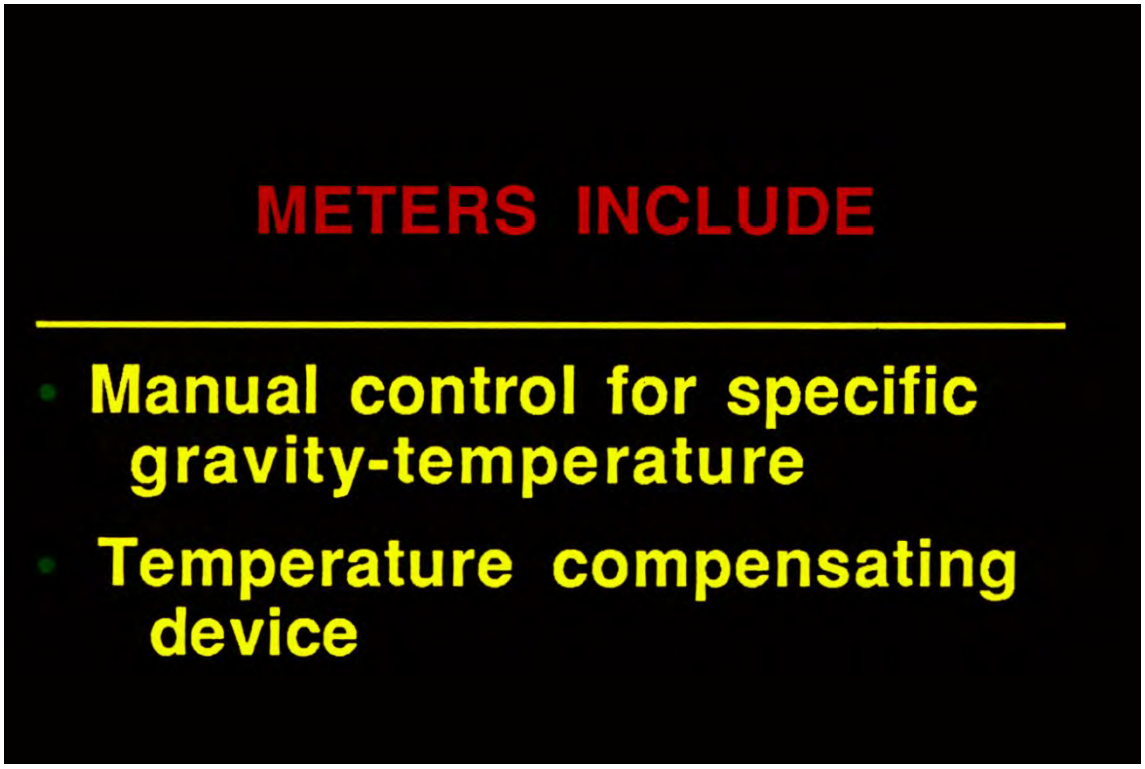
Slide 8. Cold Feed Calibration [Graph]



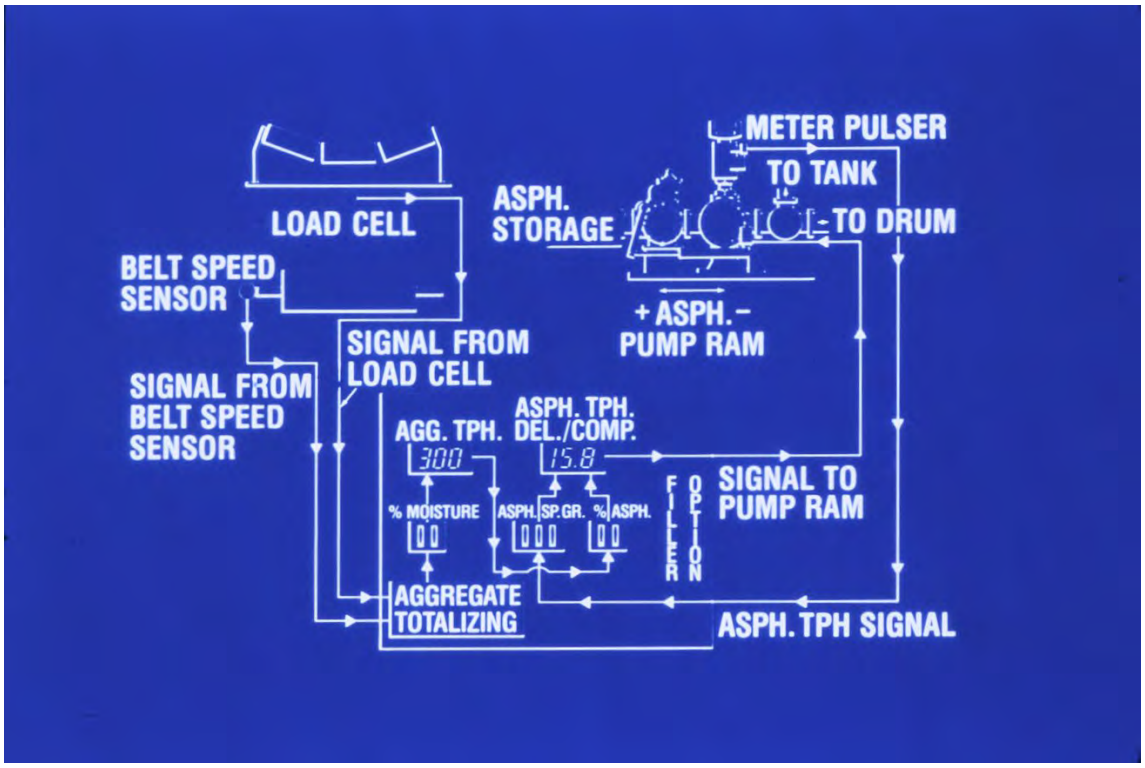
Slide 9



Slide 10



Slide 11. Meters Include

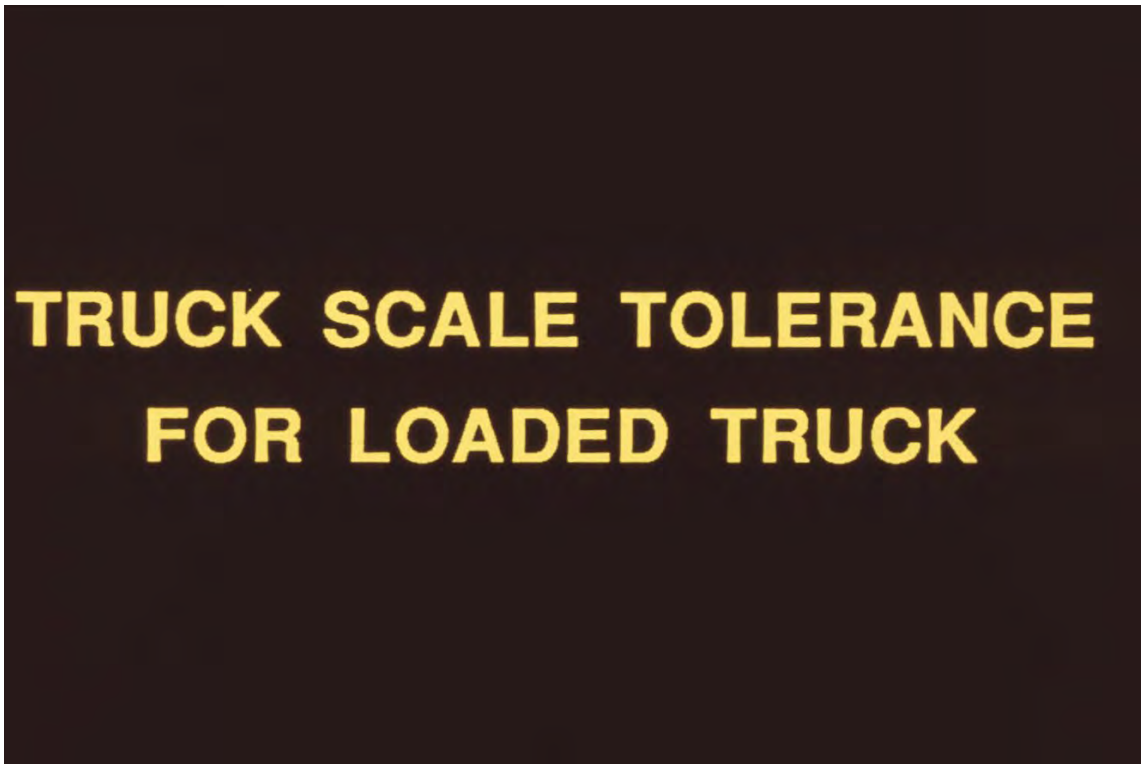


Slide 12

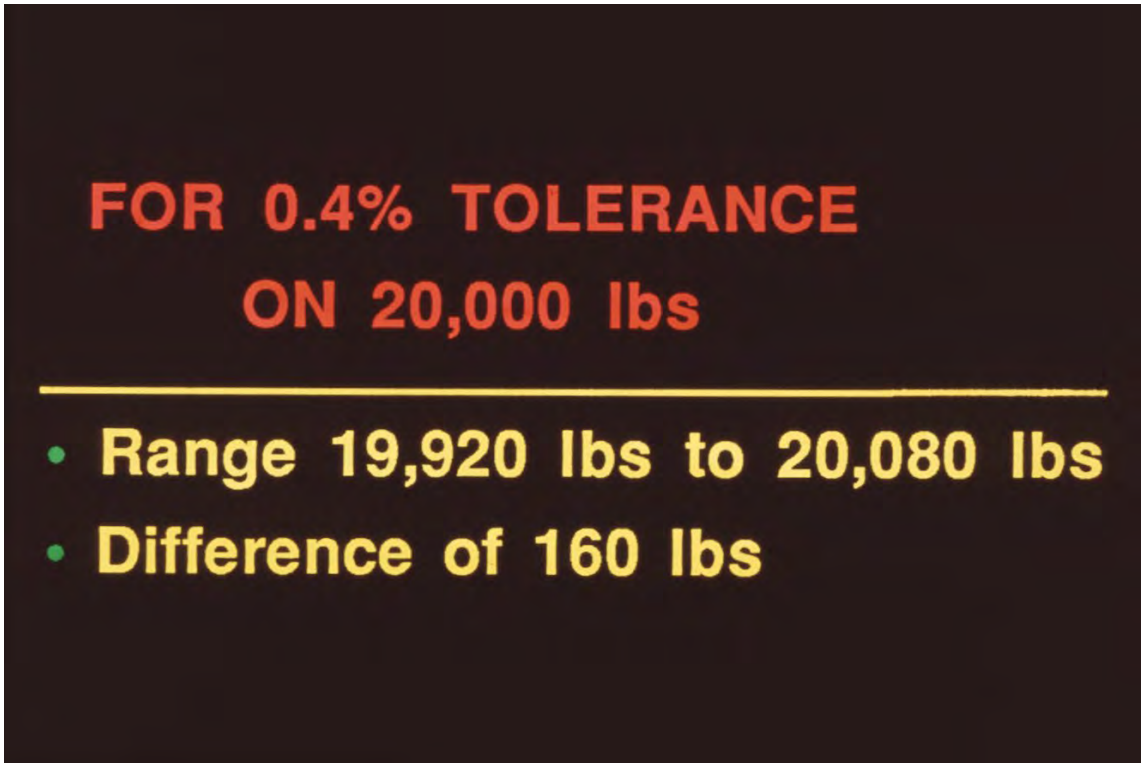
The presentation binder did not include a Slide 13.

Slide 14. Scale Tolerances

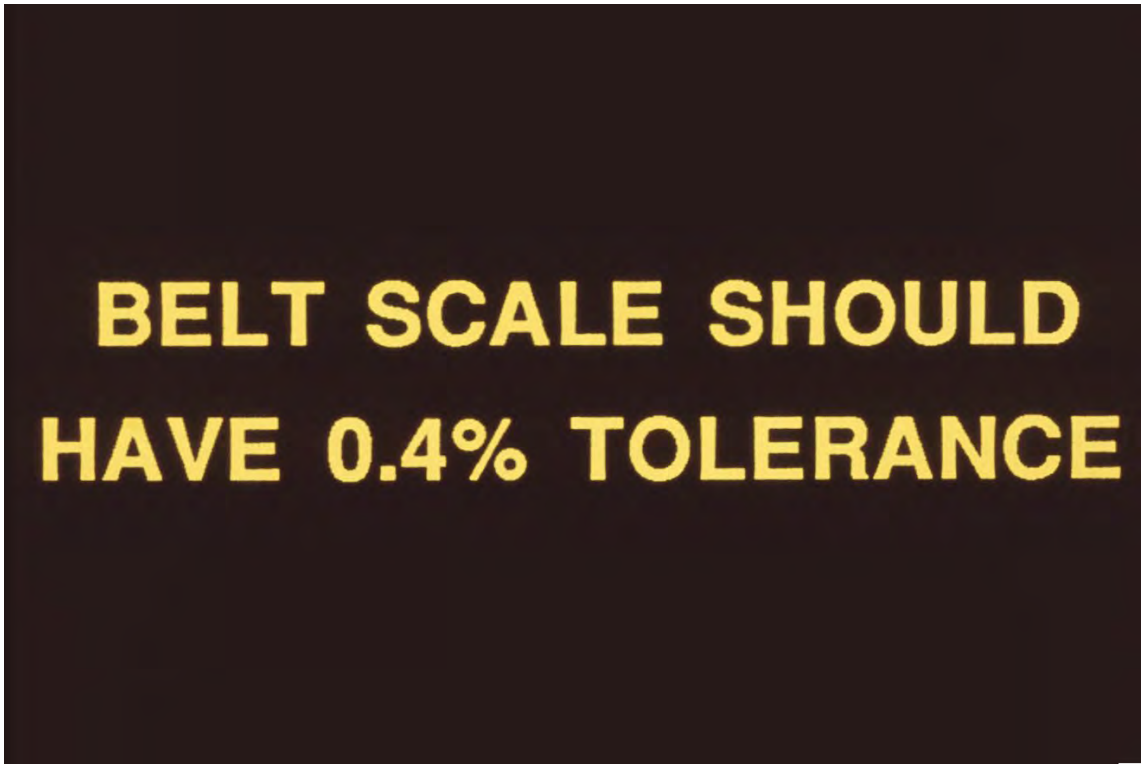
Slide 15. 0.4% Tolerance



Slide 16. Truck Scale Tolerance for Loaded Truck

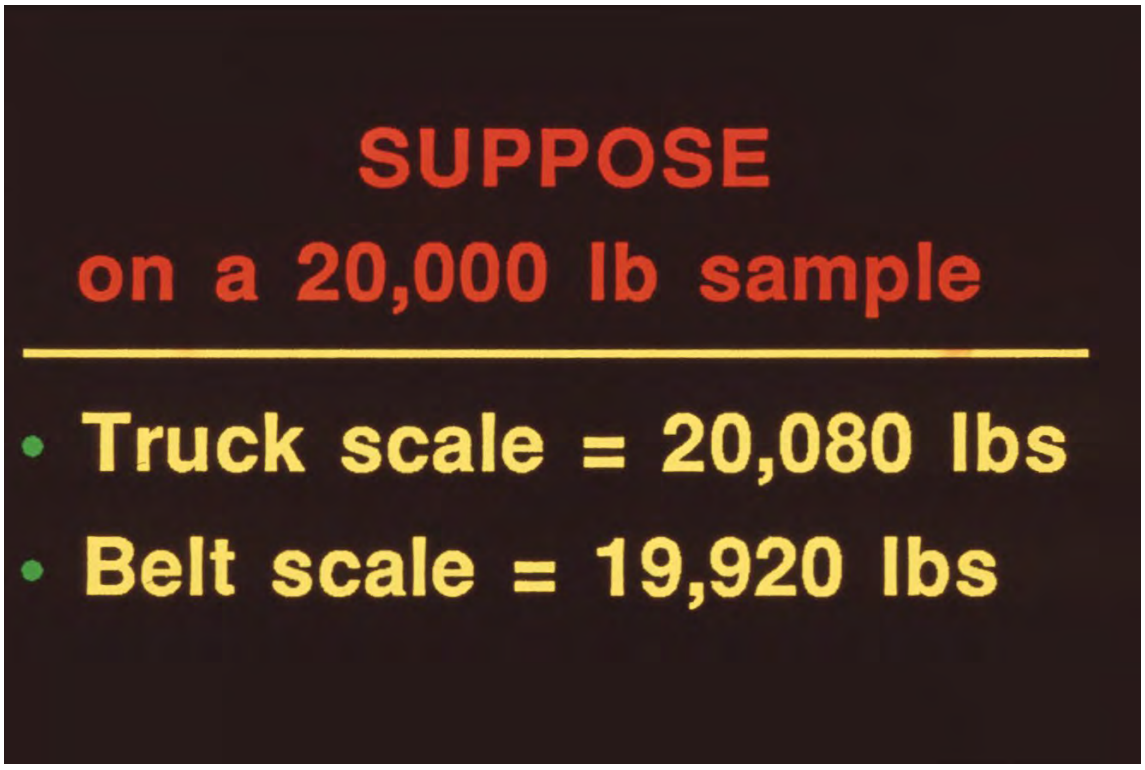


Slide 17. For 0.4% Tolerance on 20,000 lbs

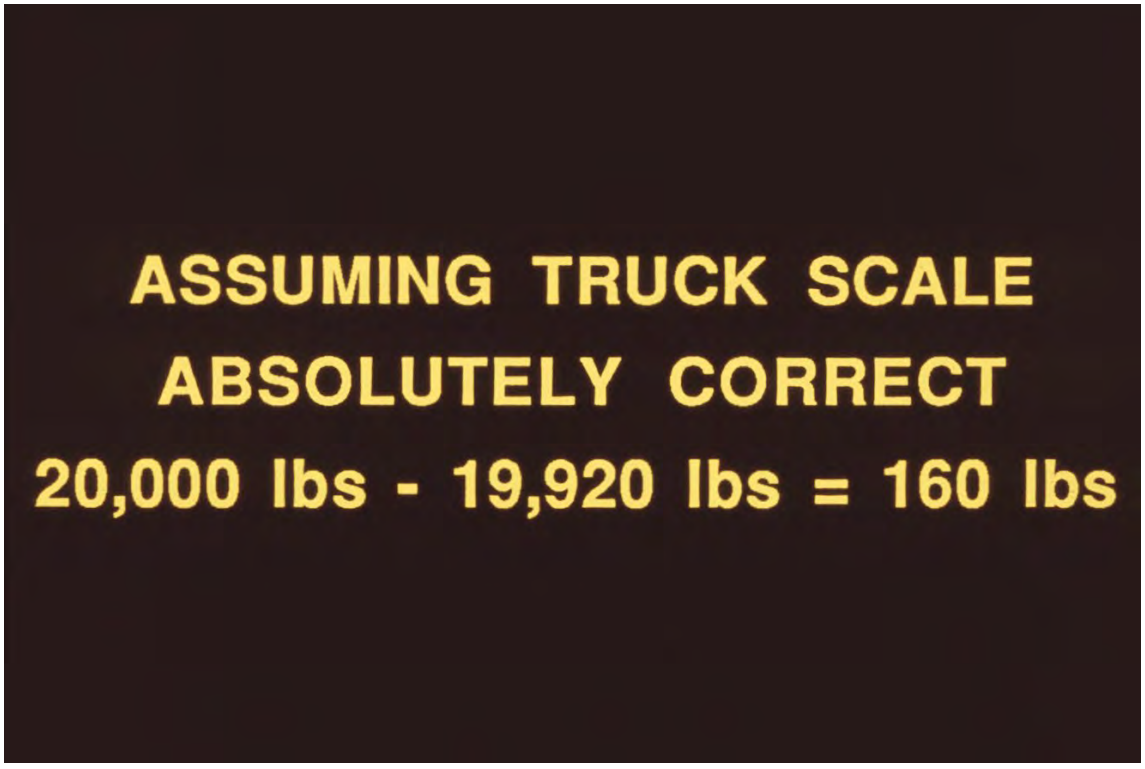


Slide 18

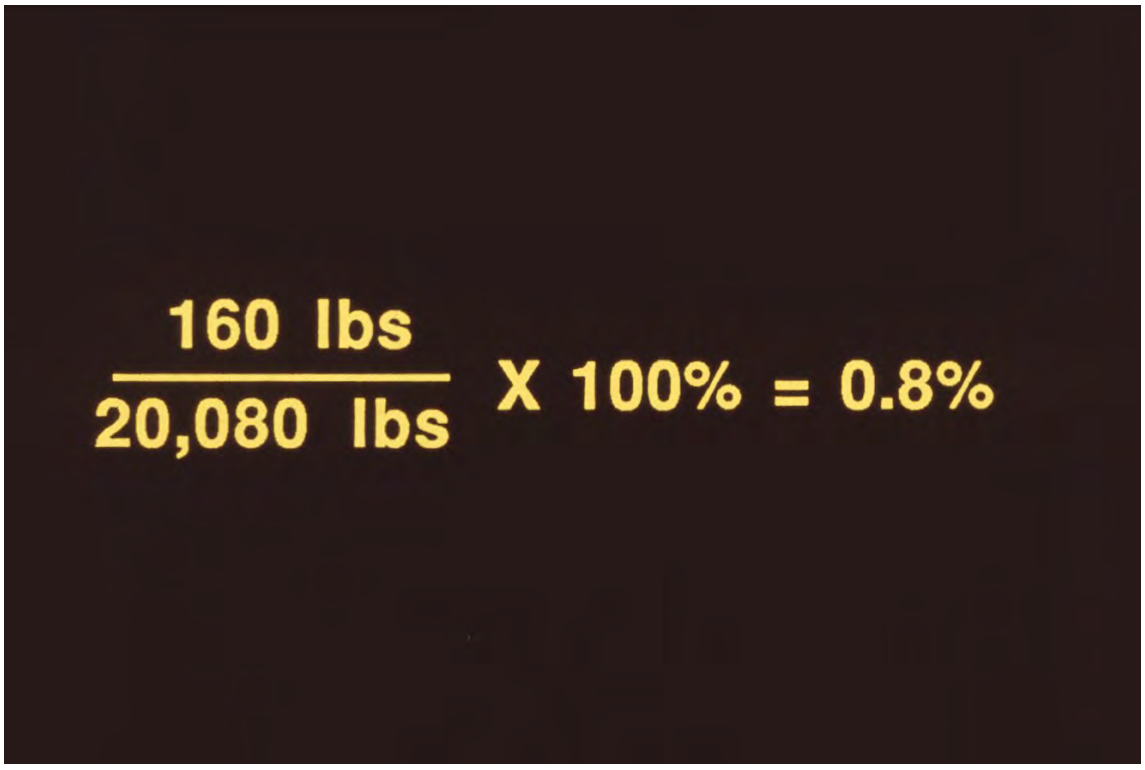
Slide 19



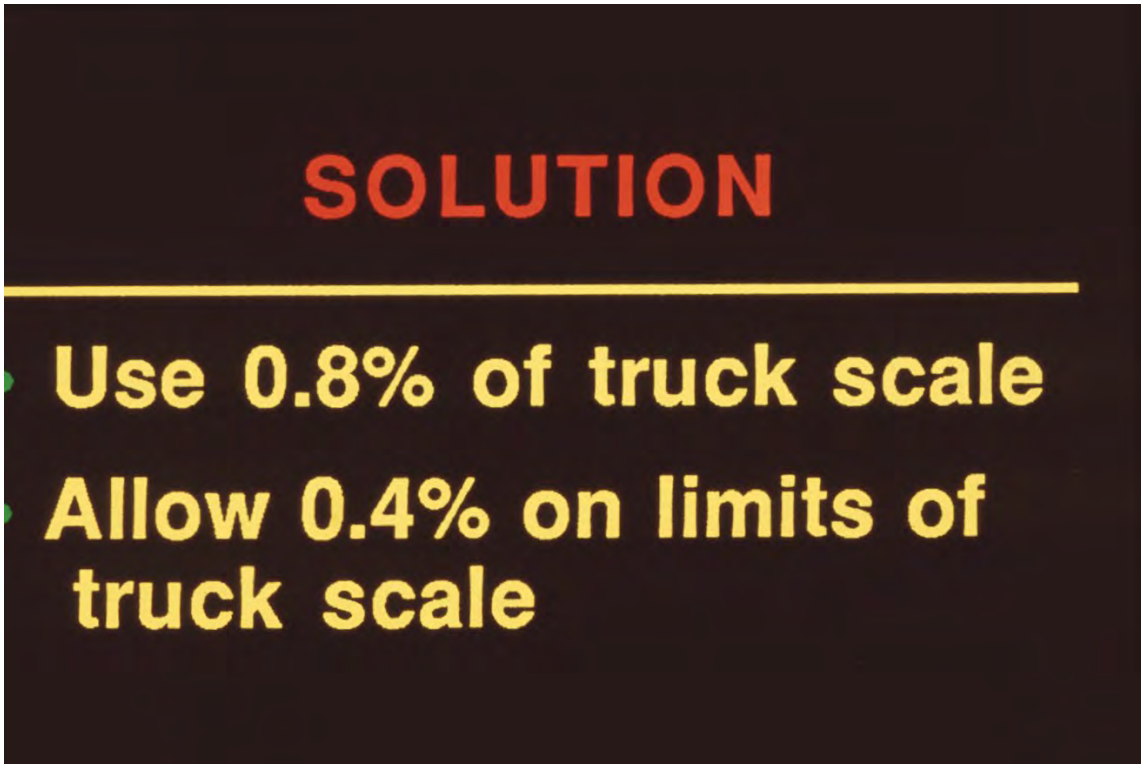
Slide 20. Suppose on a 20,000 lb Sample



Slide 21



Slide 22

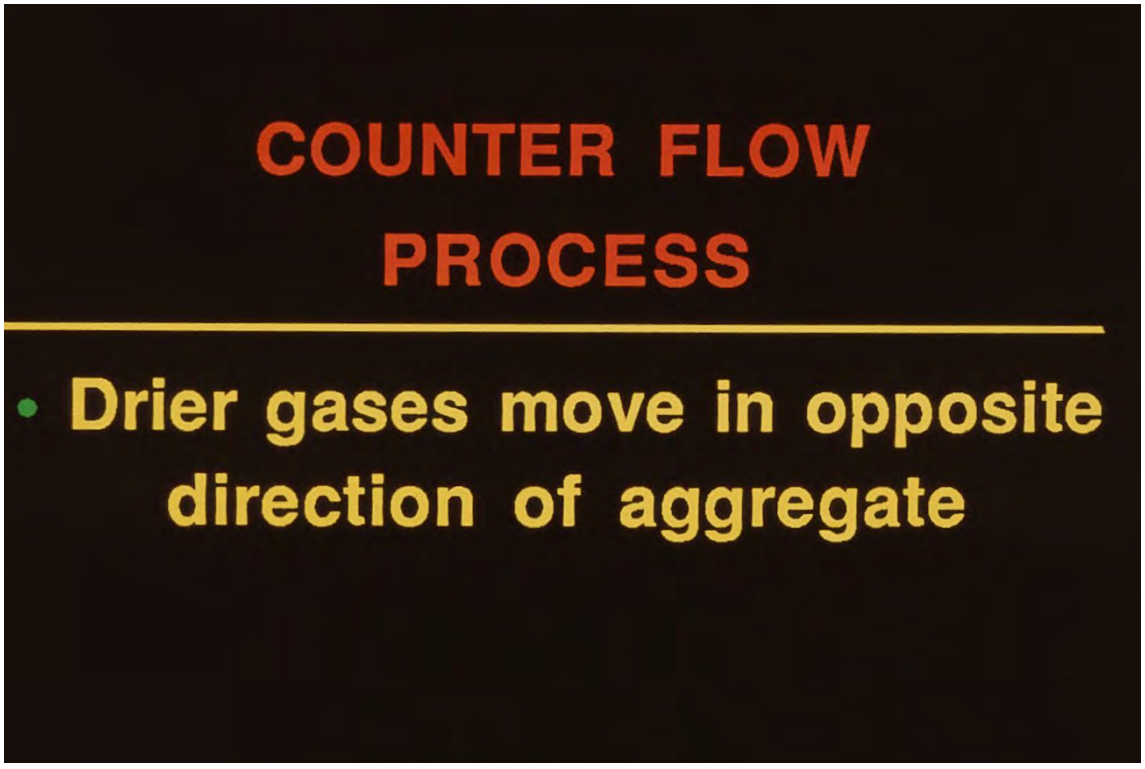


Slide 23. Solution

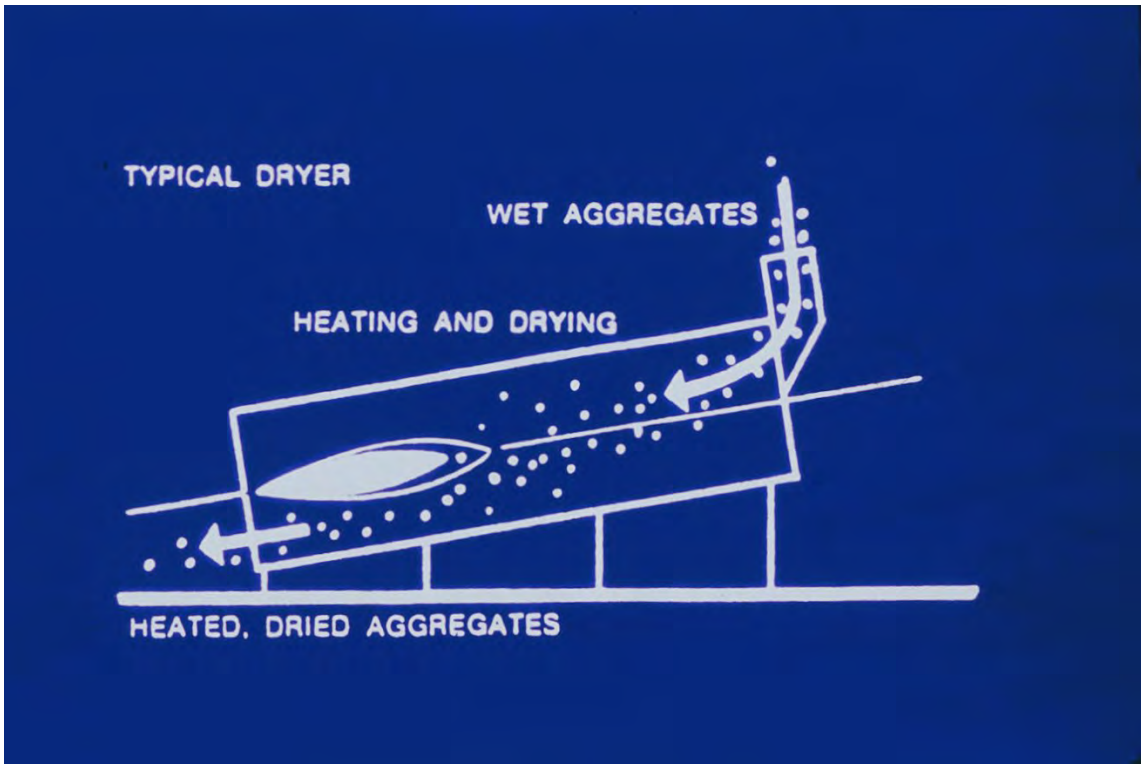
Chapter 7. Drum Mixer

Slide 1

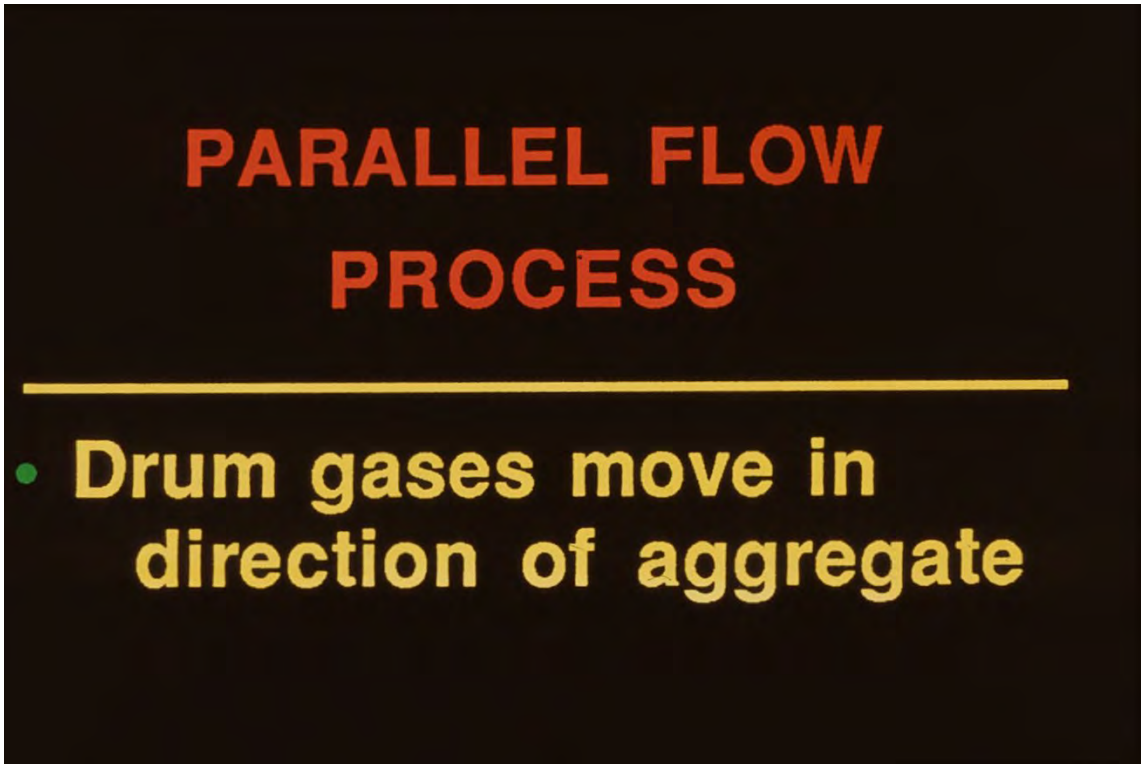
Slide 2. The Mixing Process



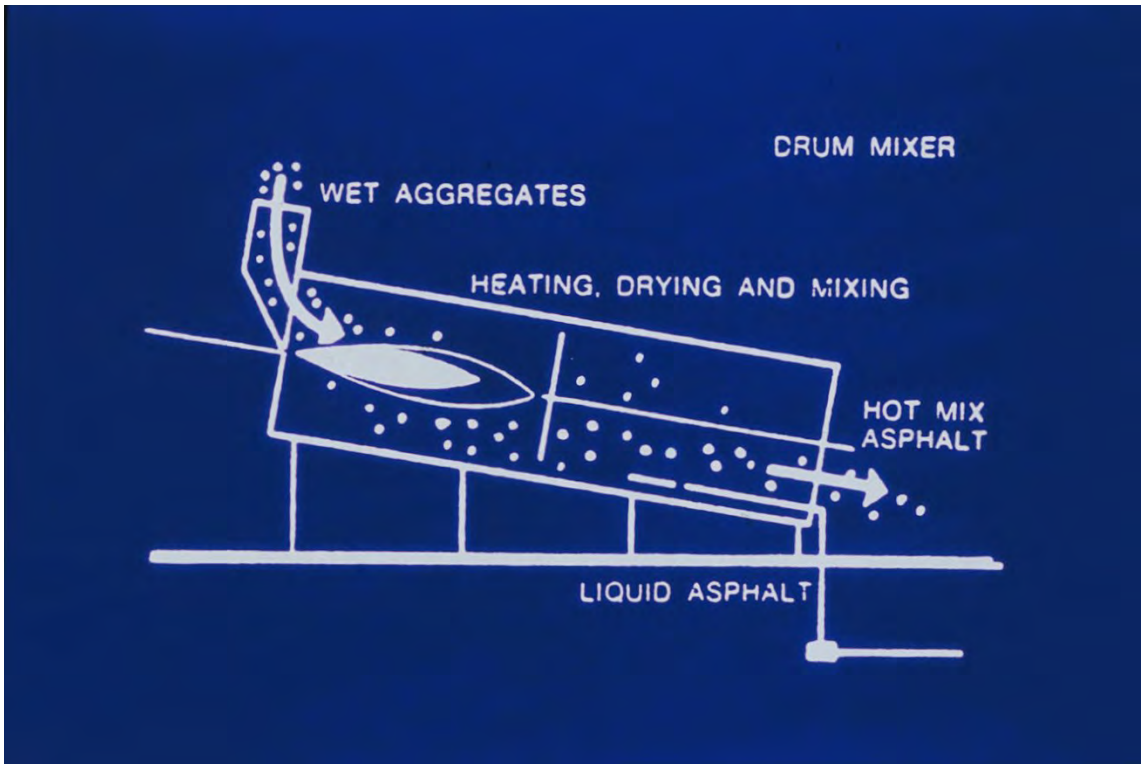
Slide 3. Counter Flow Process



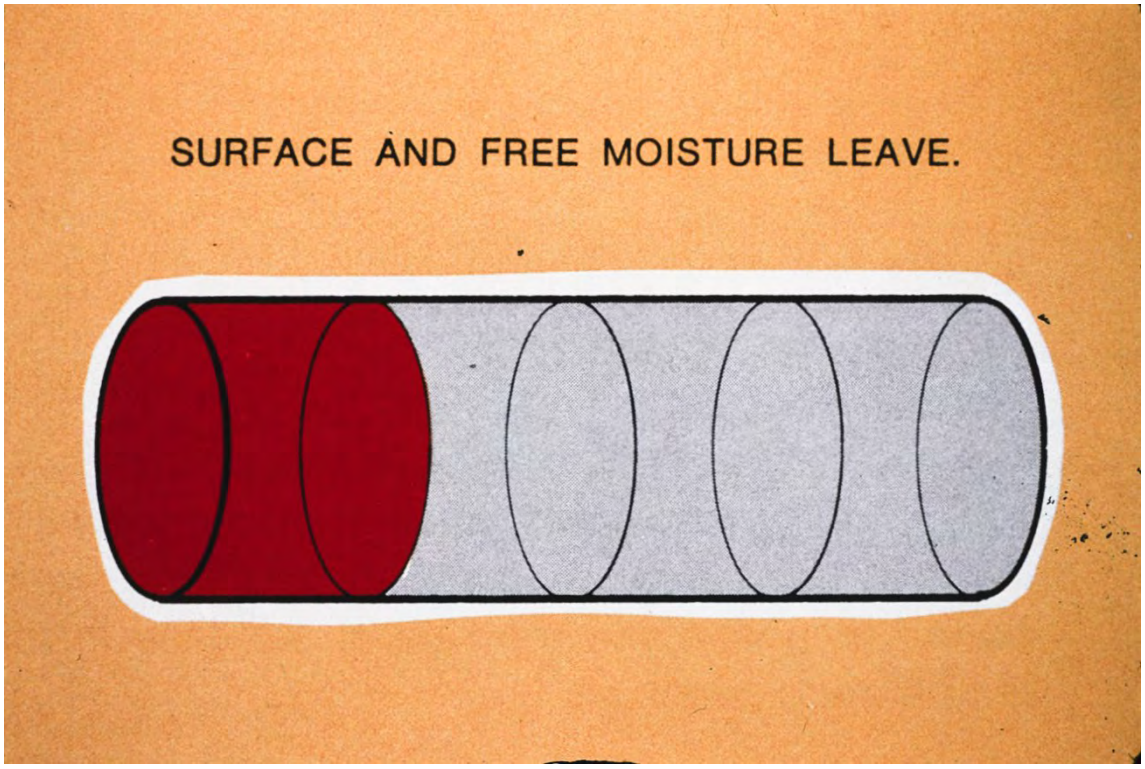
Slide 4. Typical Dryer



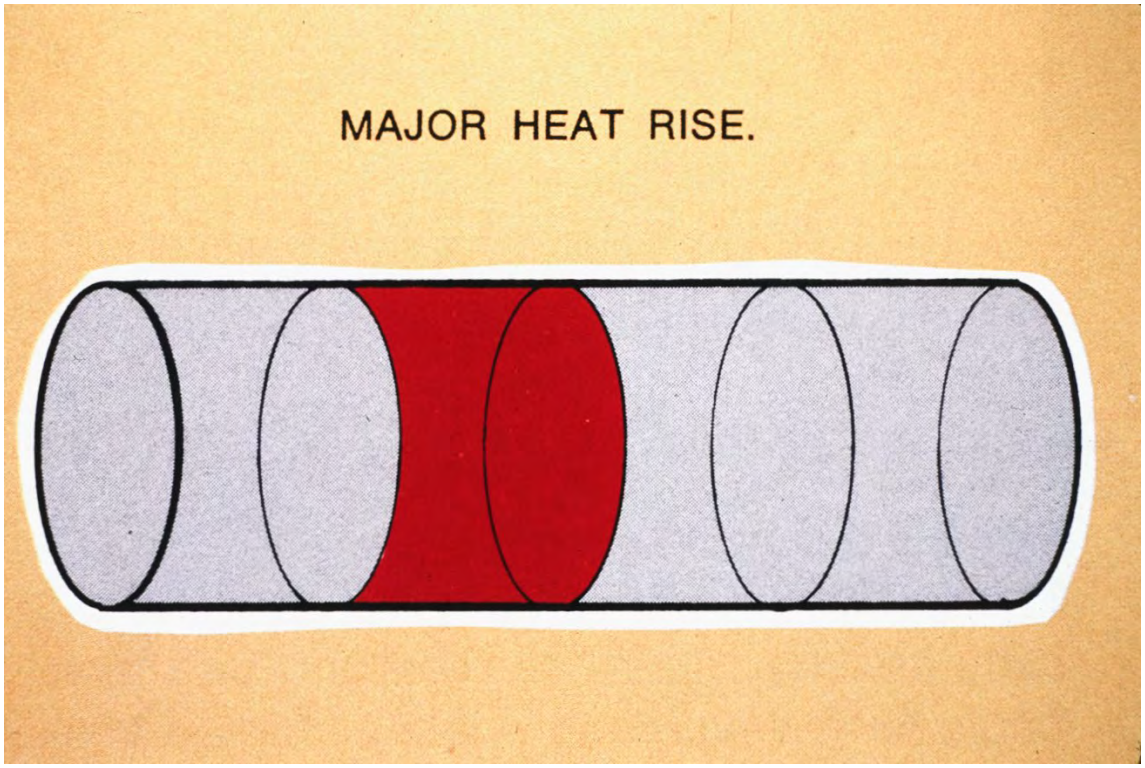
Slide 5. Parallel Flow Process



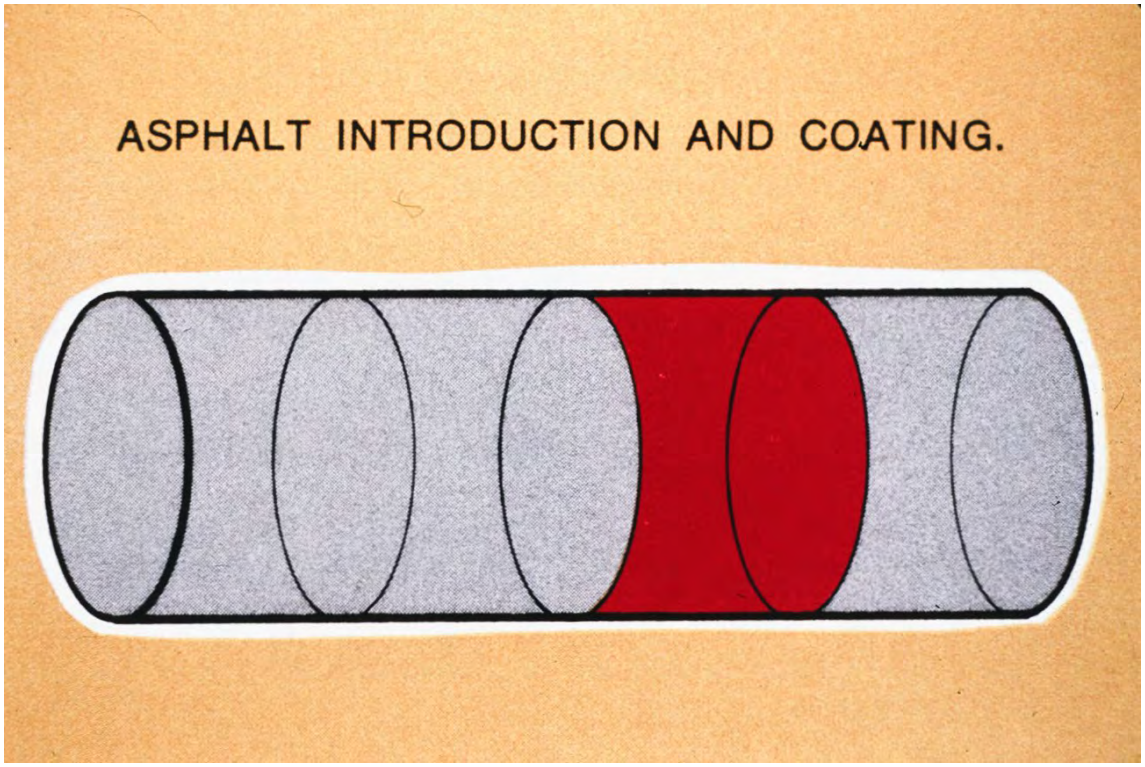
Slide 6. Drum Mixer



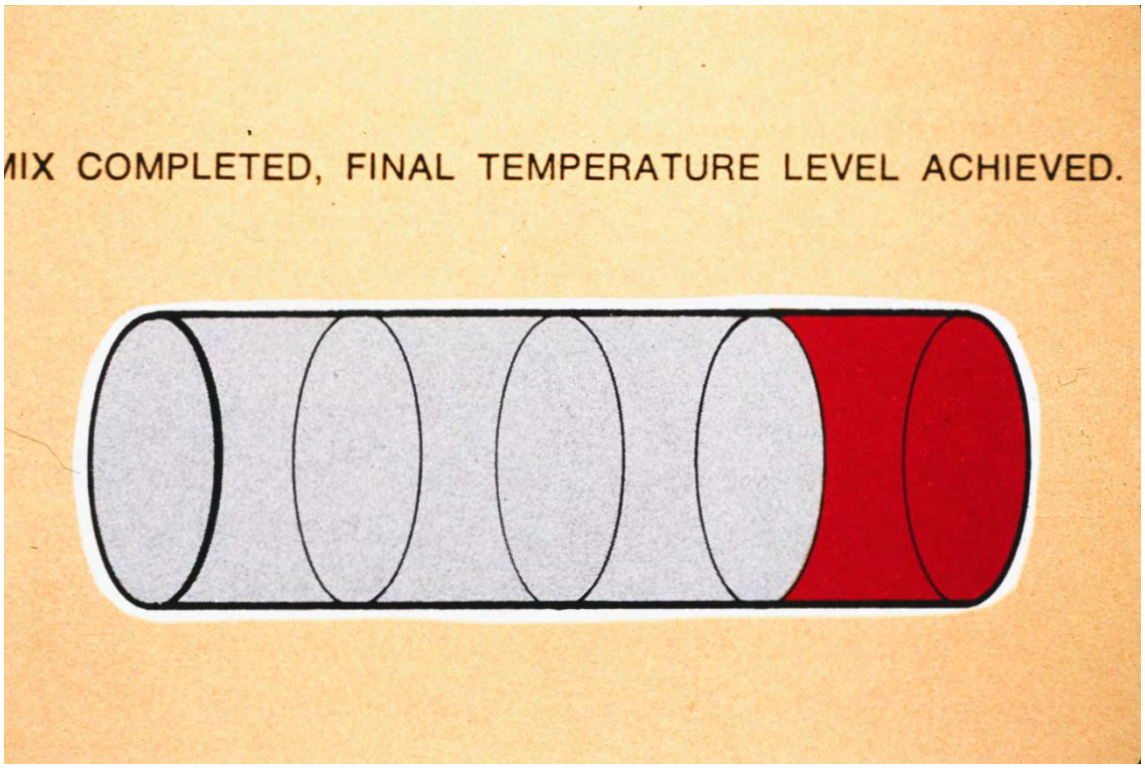
Slide 7. Surface and Free Moisture Leave



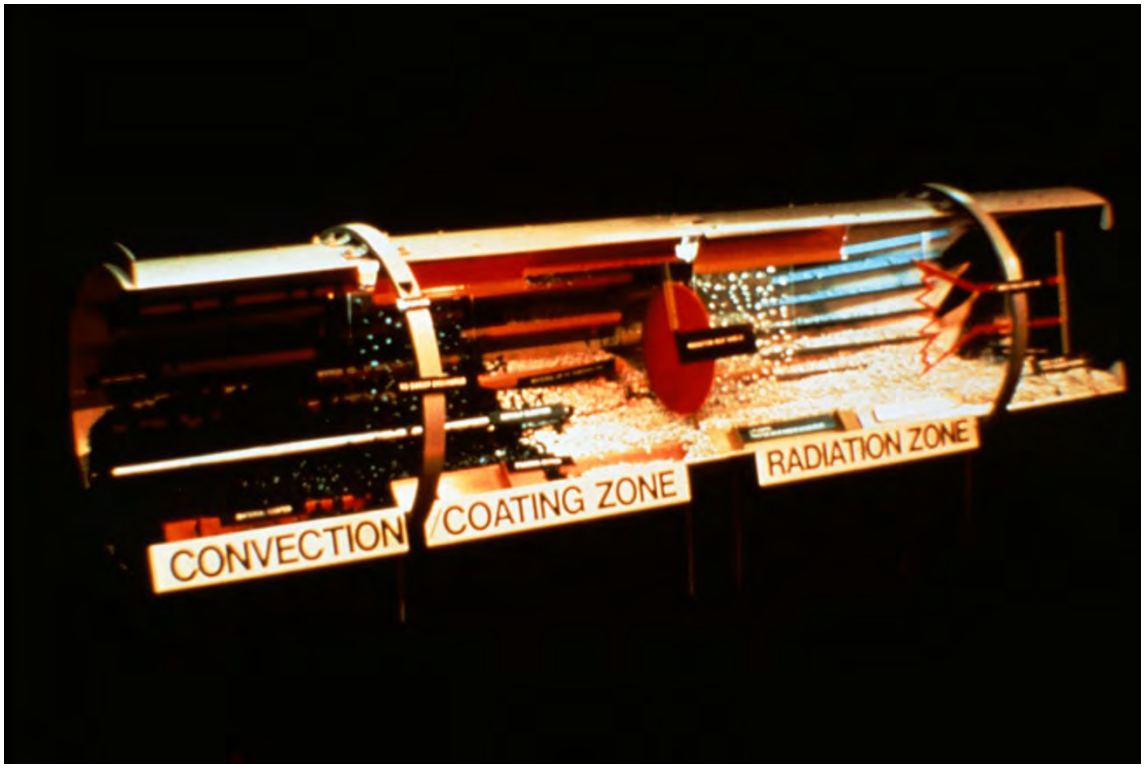
Slide 8. Major Heat Rise



Slide 9. Asphalt Introduction and Coating

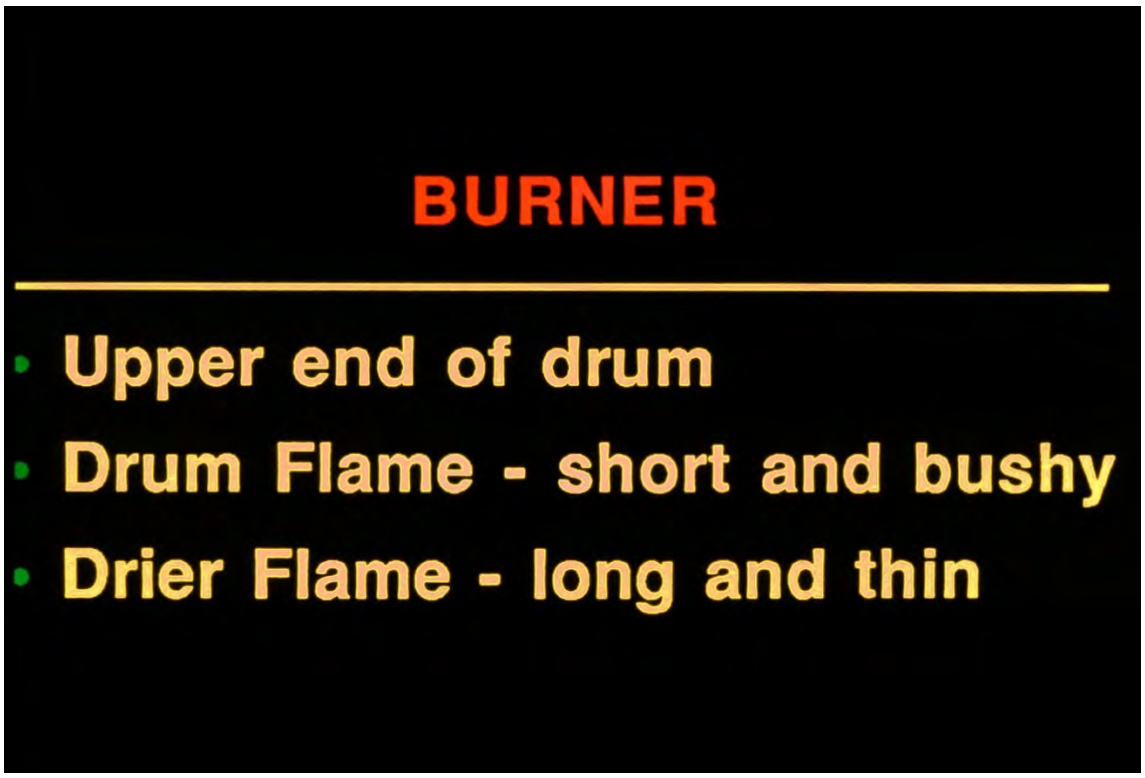


Slide 10. Mix Completed, Final Temperature Level Achieved



Slide 11

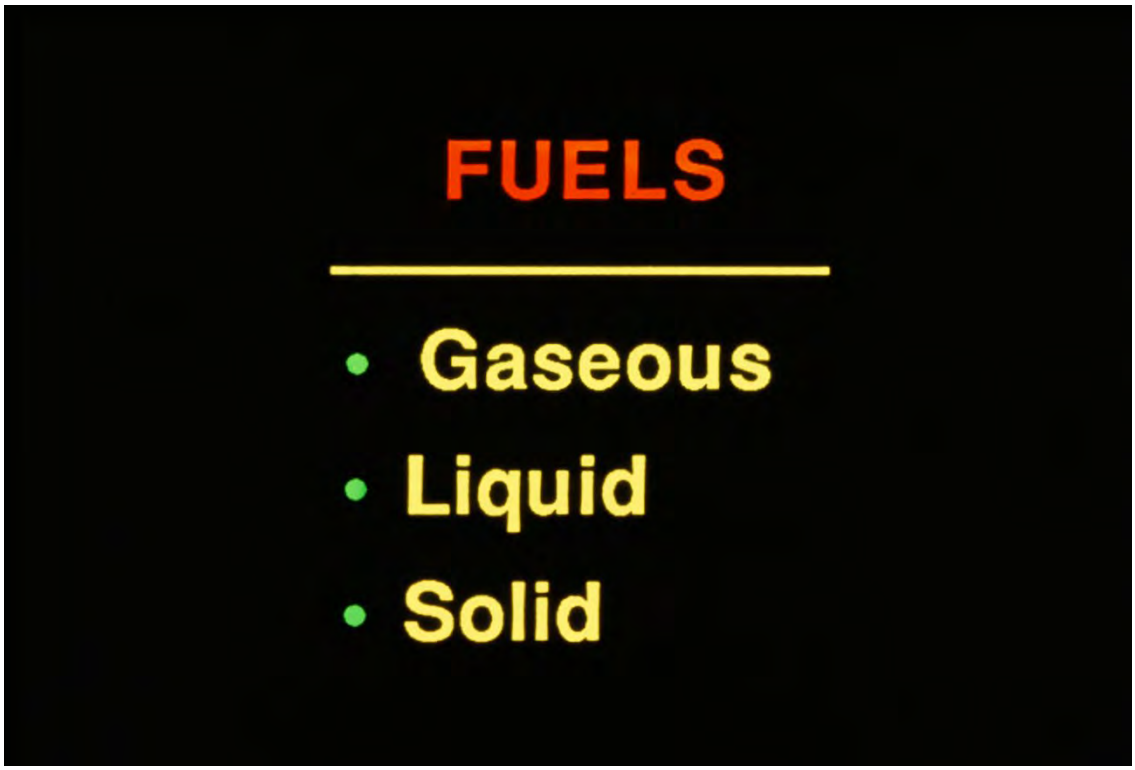
Slide 12



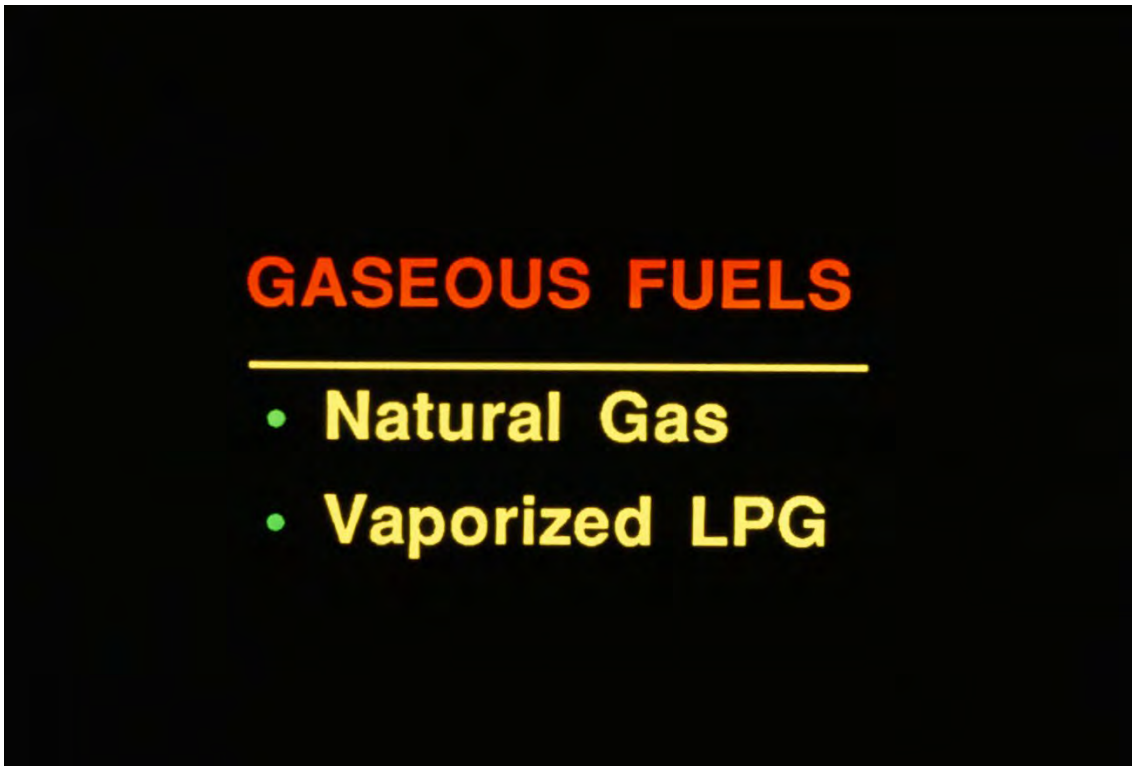
Slide 13. Burner

Slide 14

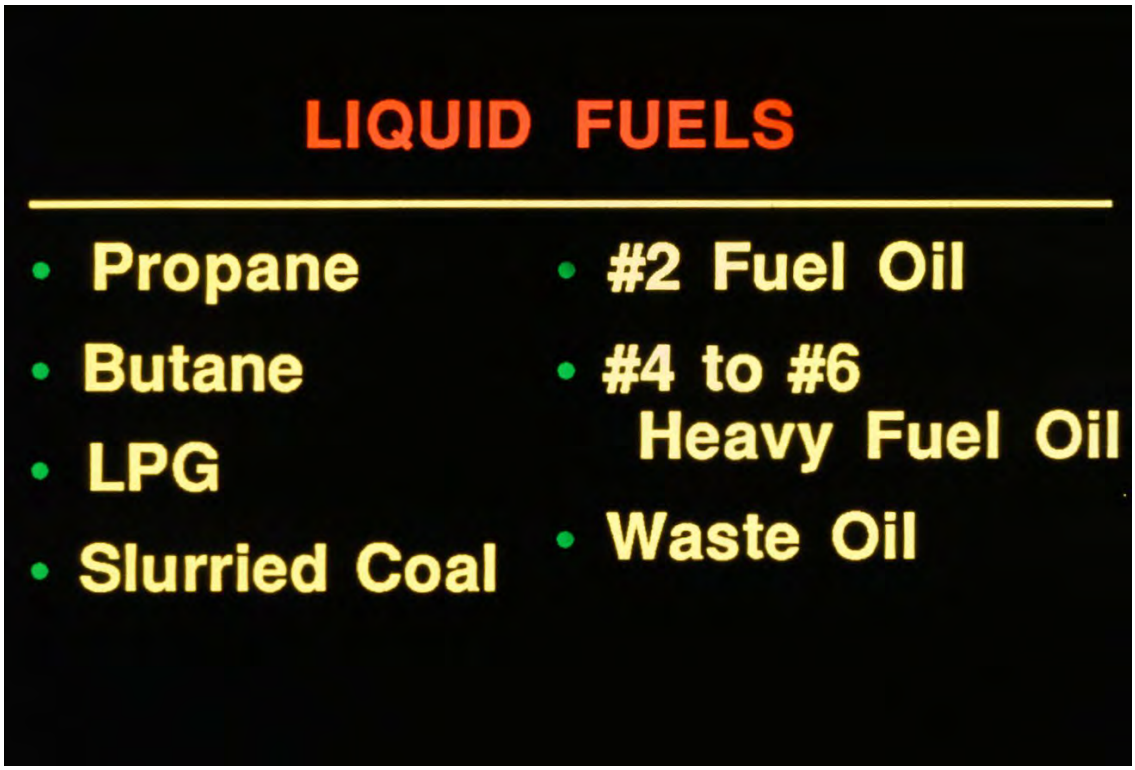
Slide 15



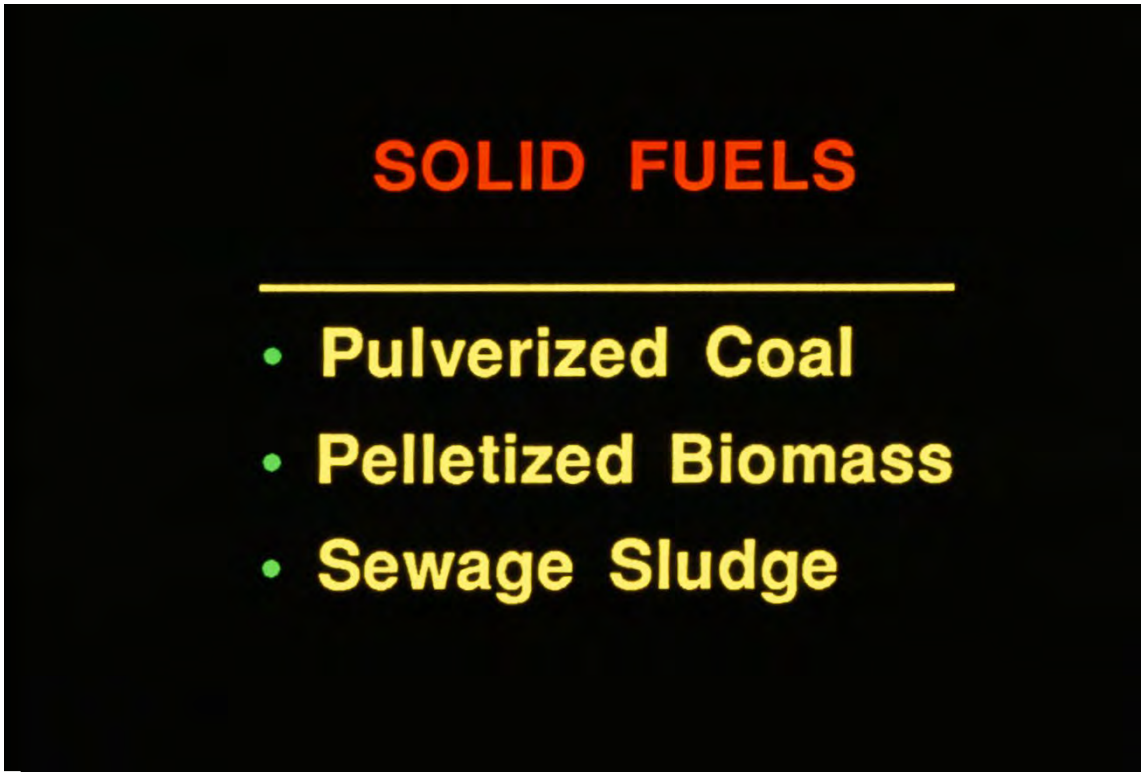
Slide 16. Fuels



Slide 17. Gaseous Fuels



Slide 18. Liquid Fuels

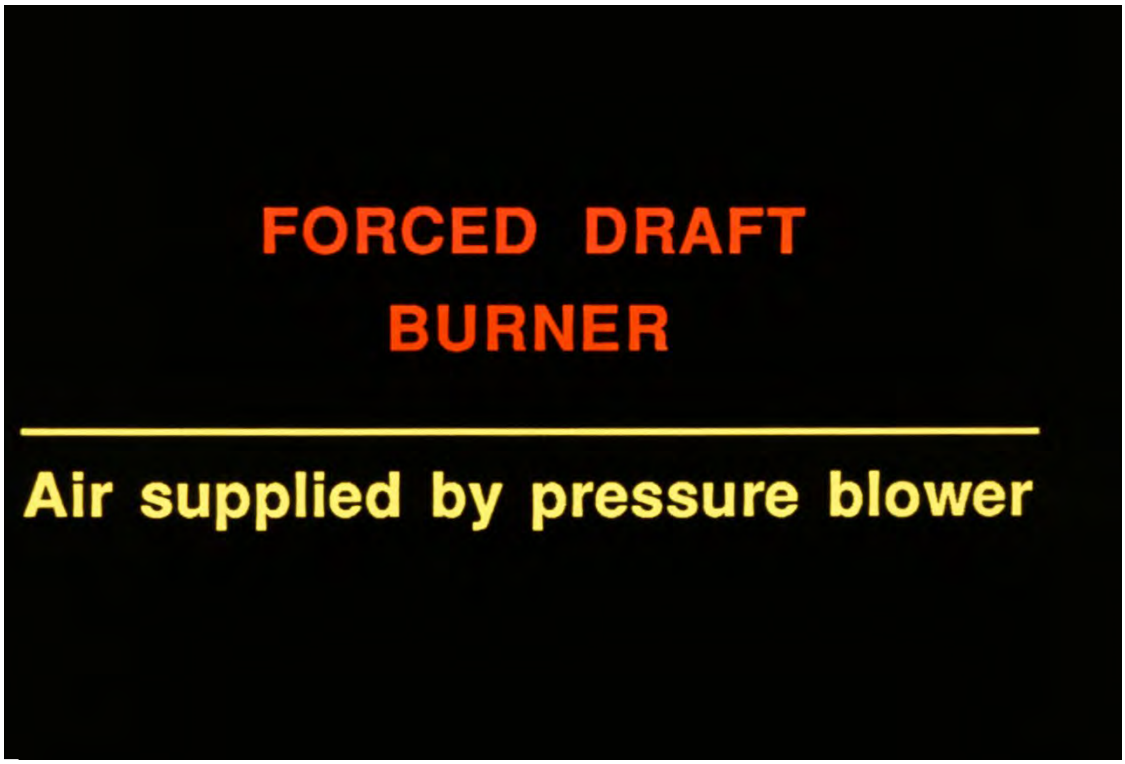


Slide 19. Solid Fuels

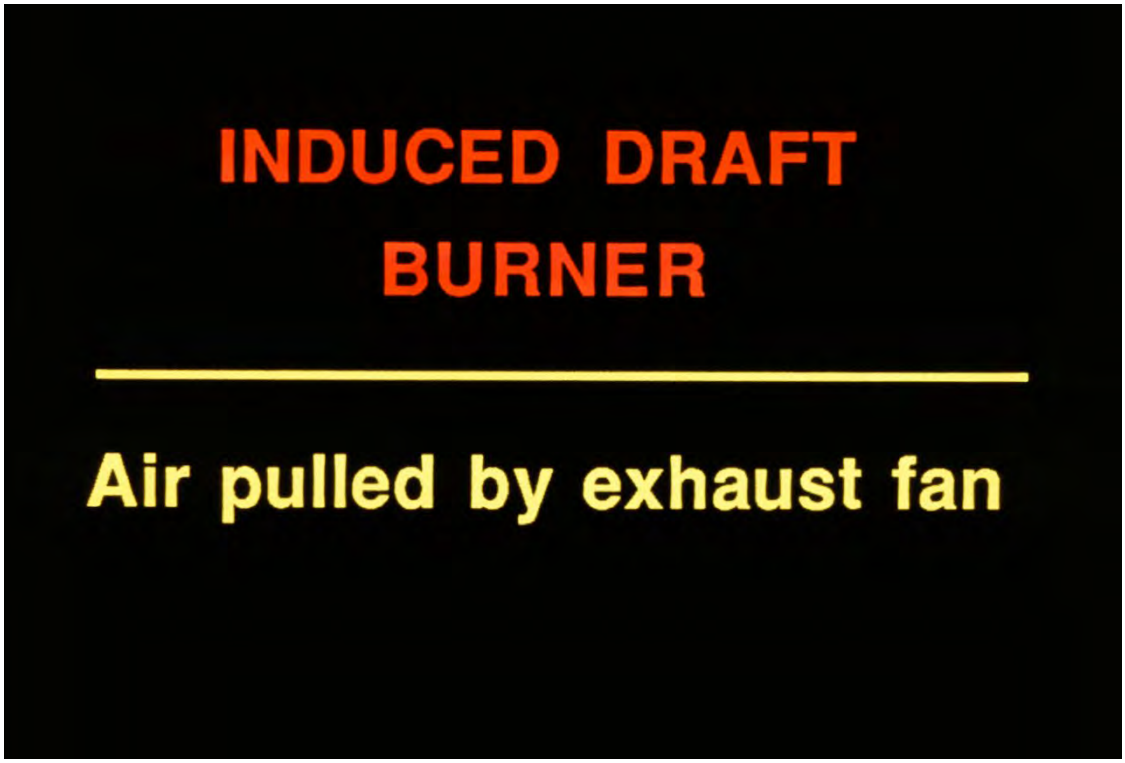
Slide 20

Slide 21

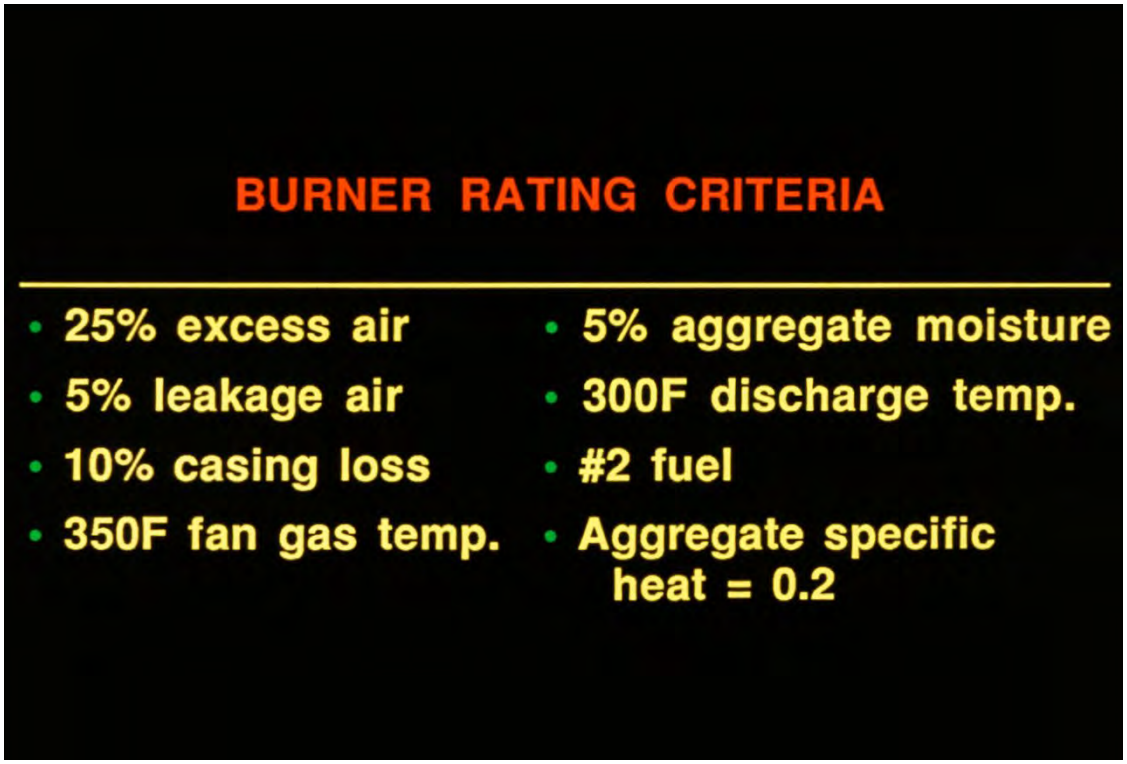
Slide 22



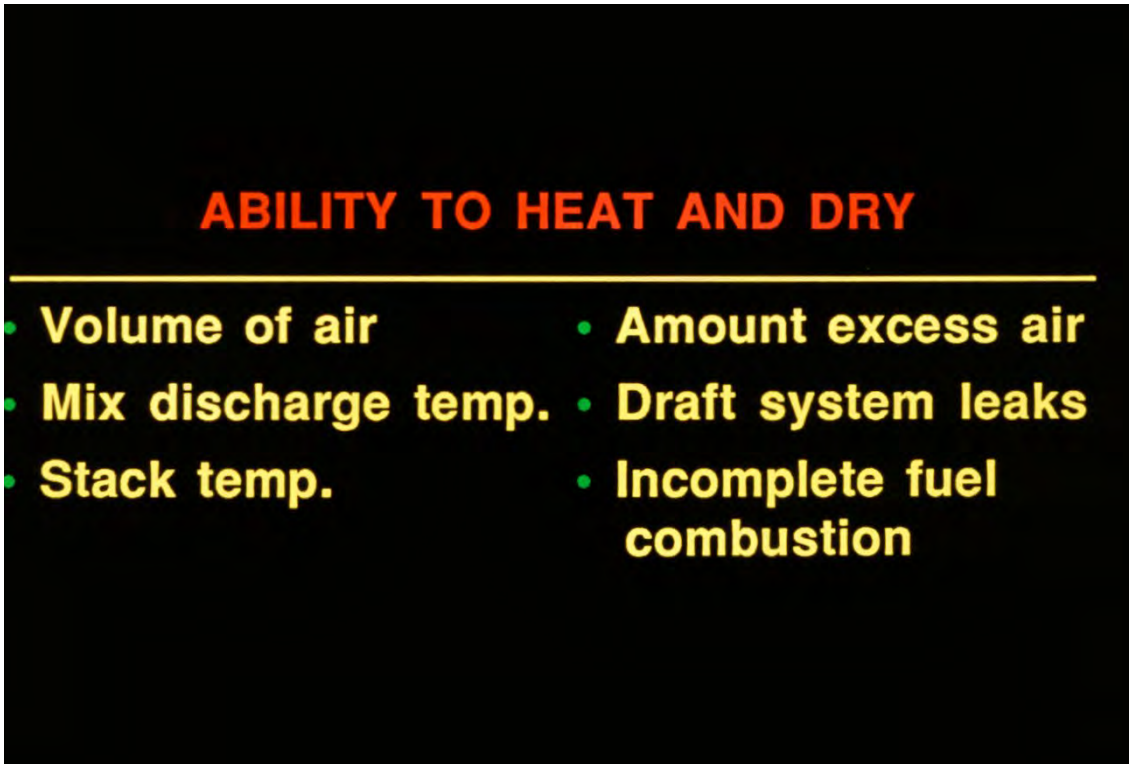
Slide 23. Forced Draft Burner



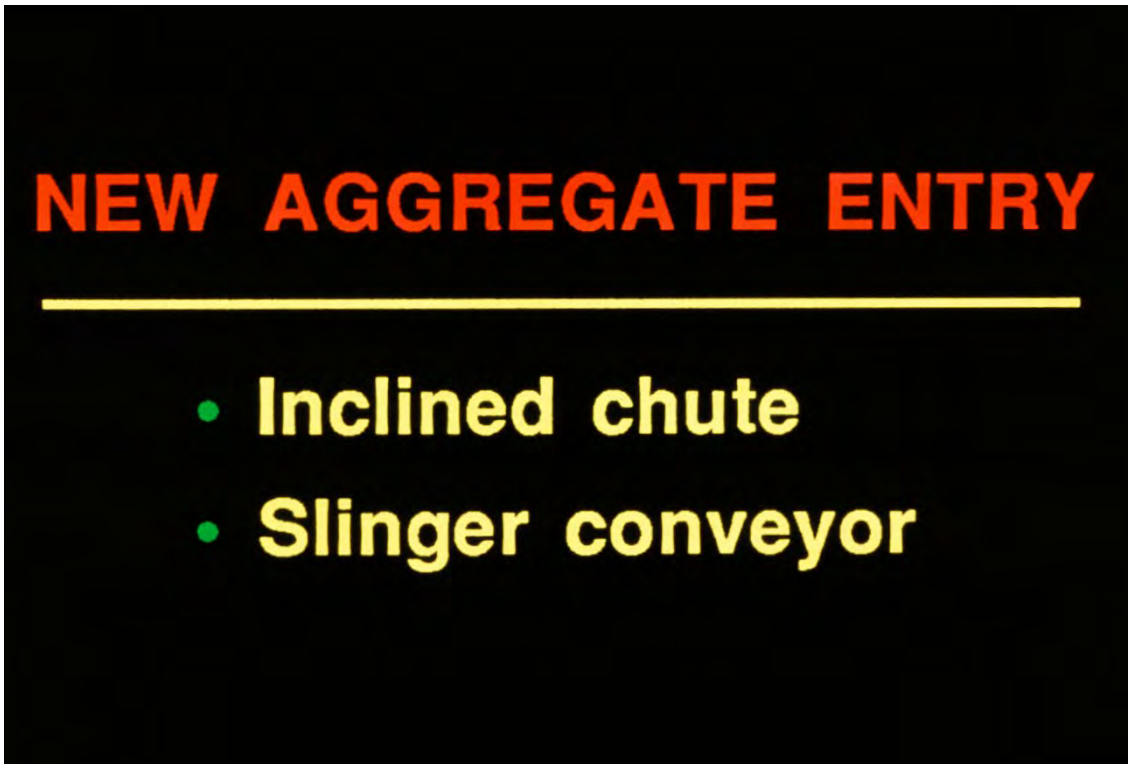
Slide 24. Induced Draft Burner



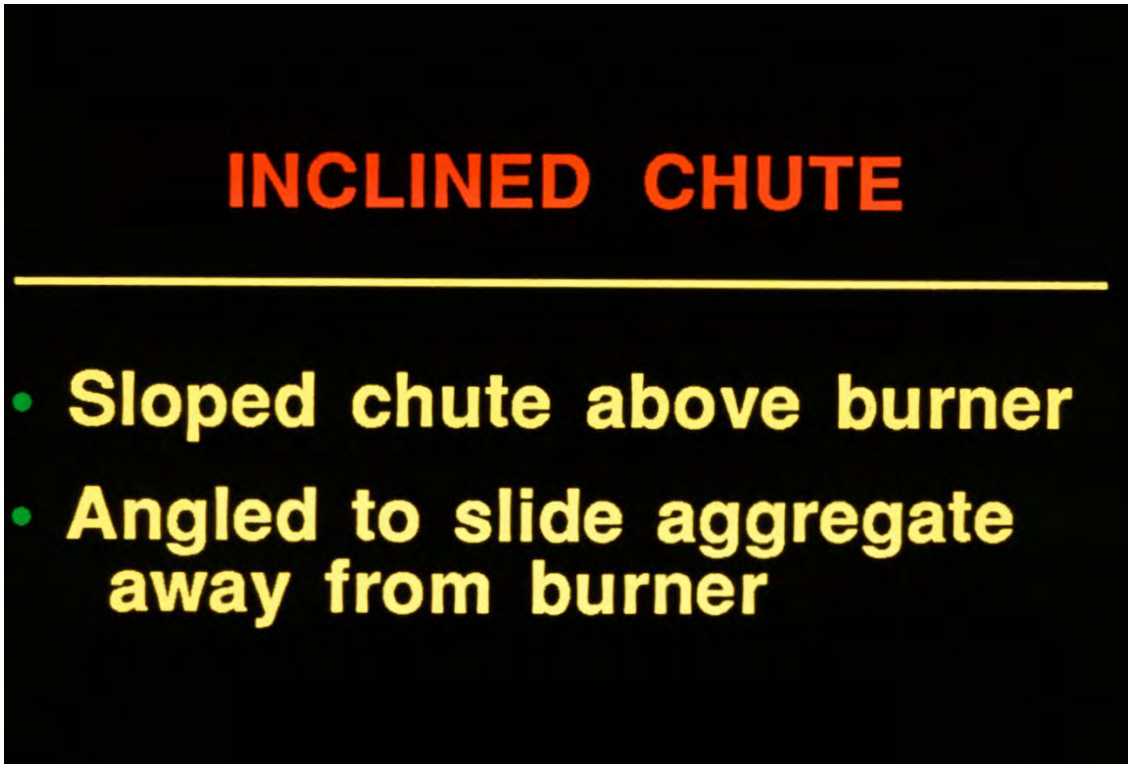
Slide 25. Burner Rating Criteria



Slide 26. Ability to Heat and Dry

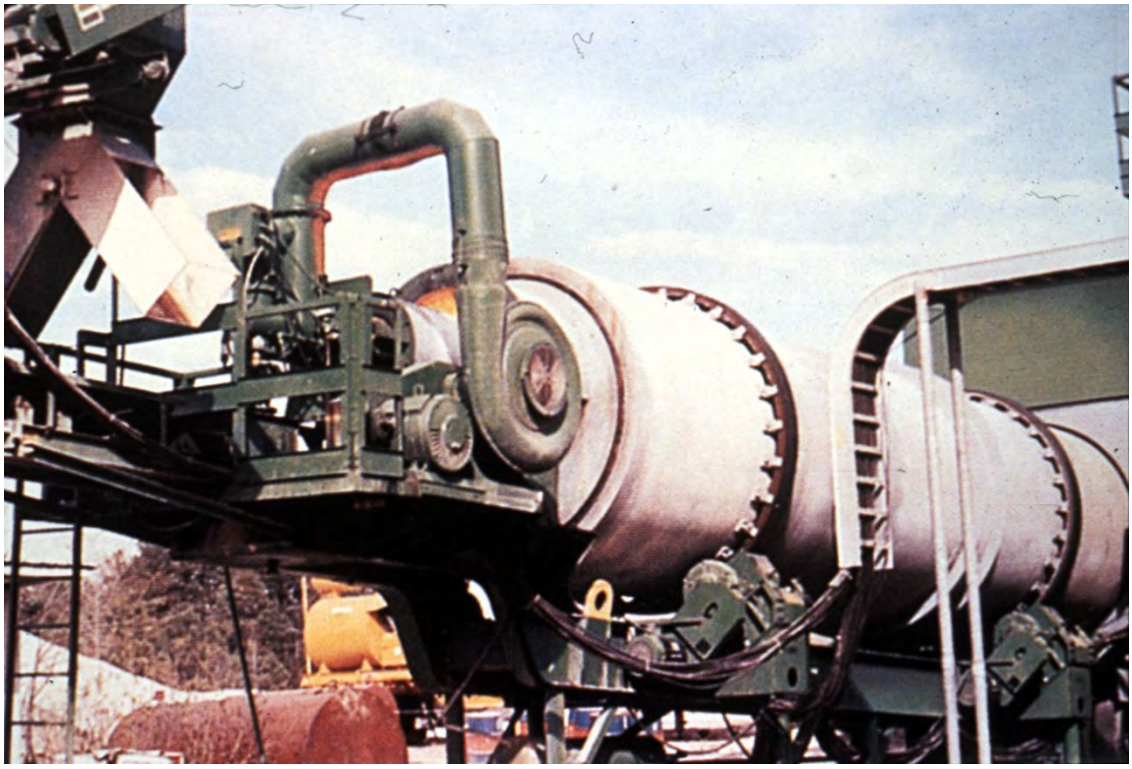


Slide 27. New Aggregate Entry

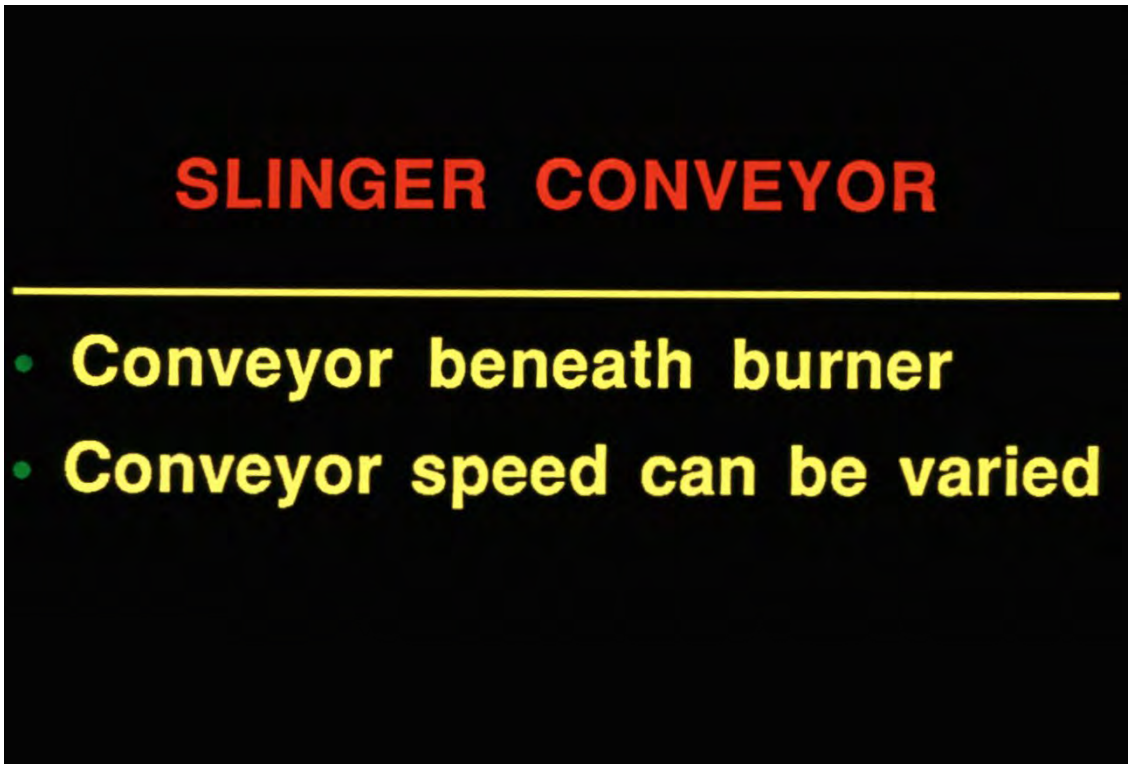


Slide 28. Inclined Chute

Slide 29



Slide 30



Slide 31. Slinger Conveyor

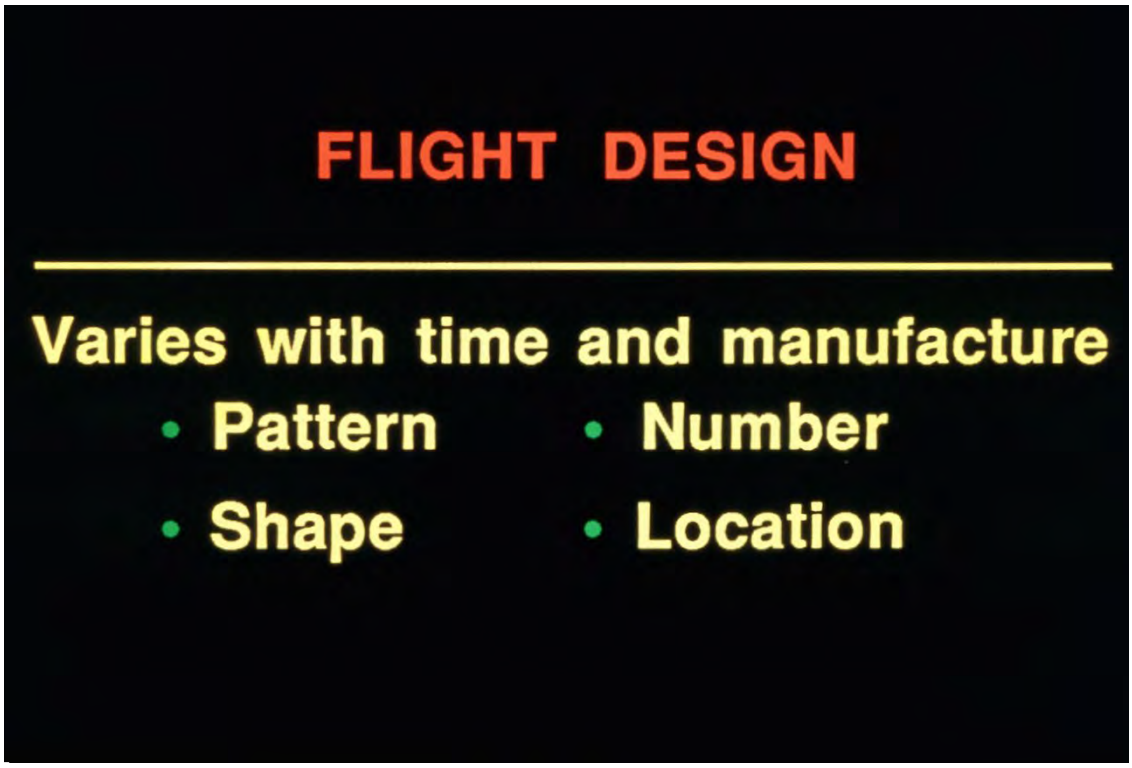
Slide 32

Slide 33

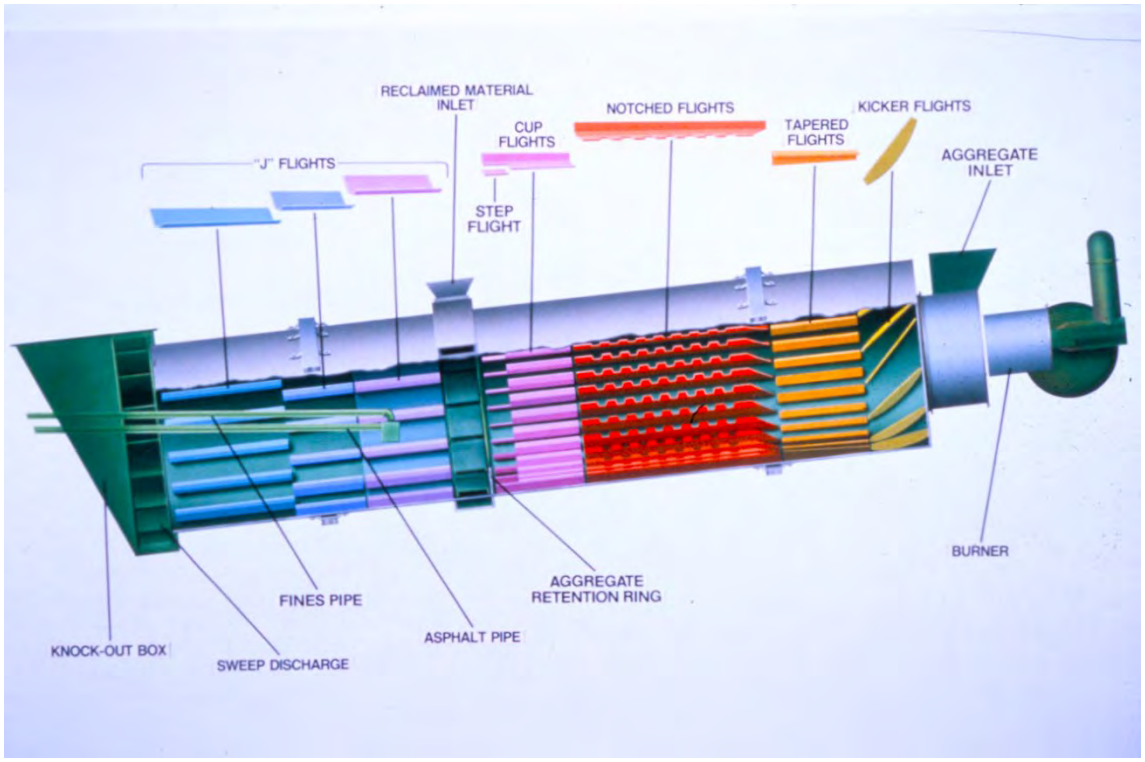
Slide 34

Slide 35. Aggregates Move by Gravity

Slide 36. Special Flight Design

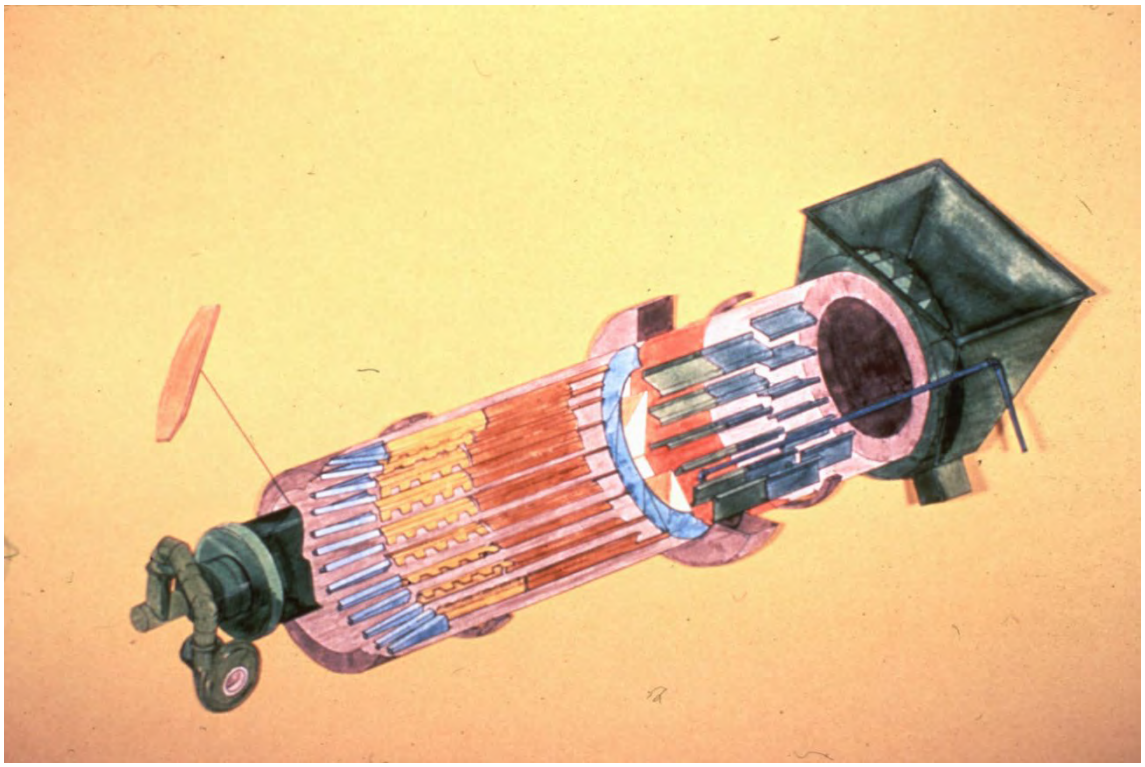


Slide 37. Flight Design

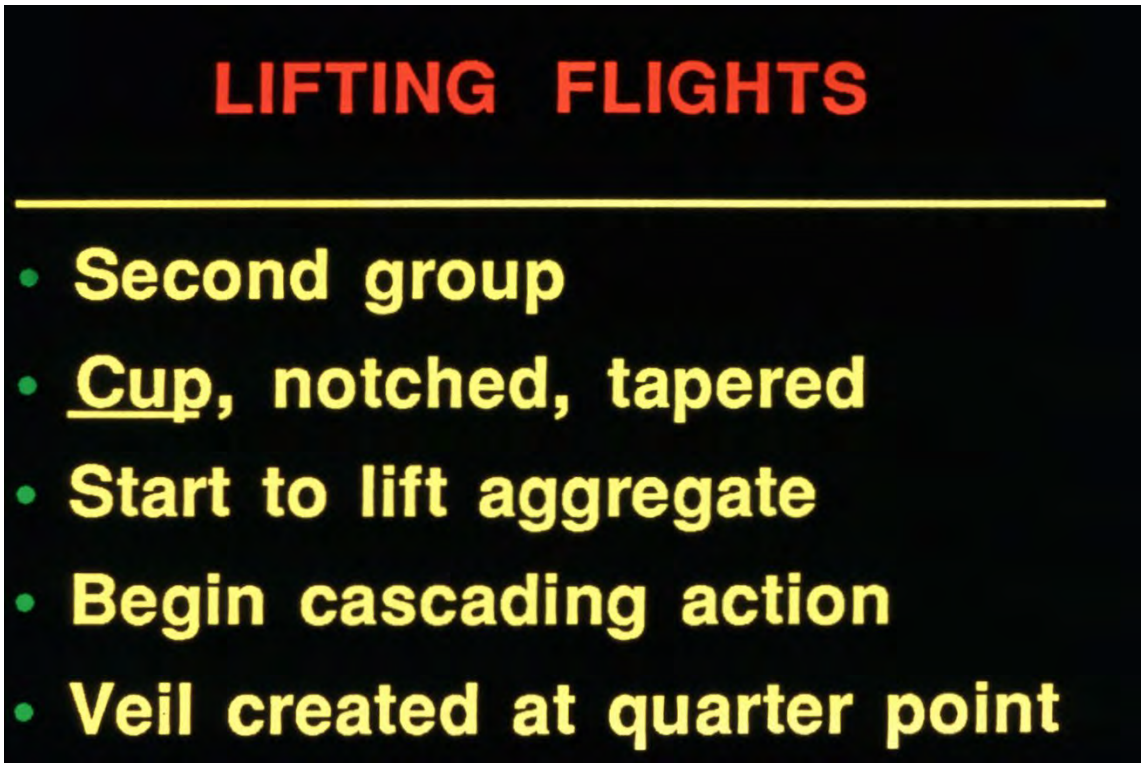


Slide 38

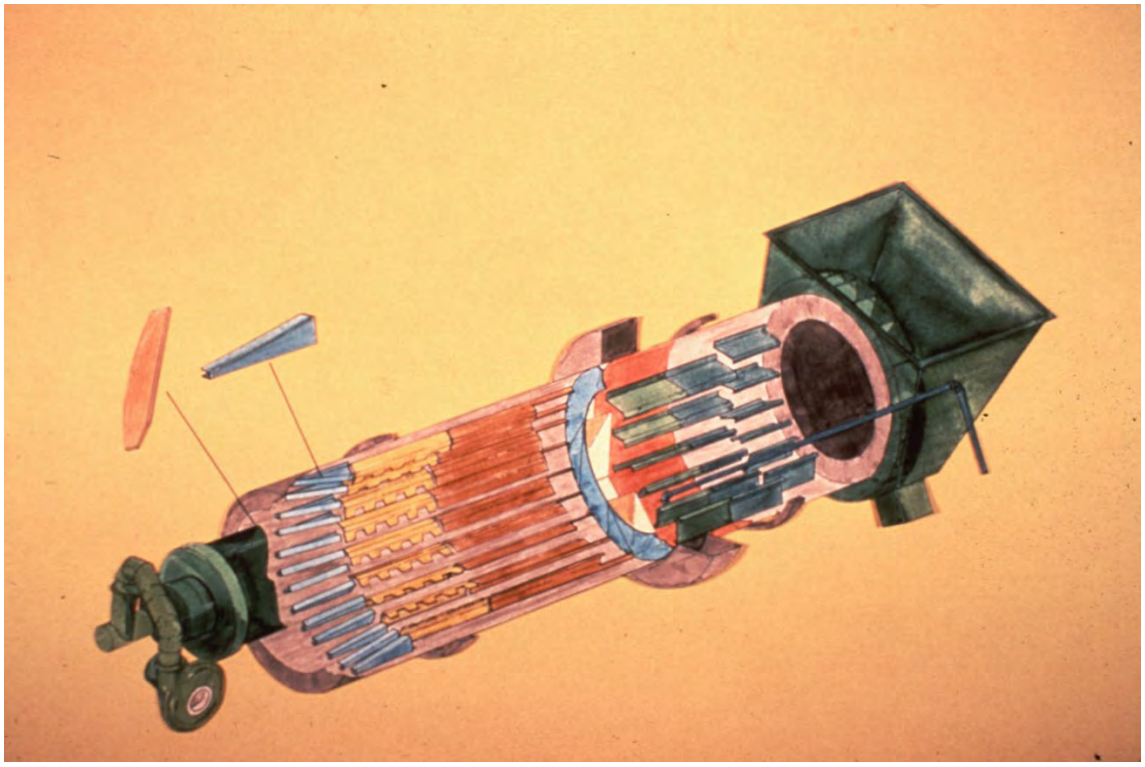
Slide 39. Kicker Flights



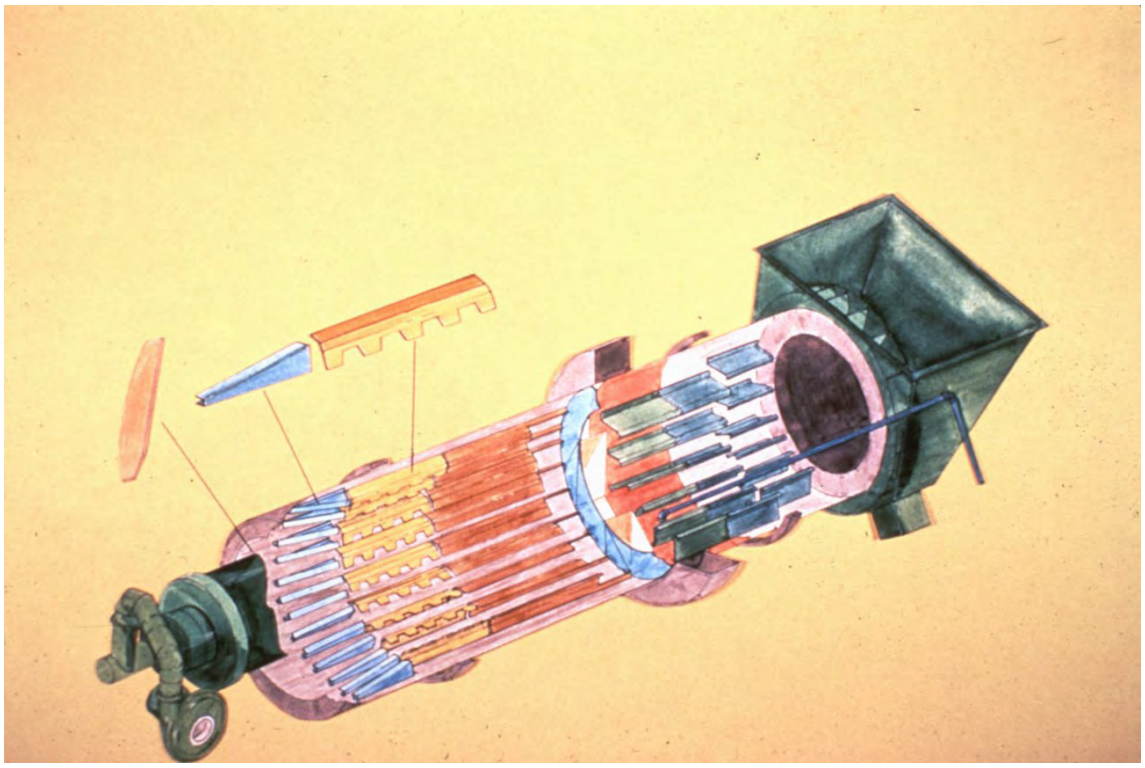
Slide 40



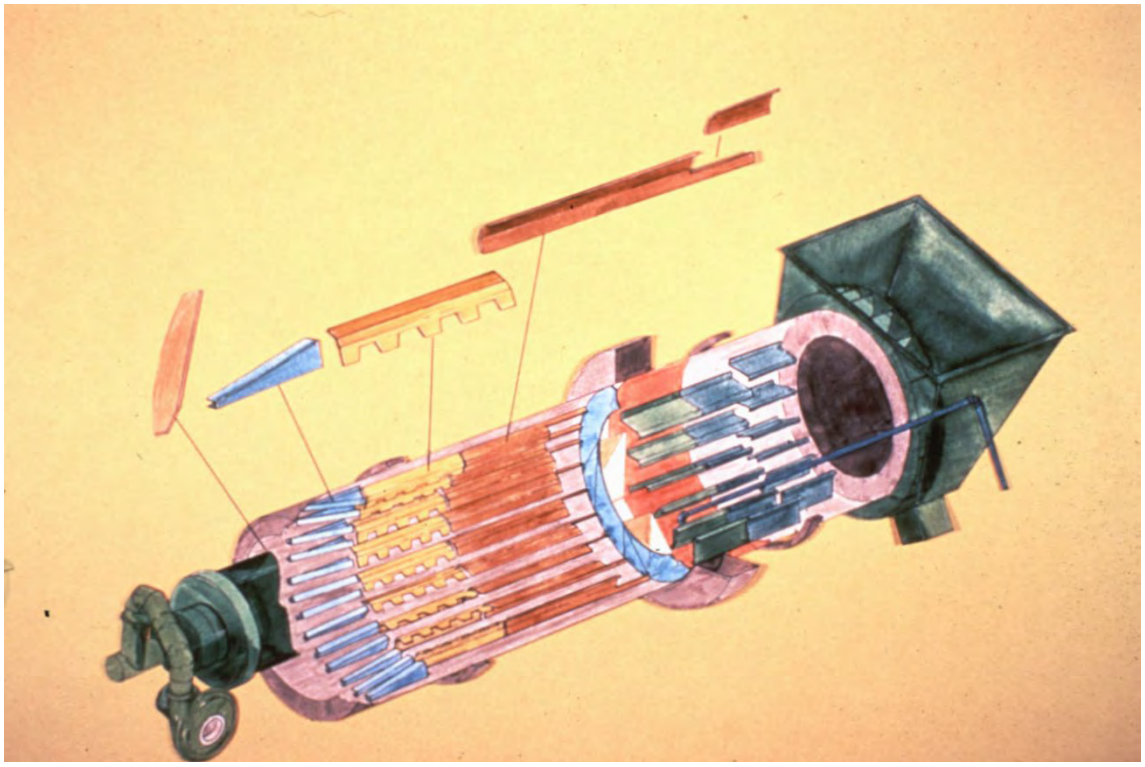
Slide 41. Lifting Flights



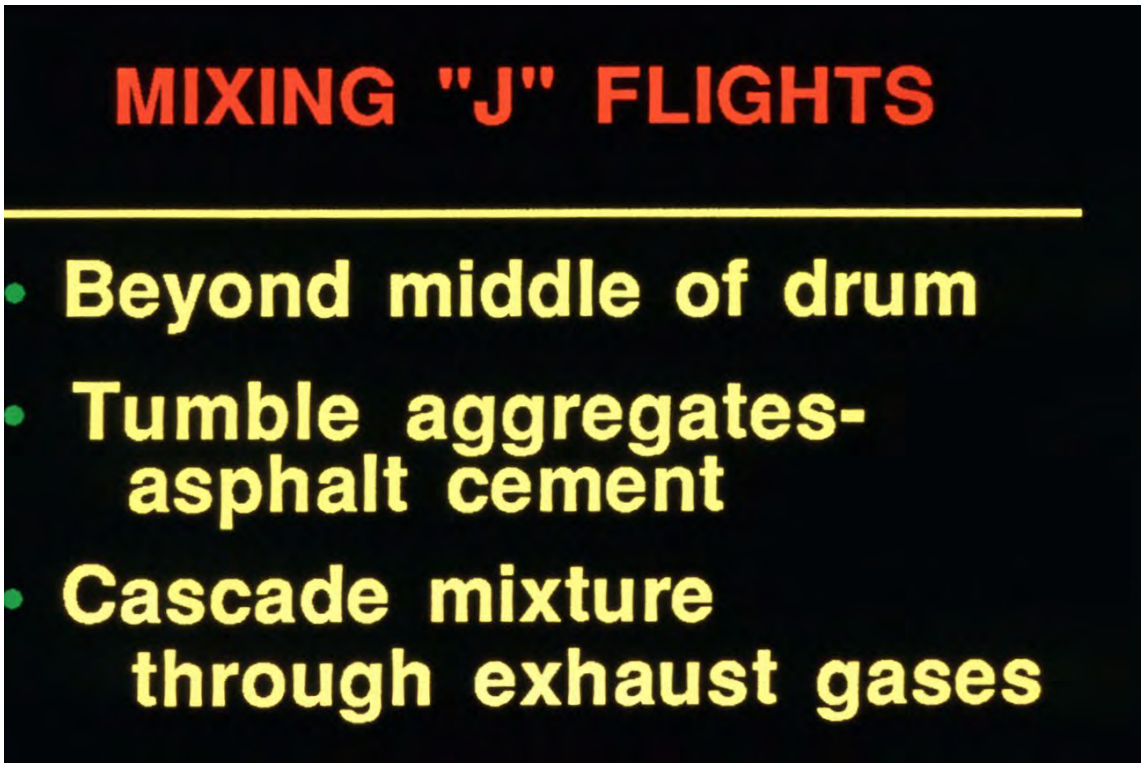
Slide 42



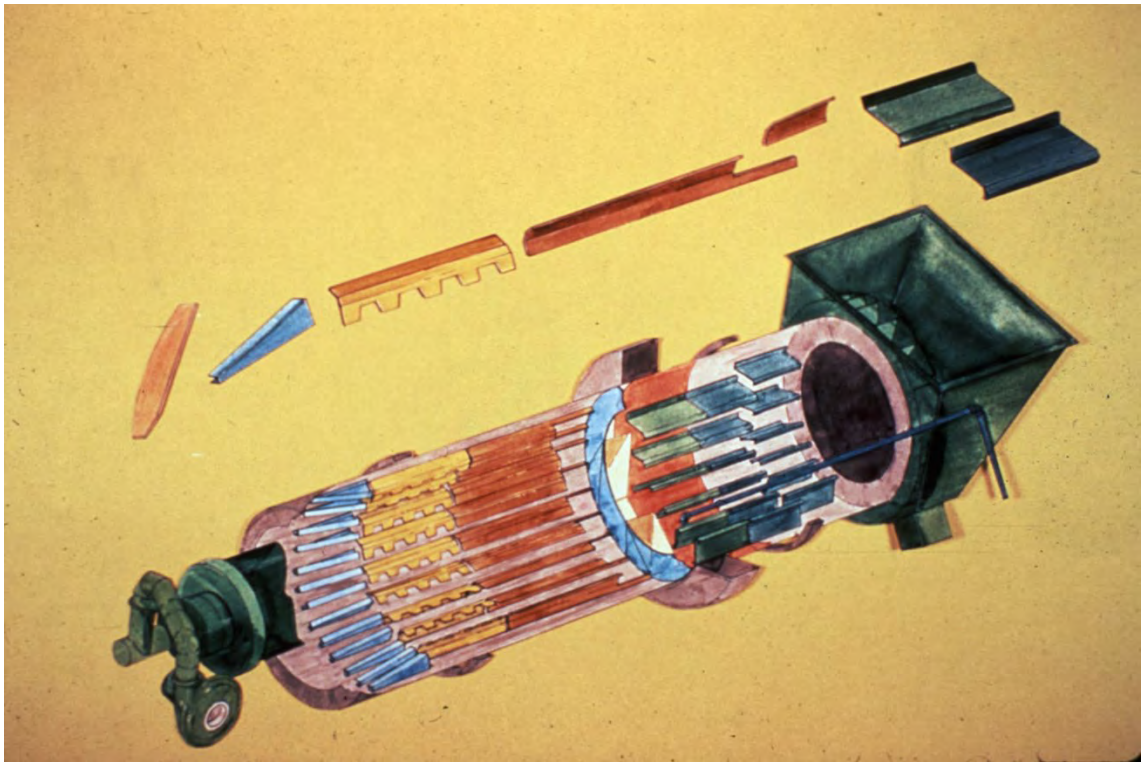
Slide 43



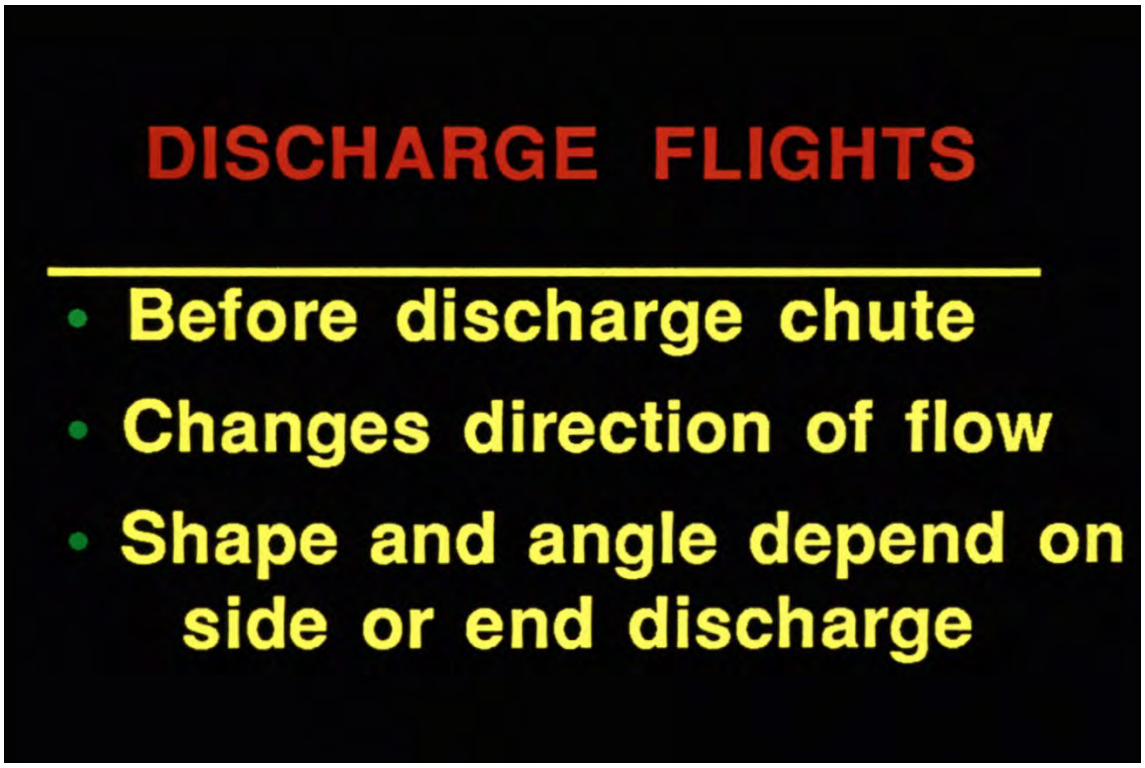
Slide 44



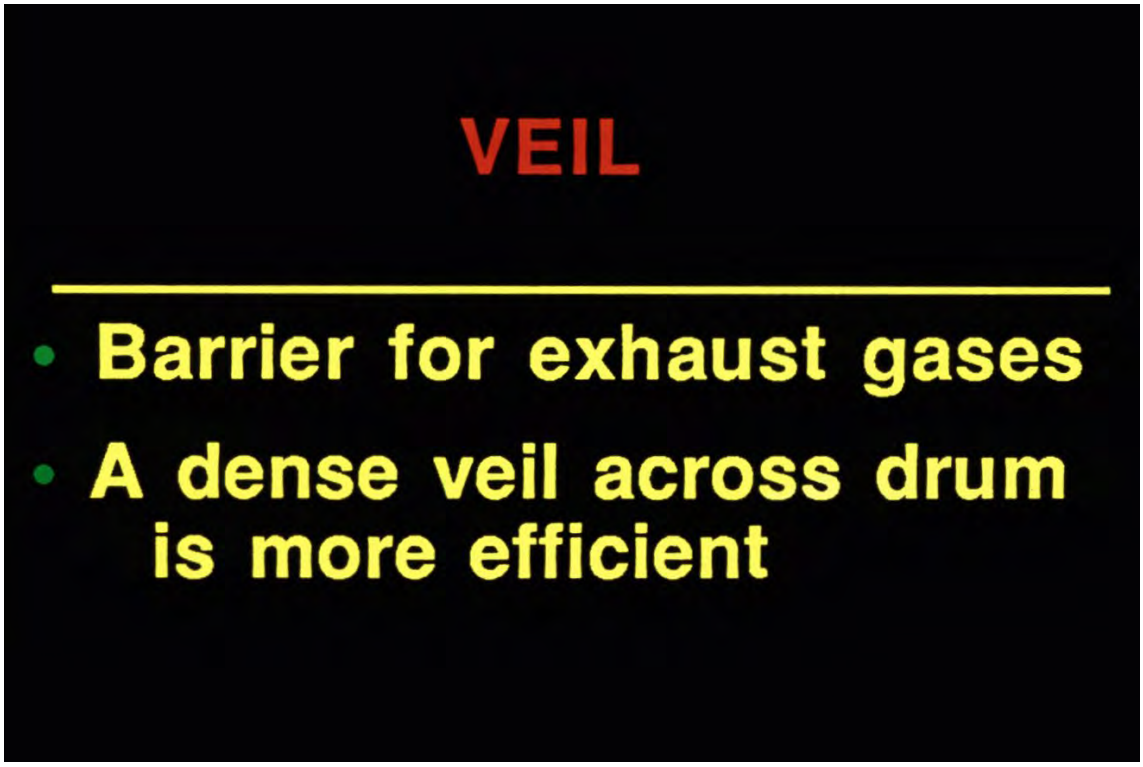
Slide 45. Mixing "J" Flights



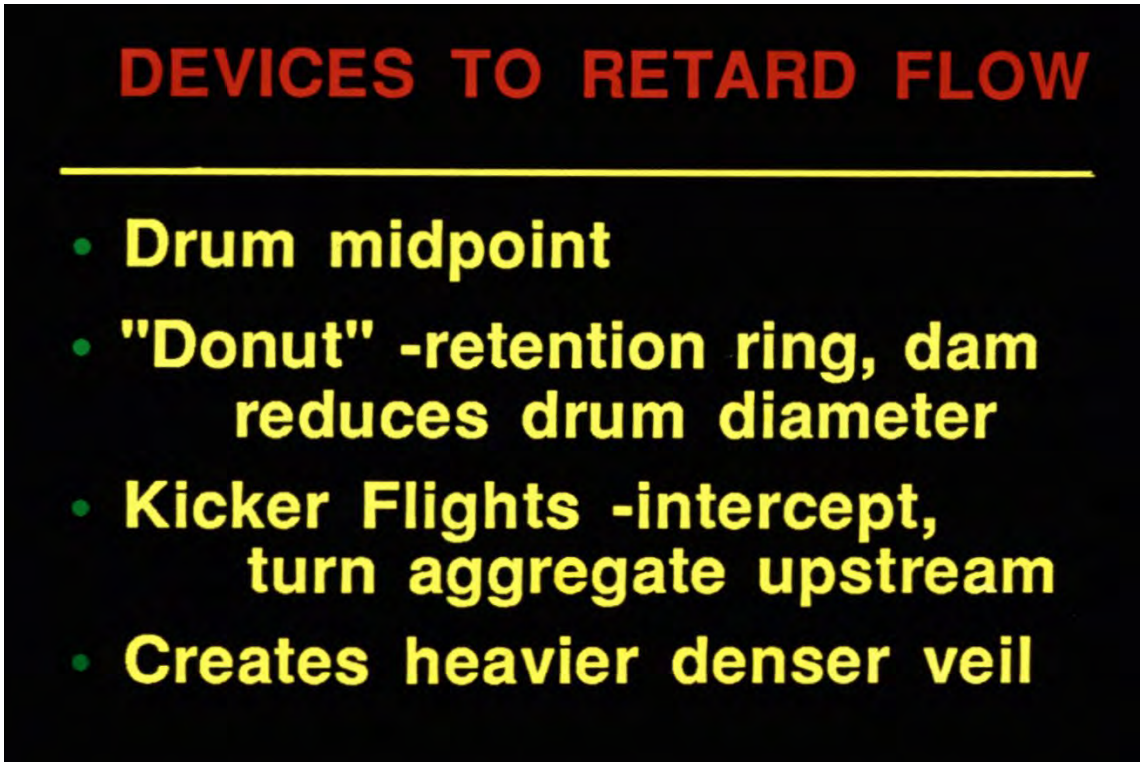
Slide 46



Slide 47. Discharge Flights



Slide 48. Veil

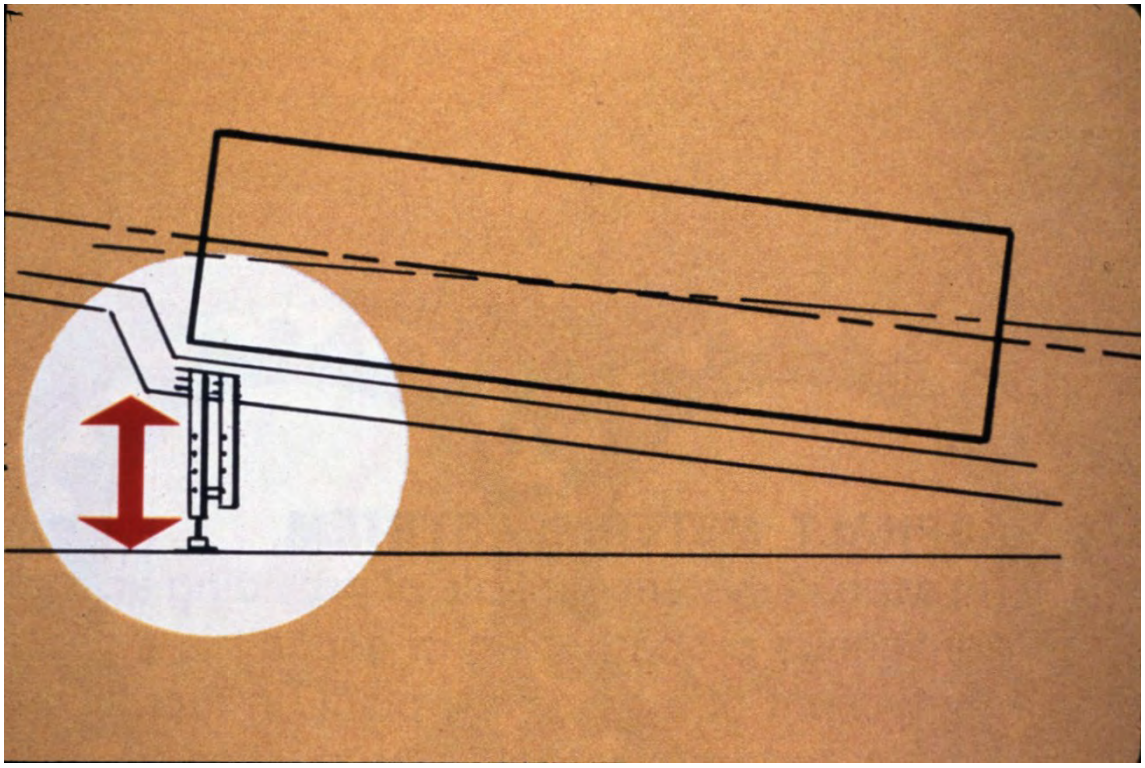


Slide 49. Devices to Retard Flow

Slide 50

Slide 51

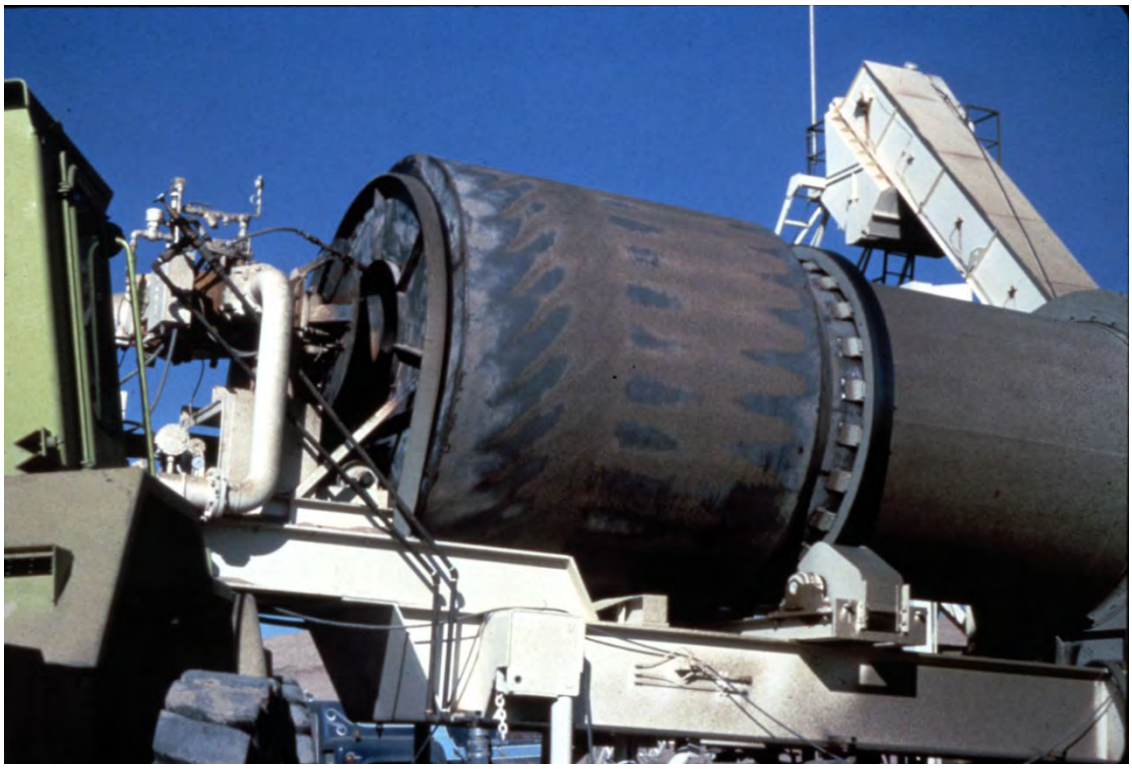
Slide 52



Slide 53

Slide 54

Slide 55



Slide 56

Slide 57

Slide 58

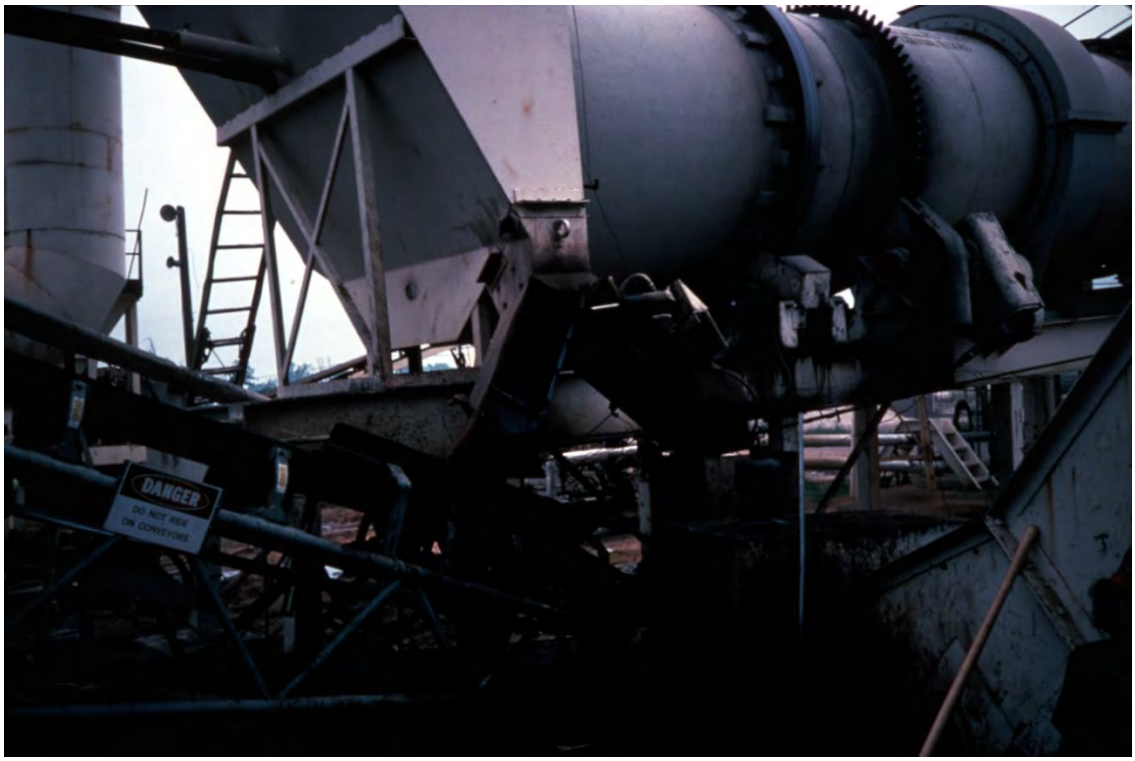
Slide 59

Slide 60

Slide 61

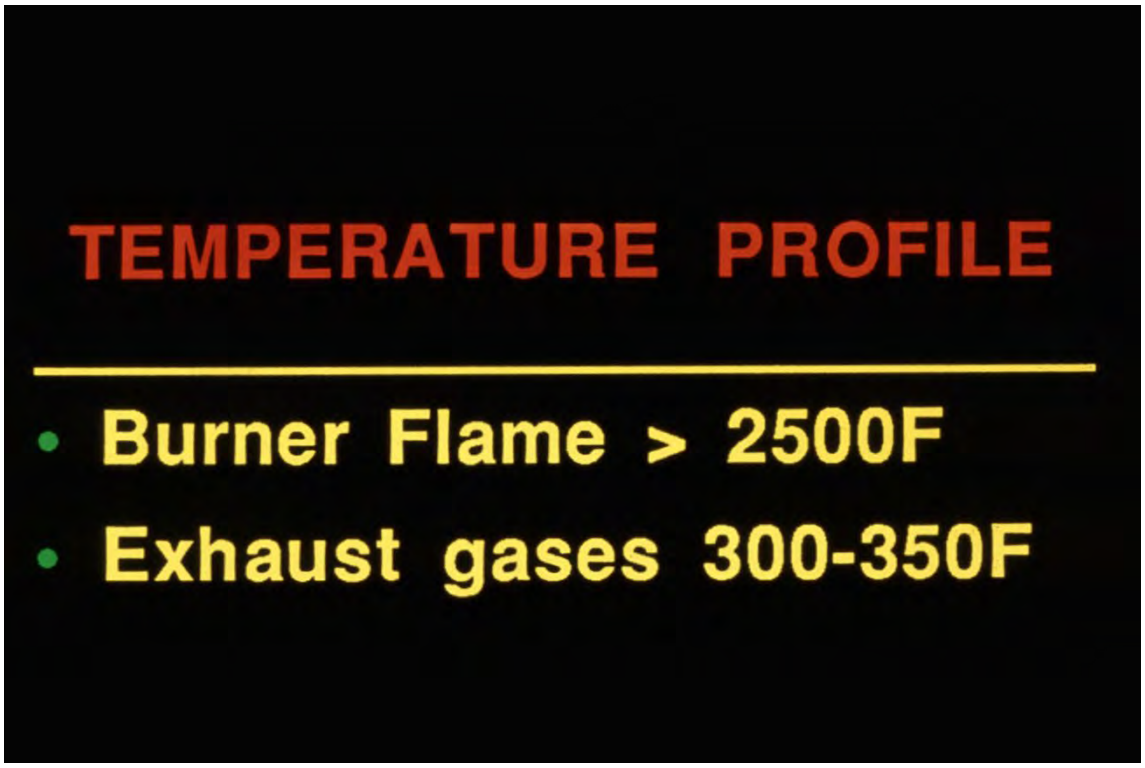
Slide 62

Slide 63

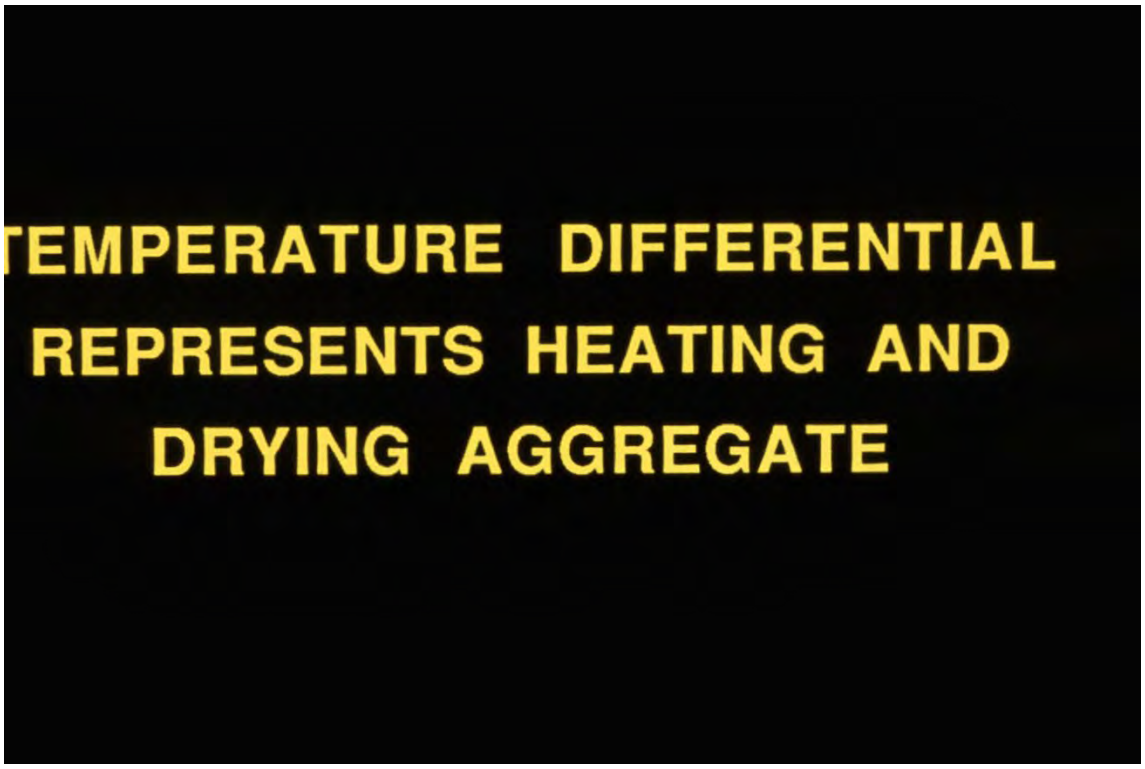


Slide 64

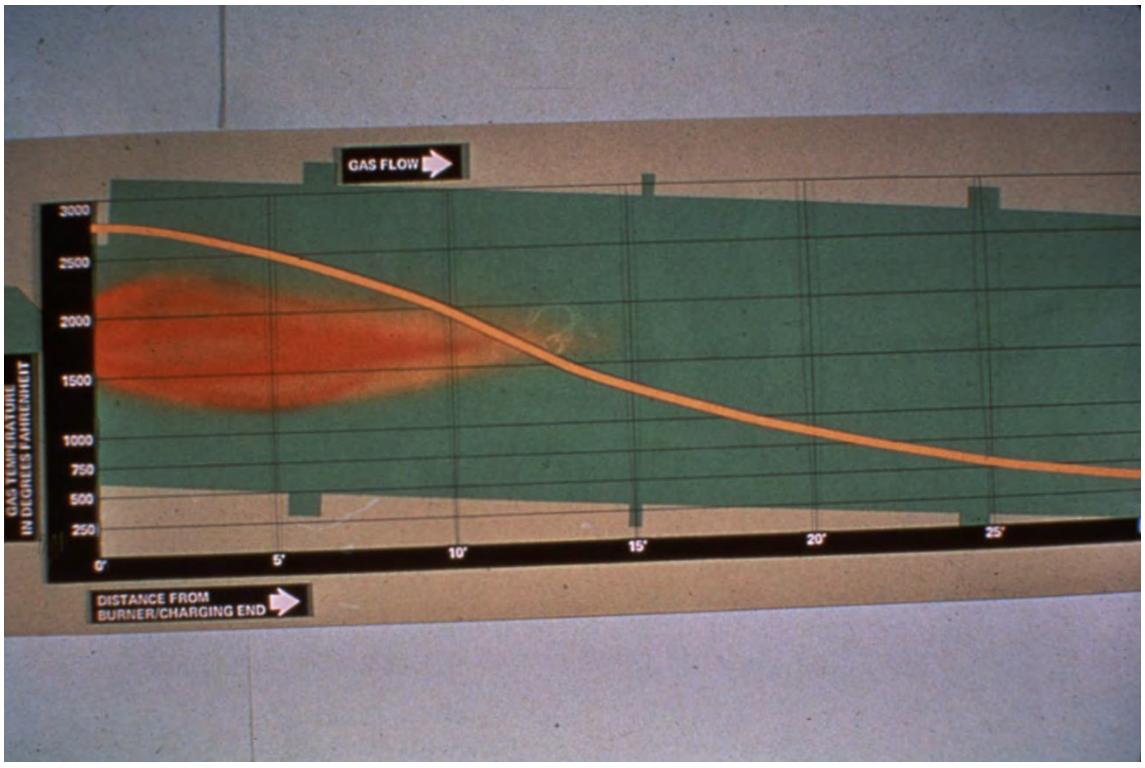
Slide 65



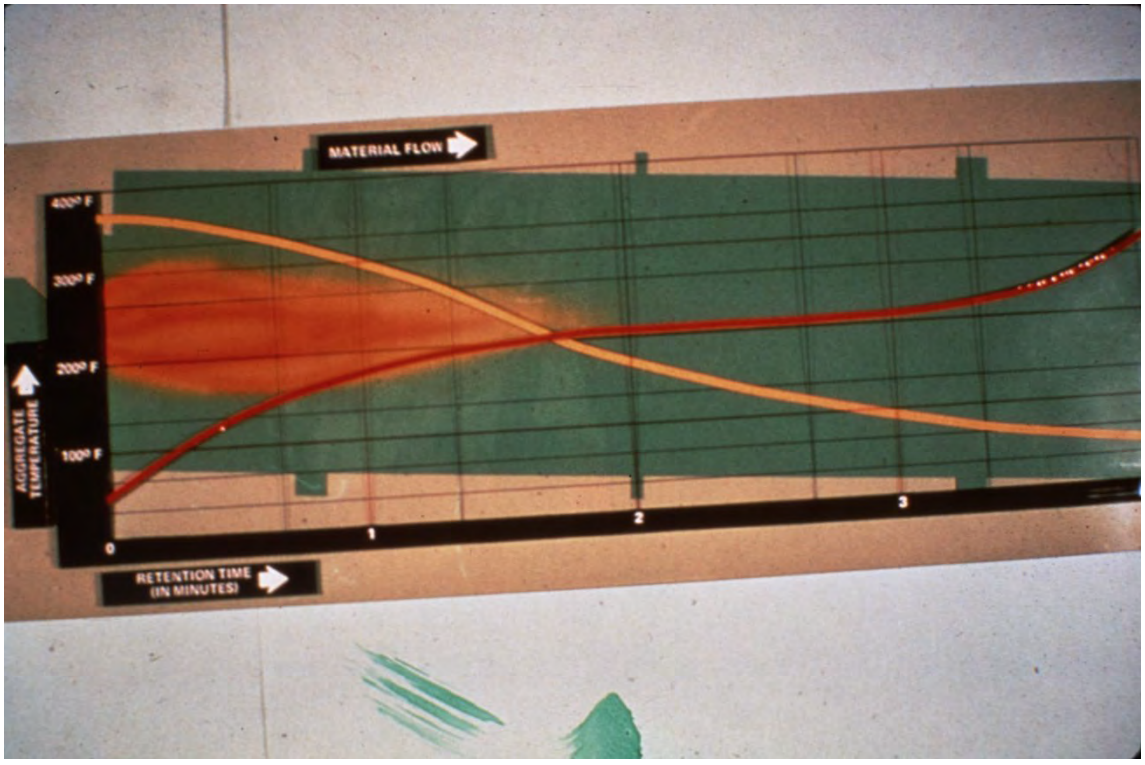
Slide 66. Temperature Profile



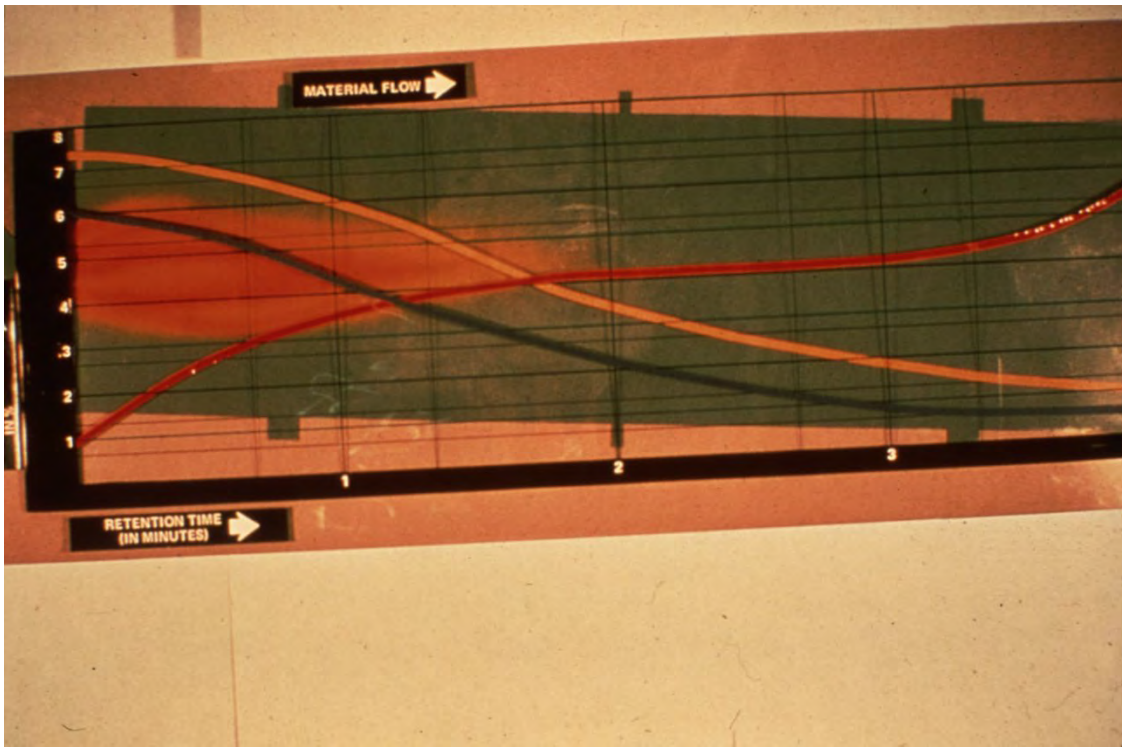
Slide 67. Temperature Differential Represents Heating and Drying Aggregate



Slide 68



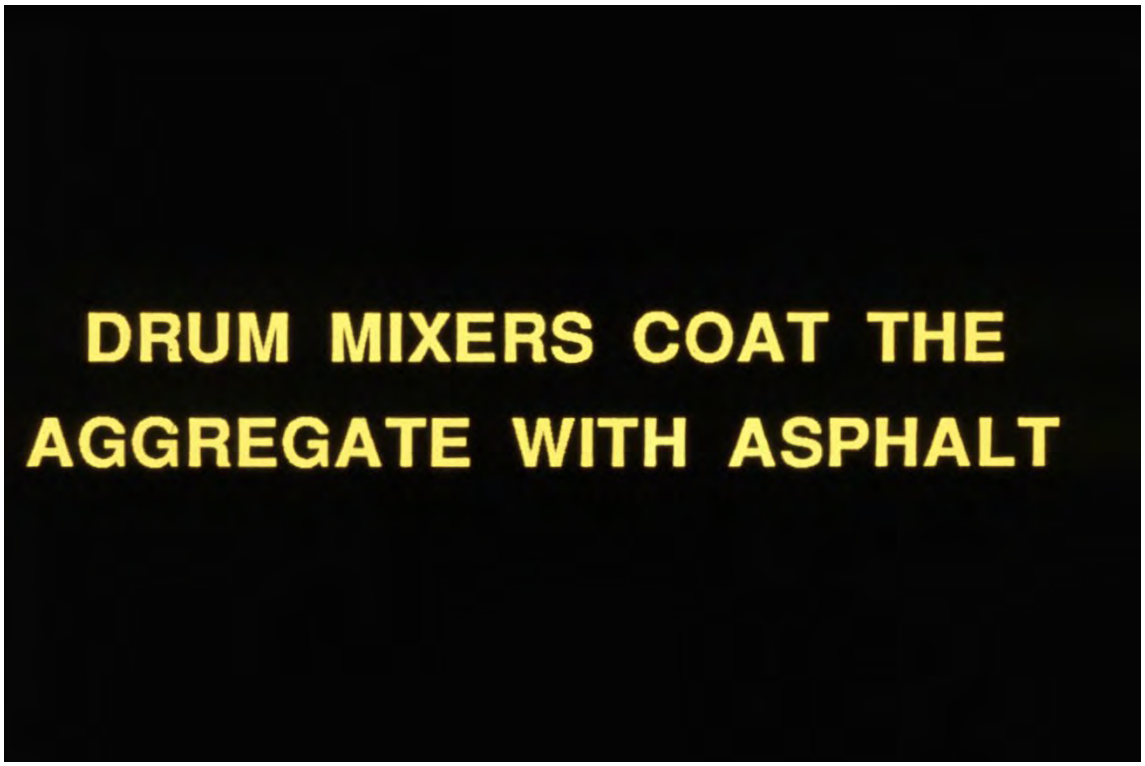
Slide 69



Slide 70

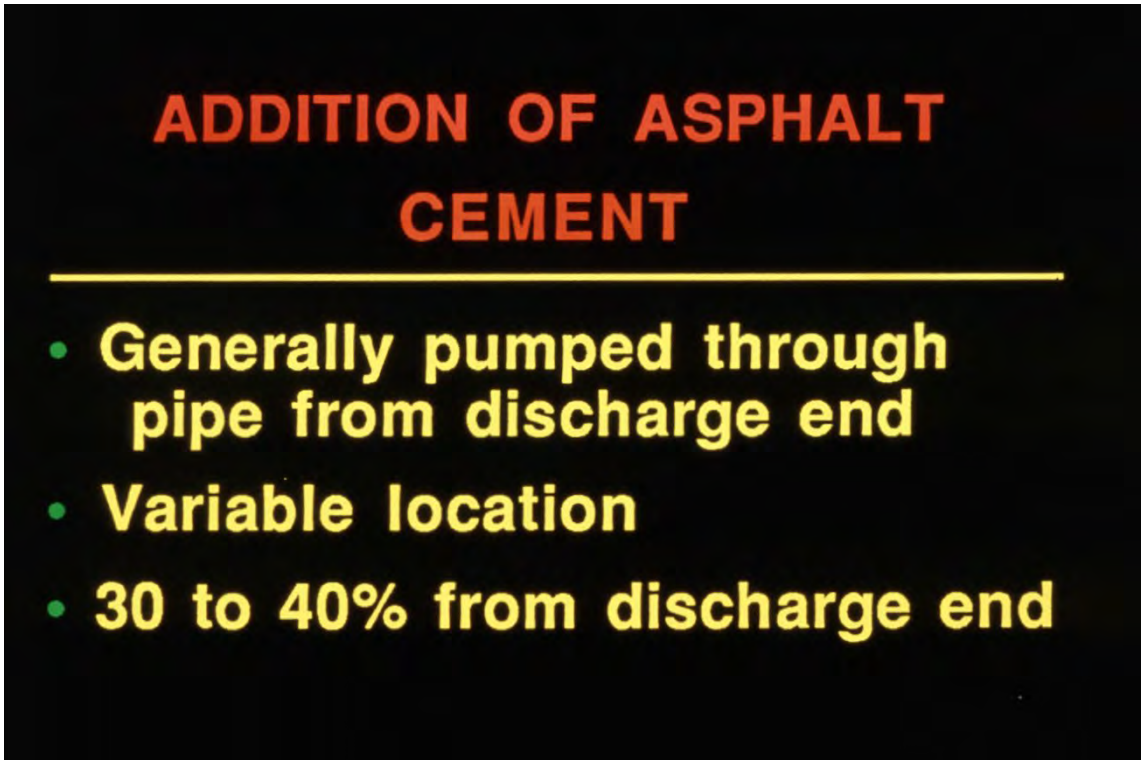
Slide 71

Slide 72. Stack Temperature Minus Mix Temperature ≤ 20F

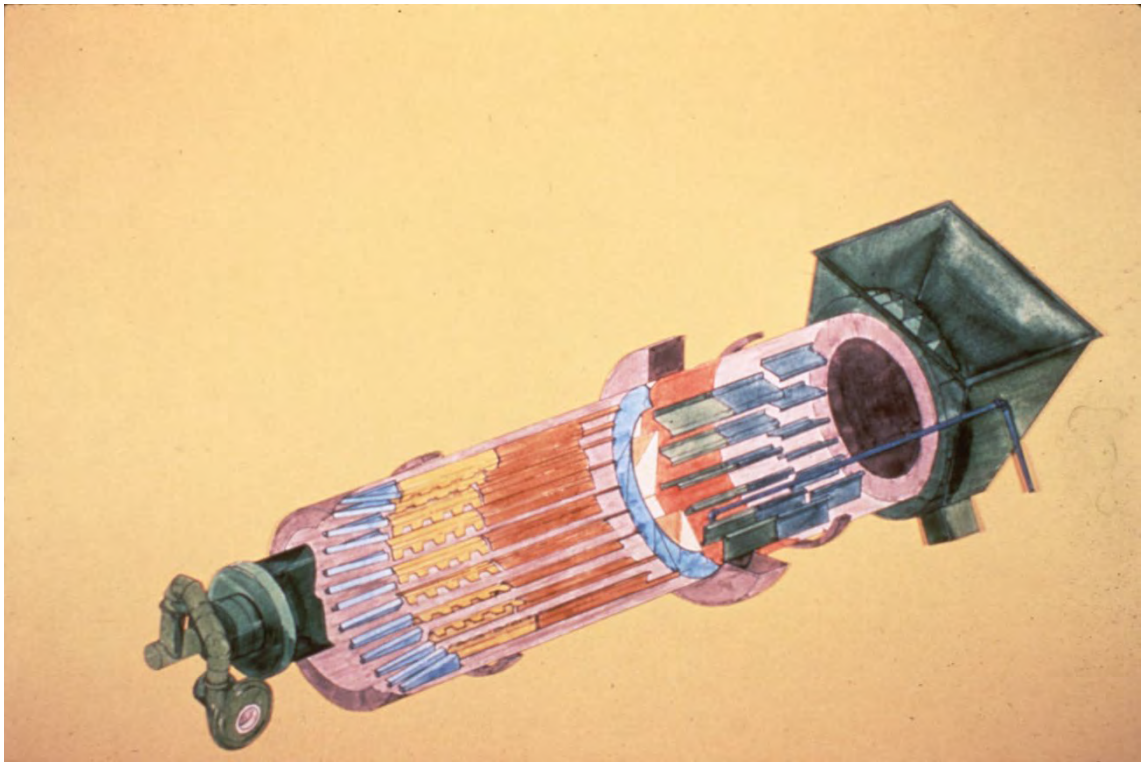


Slide 73. Drum Mixers Coats the Aggregate with Asphalt

Slide 74. Asphalt Cement Foams and Coats Aggregate



Slide 75. Addition of Asphalt Cement



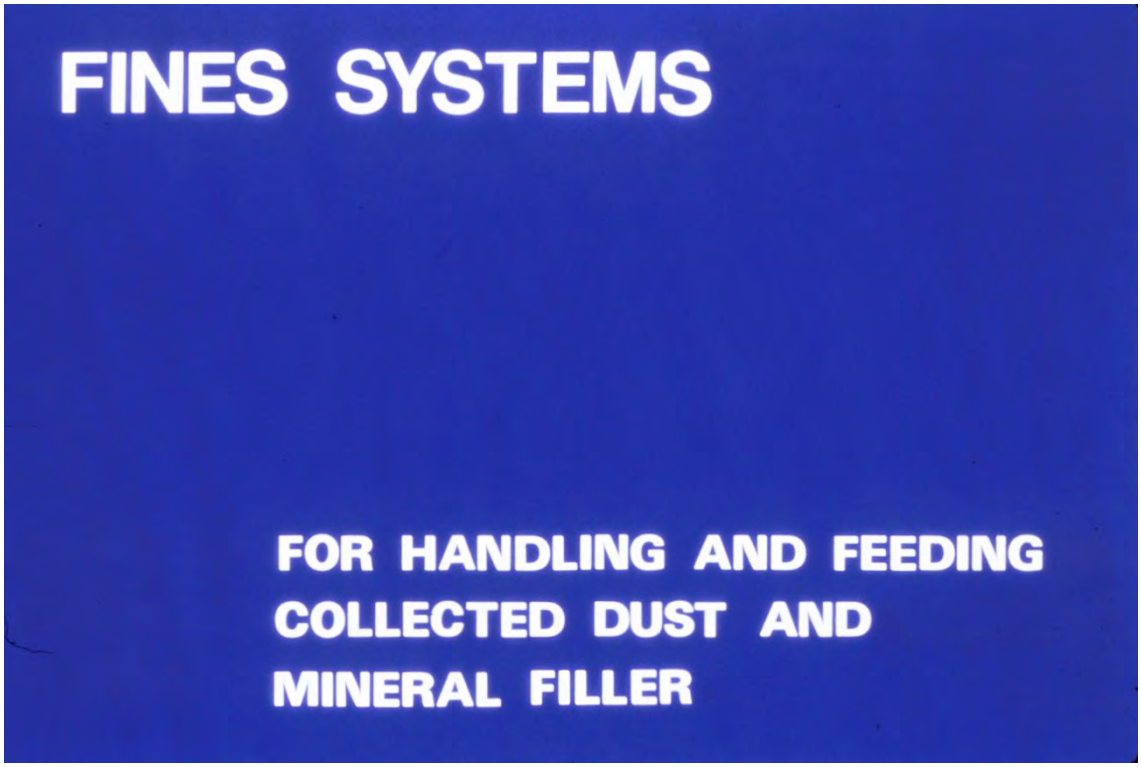
Slide 76

Slide 77

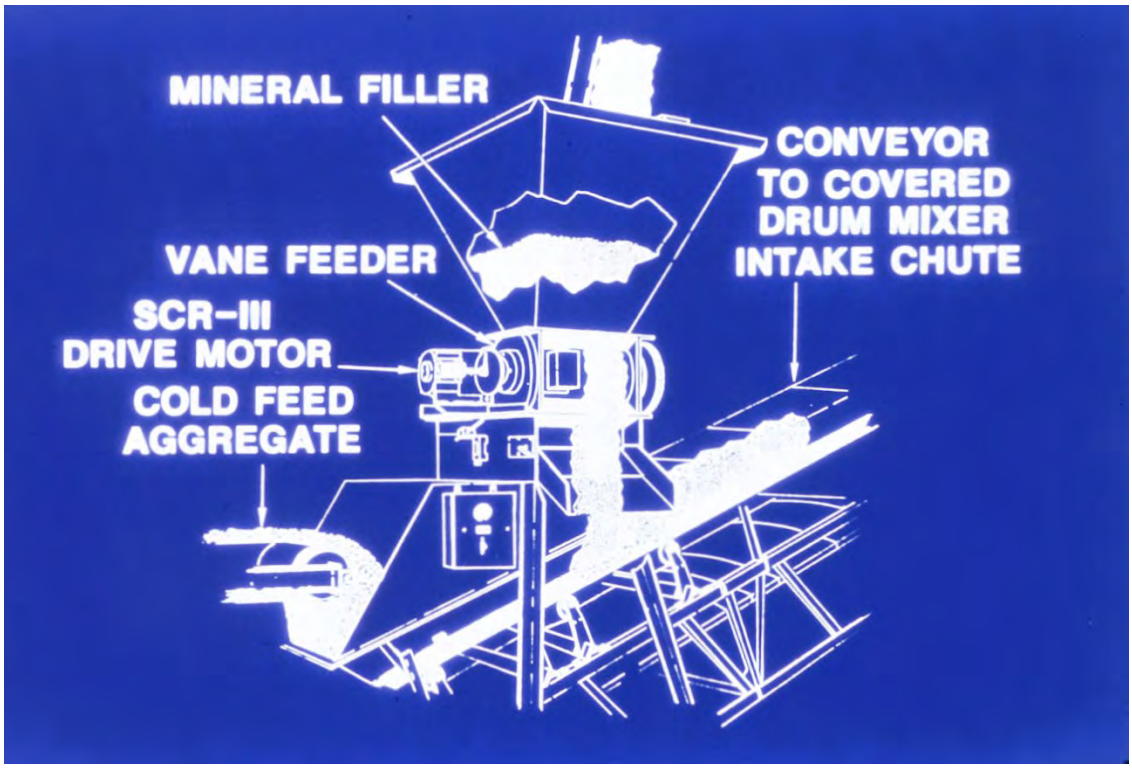
Slide 78

Slide 79

Slide 80



Slide 81. Fines Systems


MINERAL FILLER
CONVEYOR TO COVERED DRUM MIXER INTAKE CHUTE
VANE FEEDER
SCR-III DRIVE MOTOR
COLD FEED AGGREGATE

Slide 82

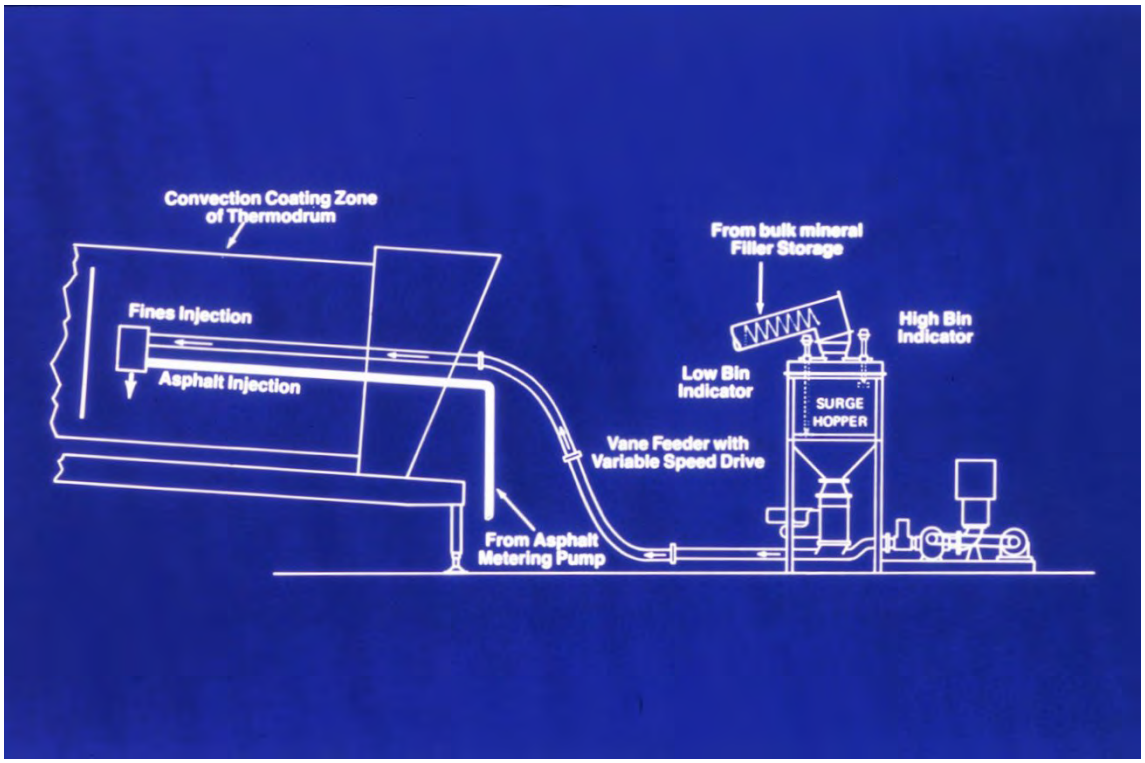
Slide 83

Slide 84

Slide 85

Slide 86

Slide 87

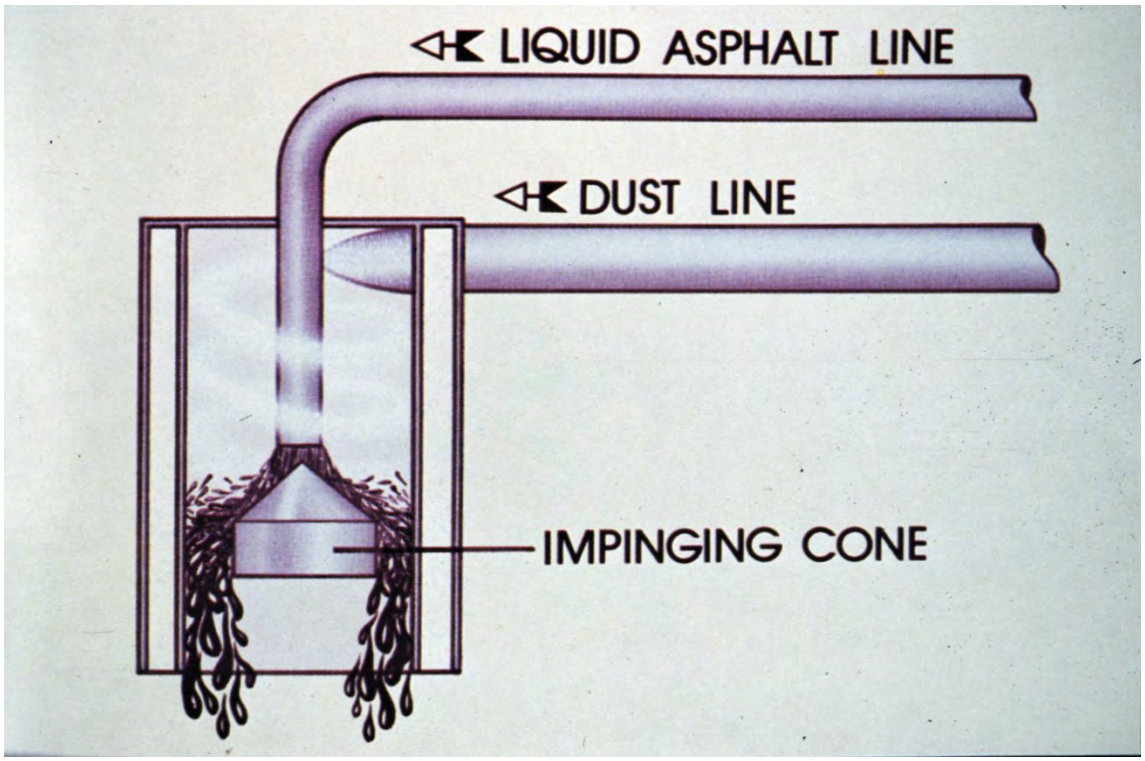

Convection Coating Zone of Thermodrum
From bulk mineral Filler Storage
Fines Injection
Asphalt Injection
High Bin Indicator
Low Bin Indicator
SURGE HOPPER
Vane Feeder with Variable Speed Drive
From Asphalt Metering Pump

Slide 88

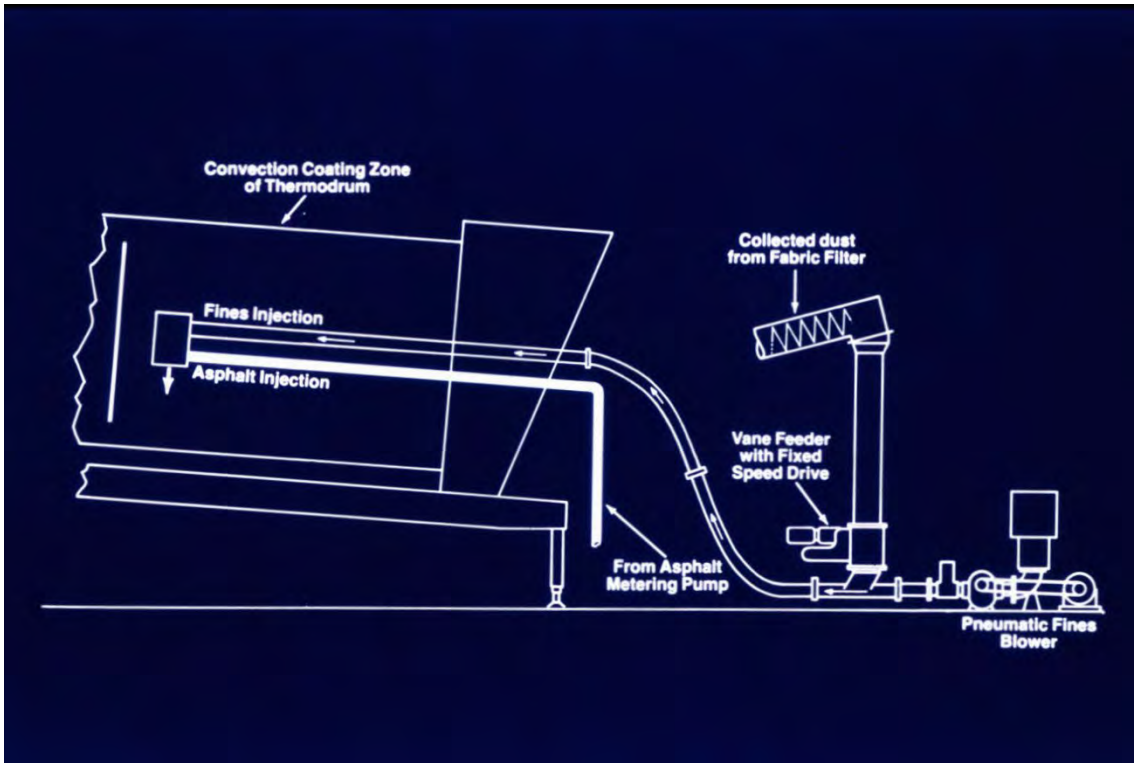
Slide 89

Slide 90

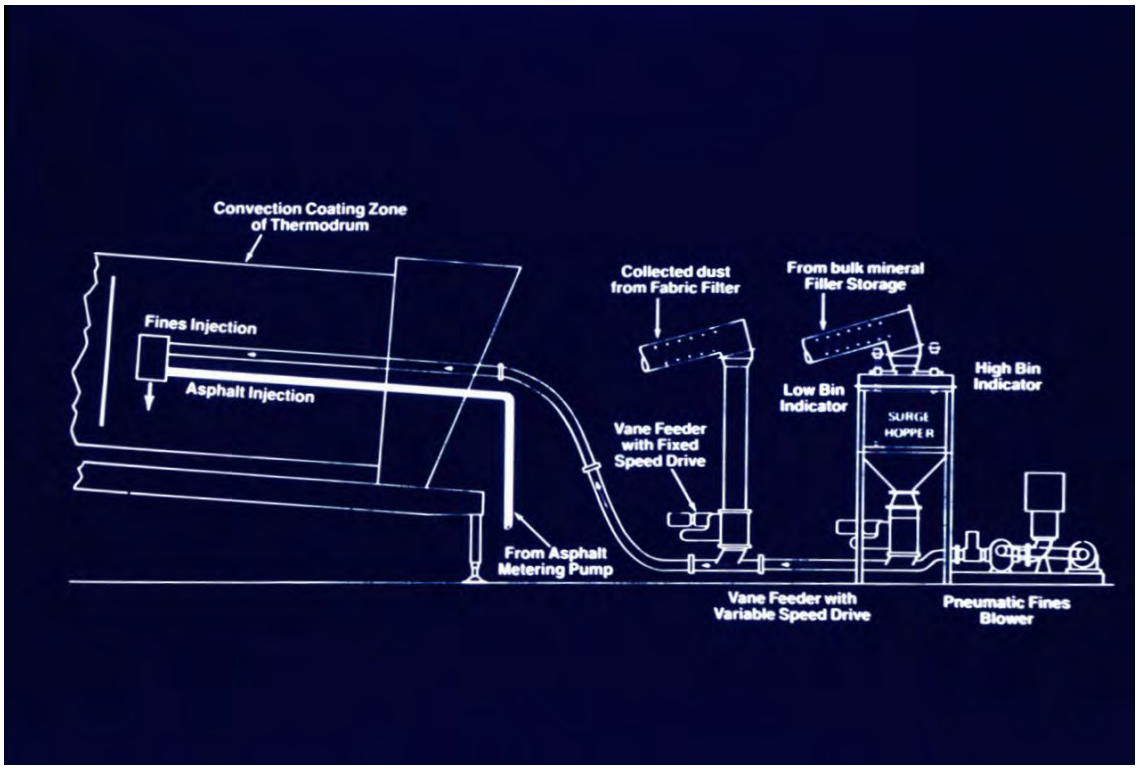
Slide 91



Slide 92



Slide 93

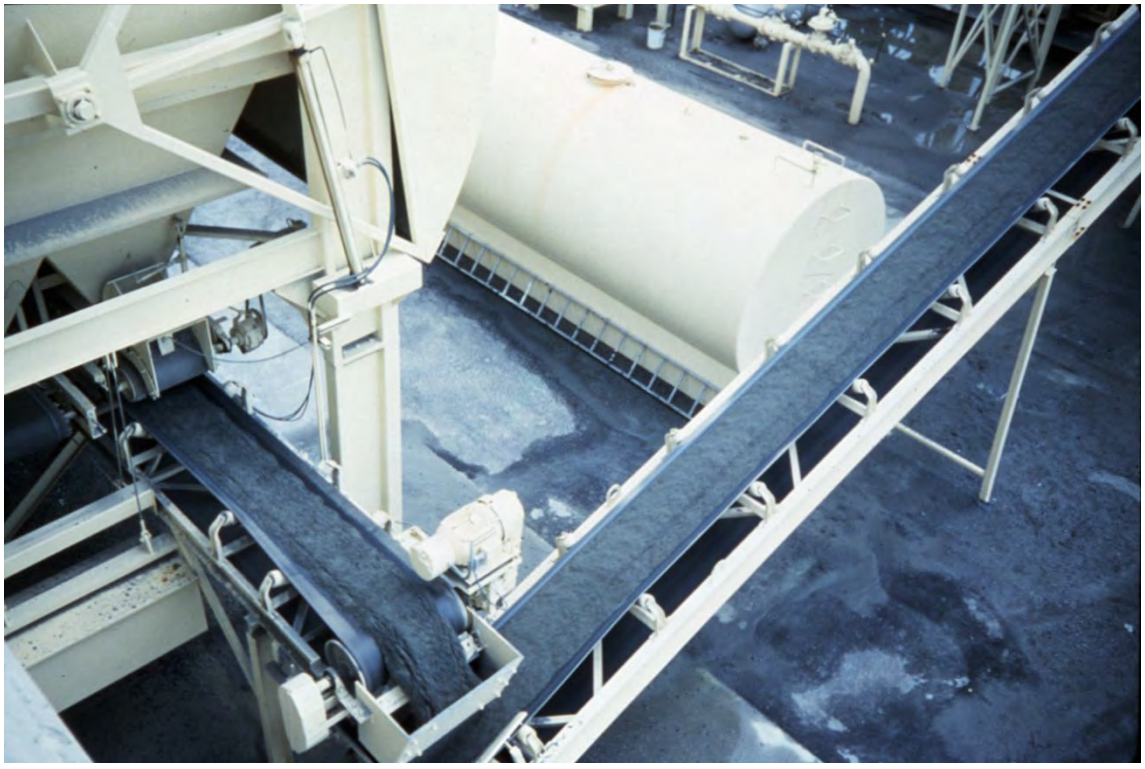

Convection Coating Zone
of Thermodrum
Fines Injection
Asphalt Injection
Collected dust
from Fabric Filter
From bulk mineral
Filler Storage
Low Bin
Indicator
High Bin
Indicator
SURGE
HOPPER
Vane Feeder
with Fixed
Speed Drive
From Asphalt
Metering Pump
Vane Feeder with
Variable Speed Drive
Pneumatic Fines
Blower

Slide 94

Slide 95

Slide 96

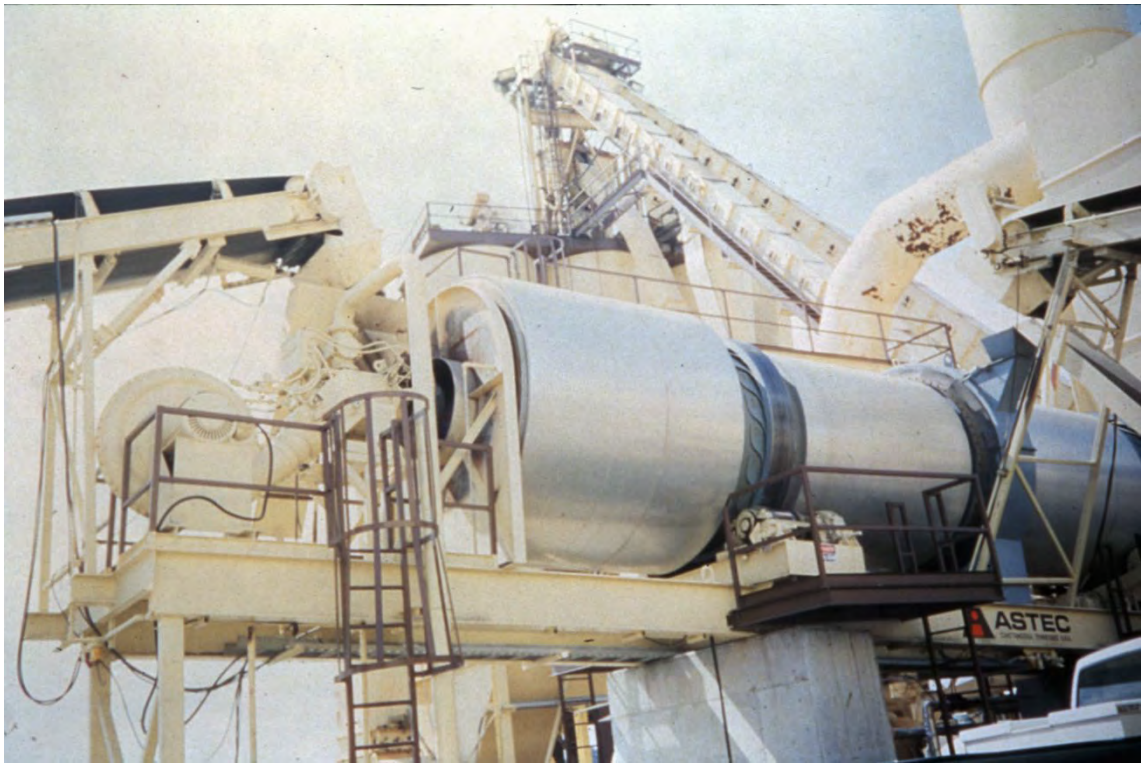
Slide 97



Slide 98

Slide 99

Slide 100



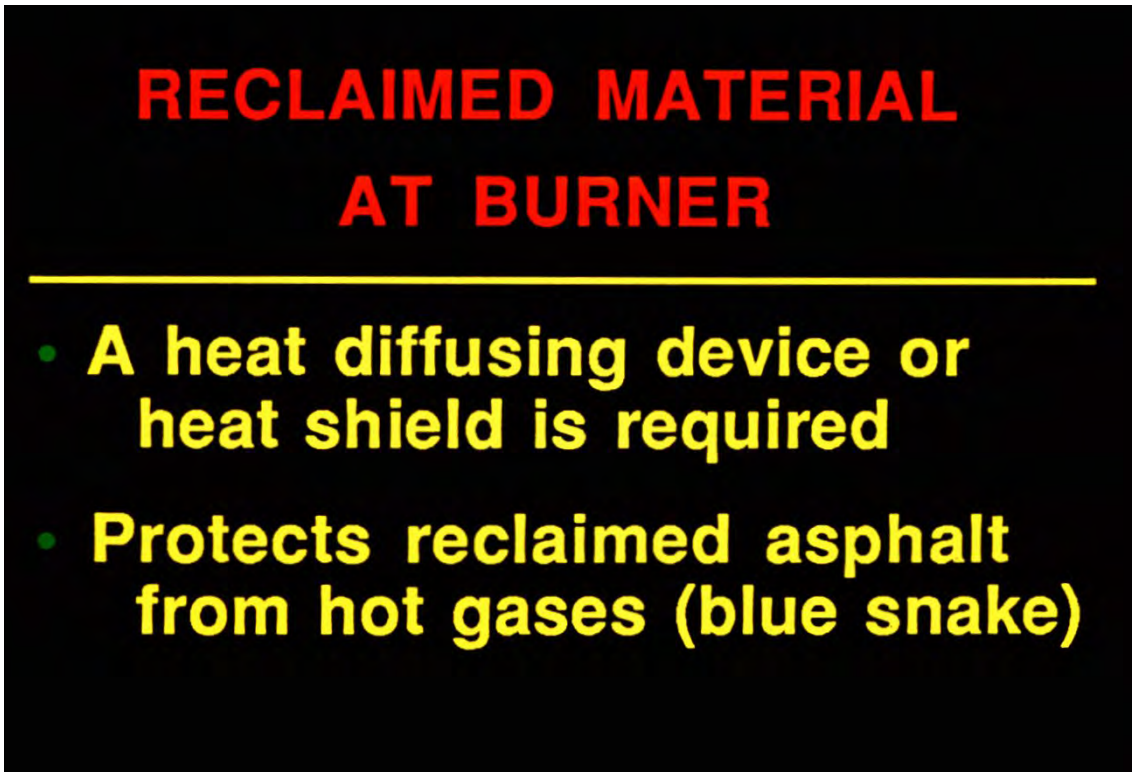
Slide 101

Slide 102

Slide 103

Slide 104

Slide 105



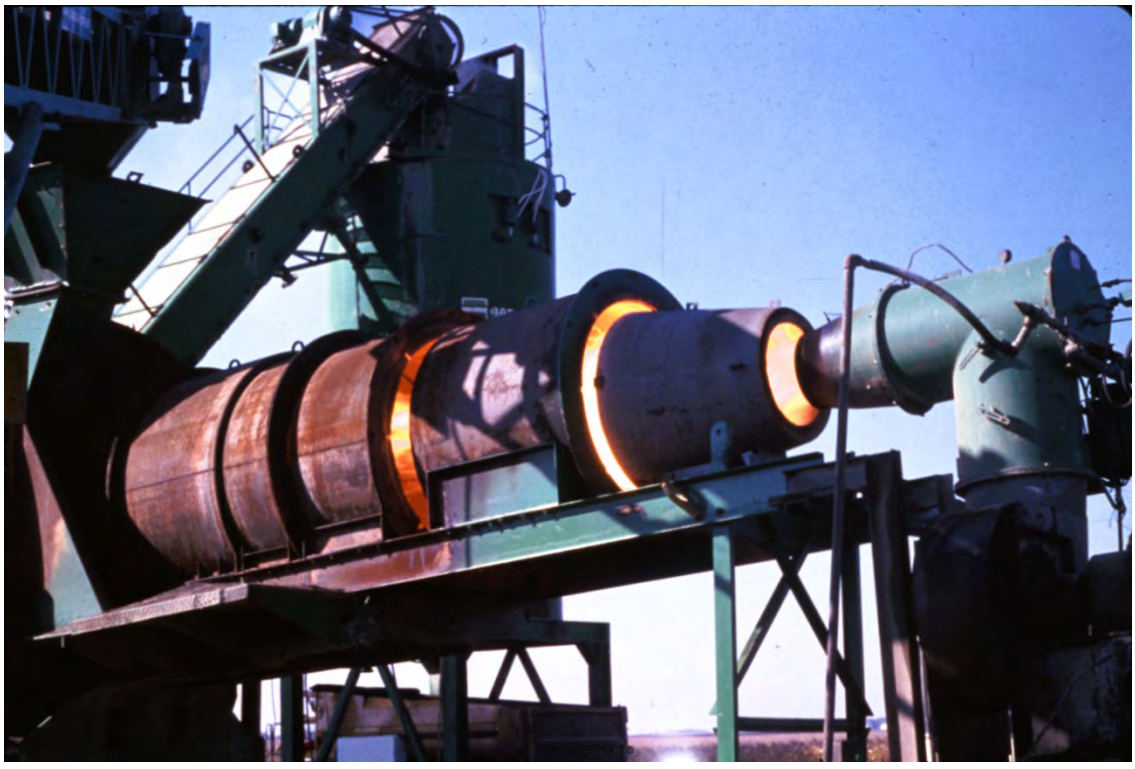
Slide 106. Reclaimed Material at Burner

Slide 107

Slide 108

Slide 109

Slide 110



Slide 111

Slide 112

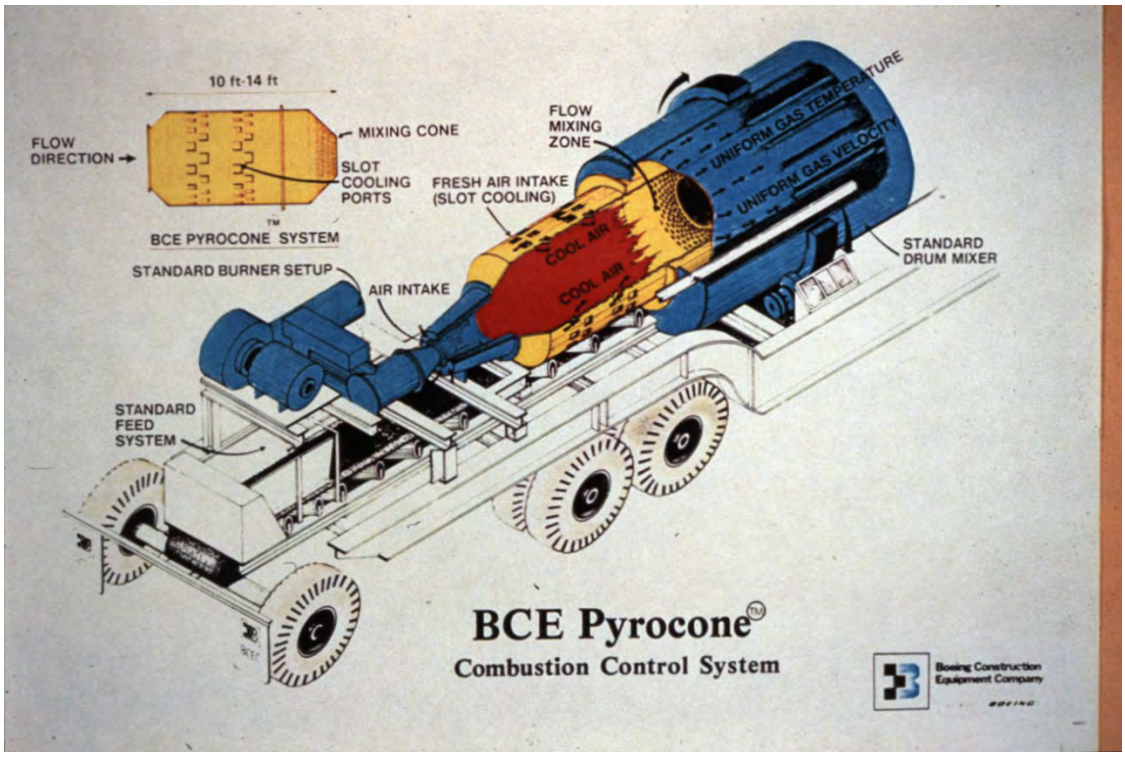
Slide 113

Slide 114

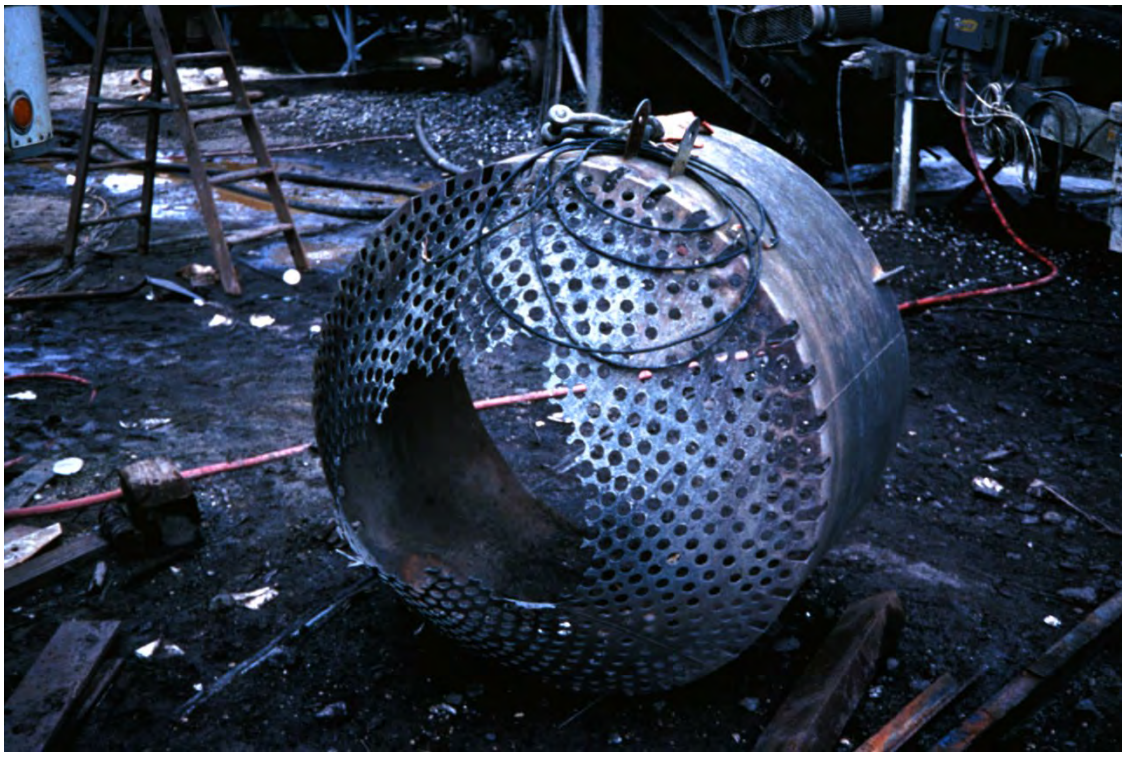
Slide 115

Slide 116

Slide 117



Slide 118. BCE Pyrocone™ Combustion Control System



Slide 119

Slide 120

Slide 121

Slide 122

Slide 123

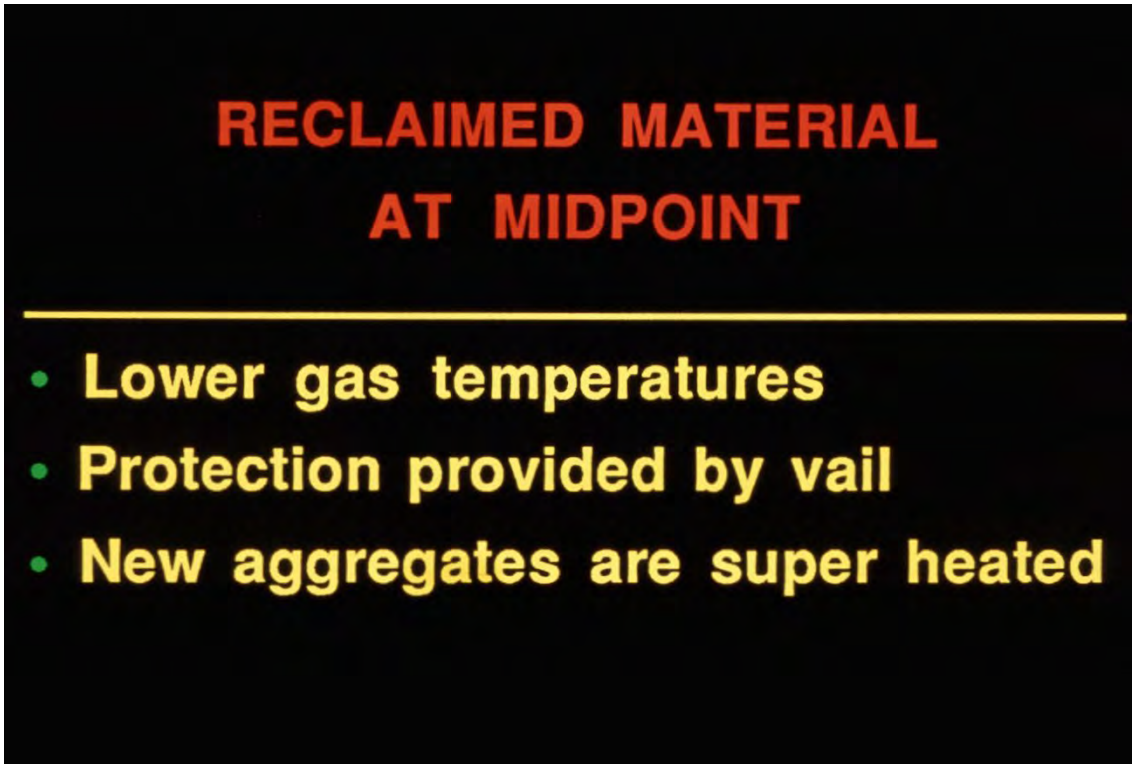
Slide 124

Slide 125

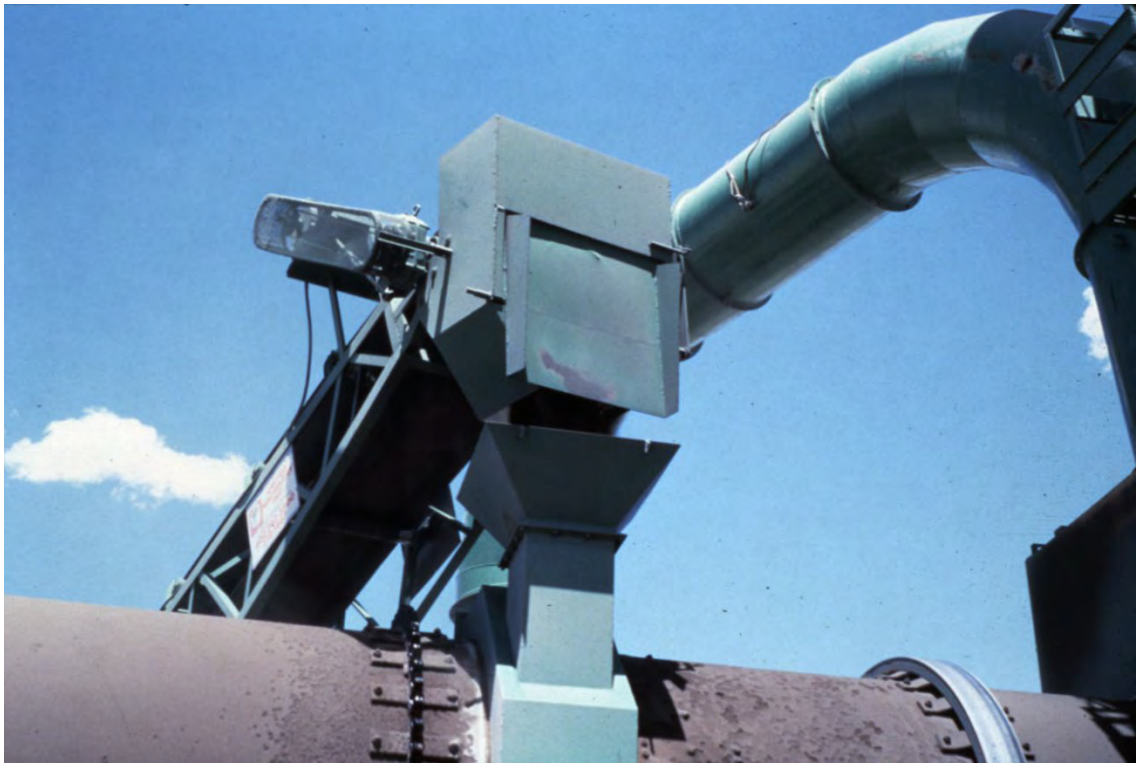
Slide 126

Slide 127

Slide 128



Slide 129. Reclaimed Material at Midpoint



Slide 130

Slide 131

Slide 132

Slide 133

Slide 134

Slide 135

Slide 136

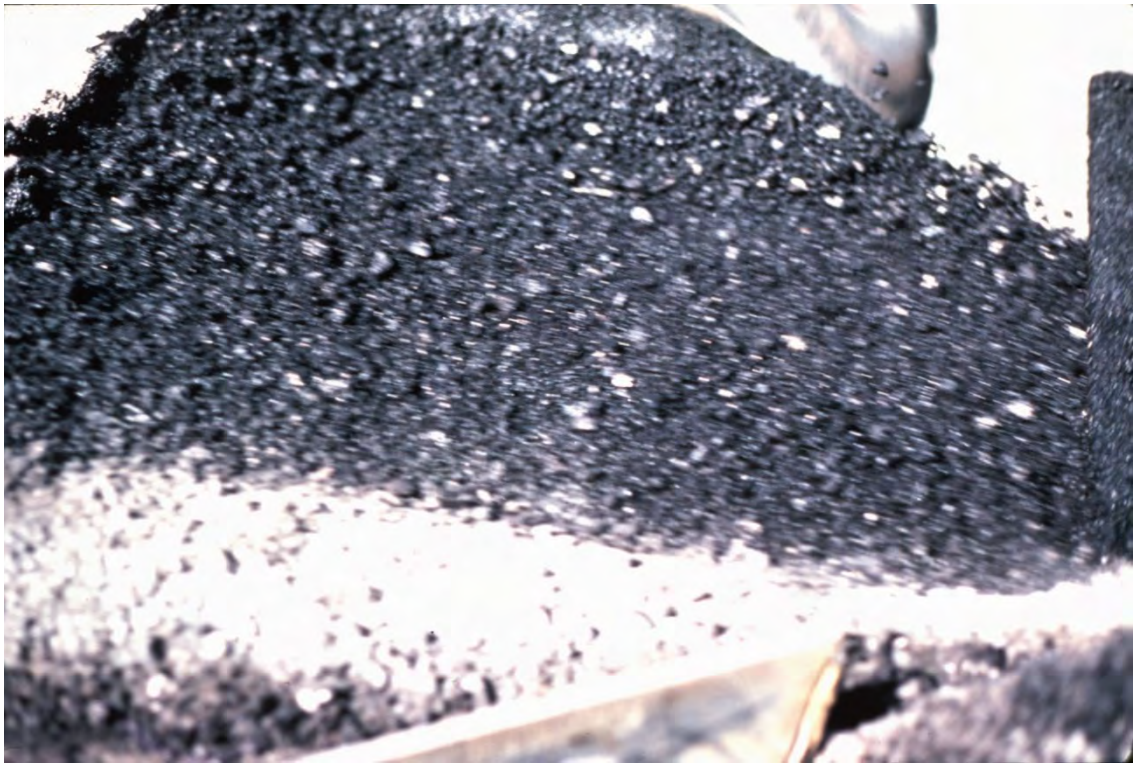
Slide 137

Slide 138

Slide 139

Slide 140

Slide 141



Slide 142

Slide 143

Slide 144

Slide 145

Slide 146

Slide 147

Slide 148

Slide 149

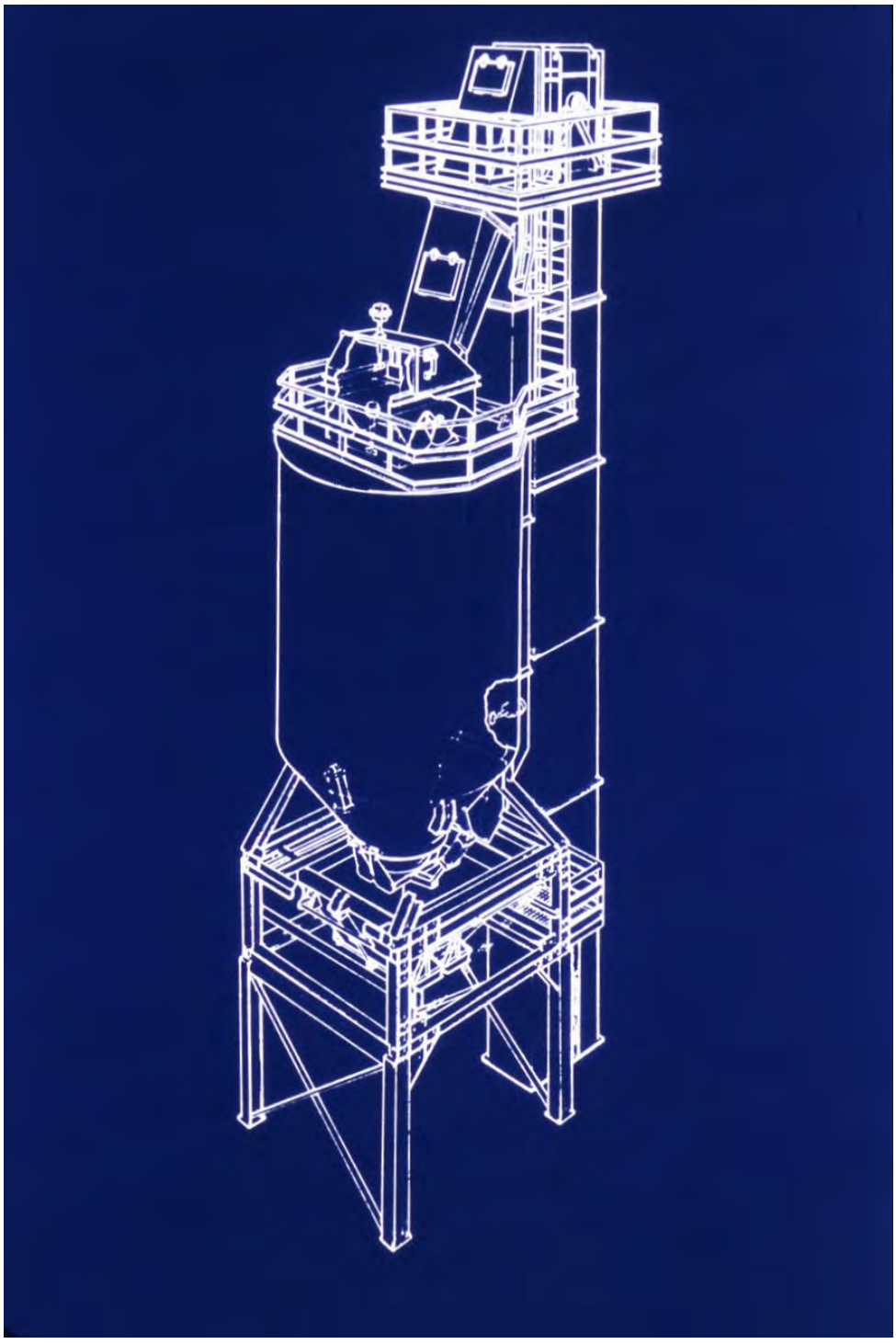
Slide 150

Slide 151

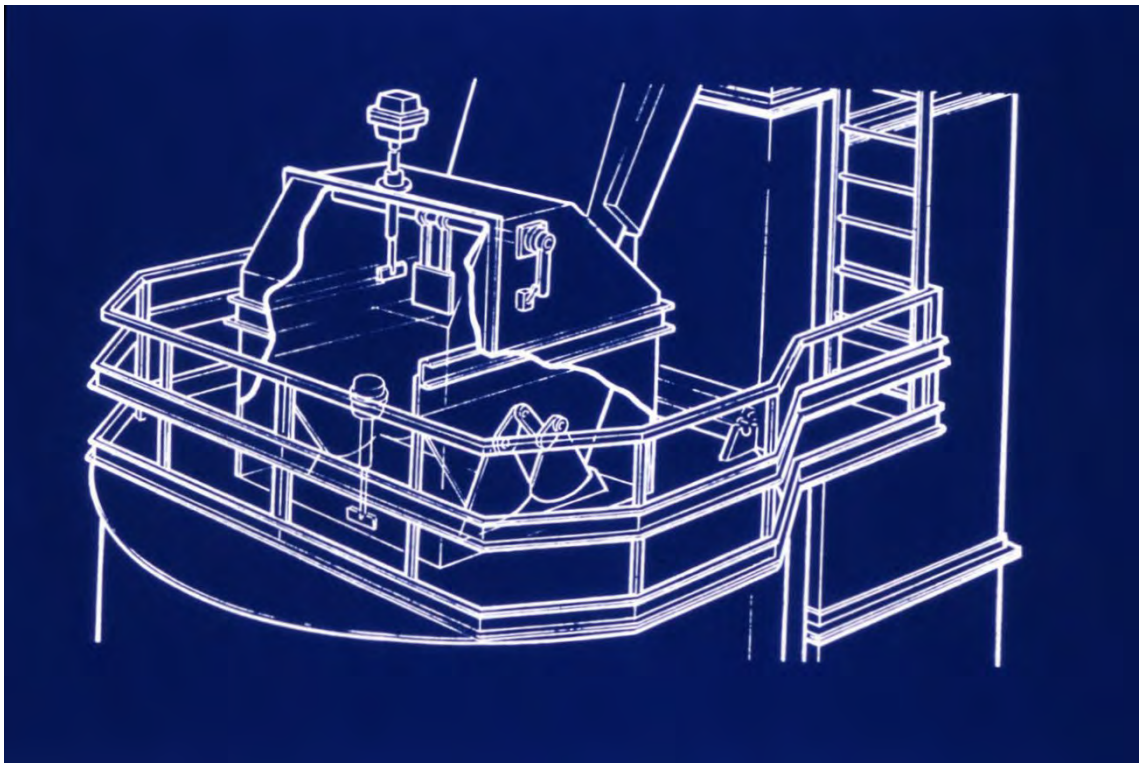
Slide 152

Chapter 8. Hot Mix Loadout Systems

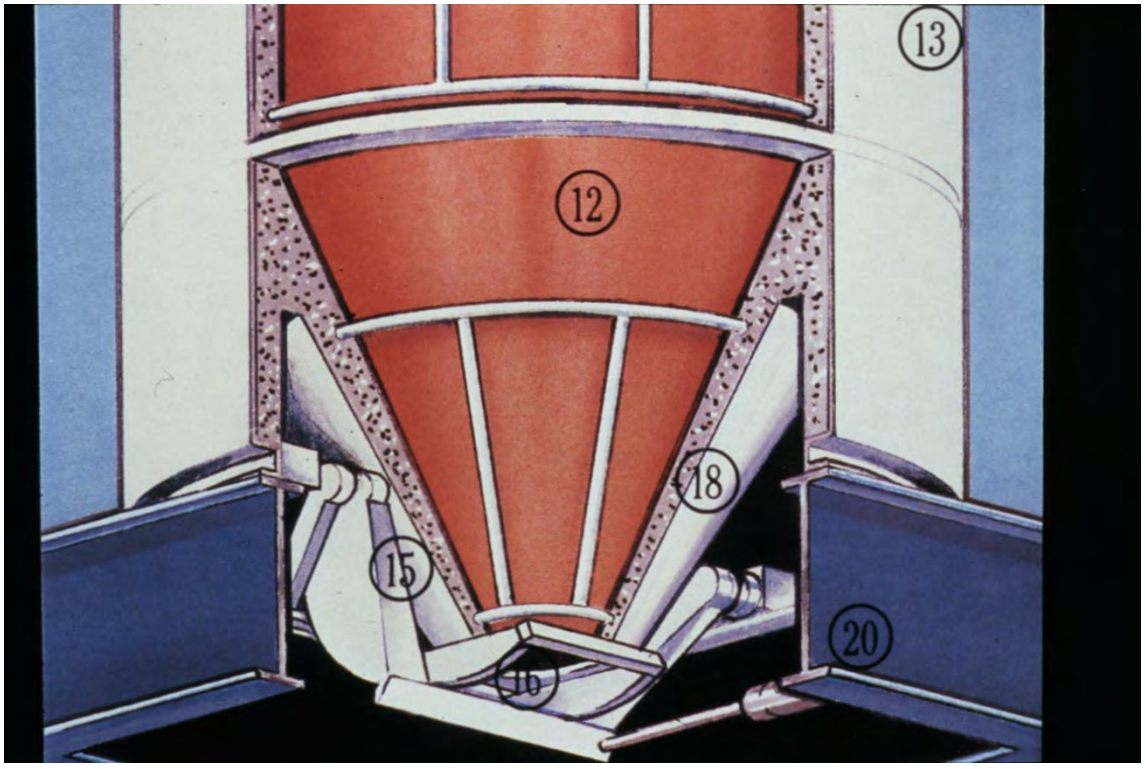
Slide 1



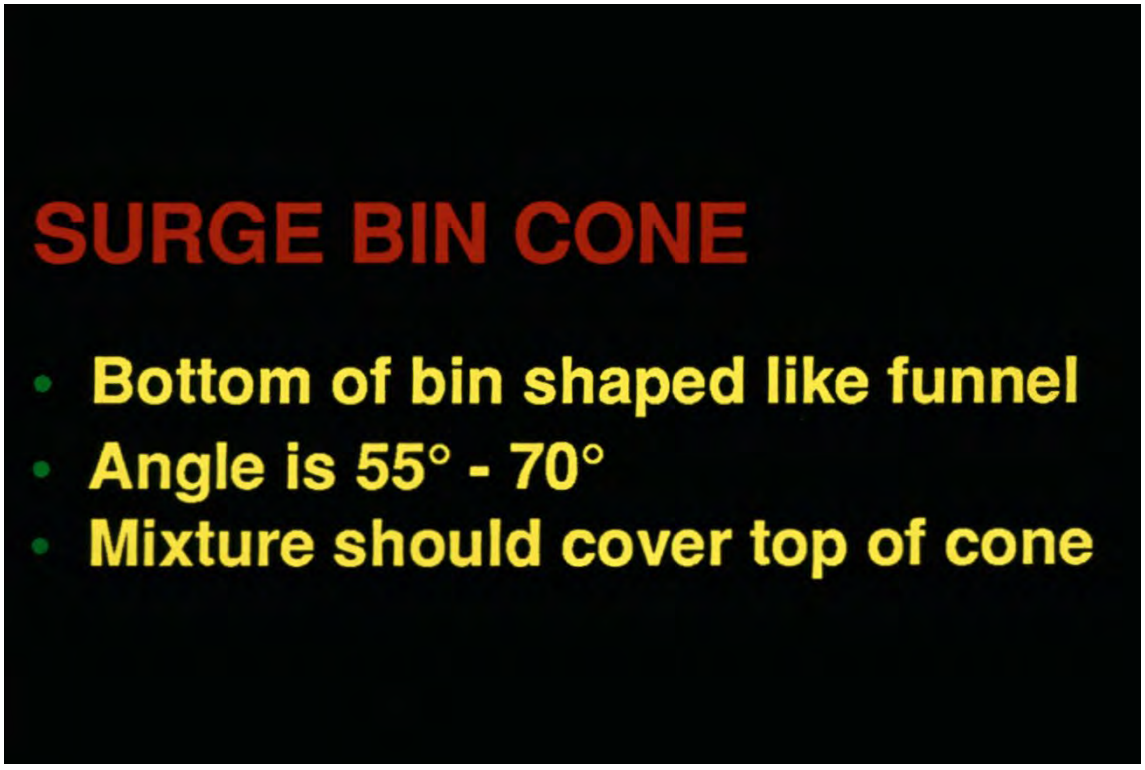
Slide 2



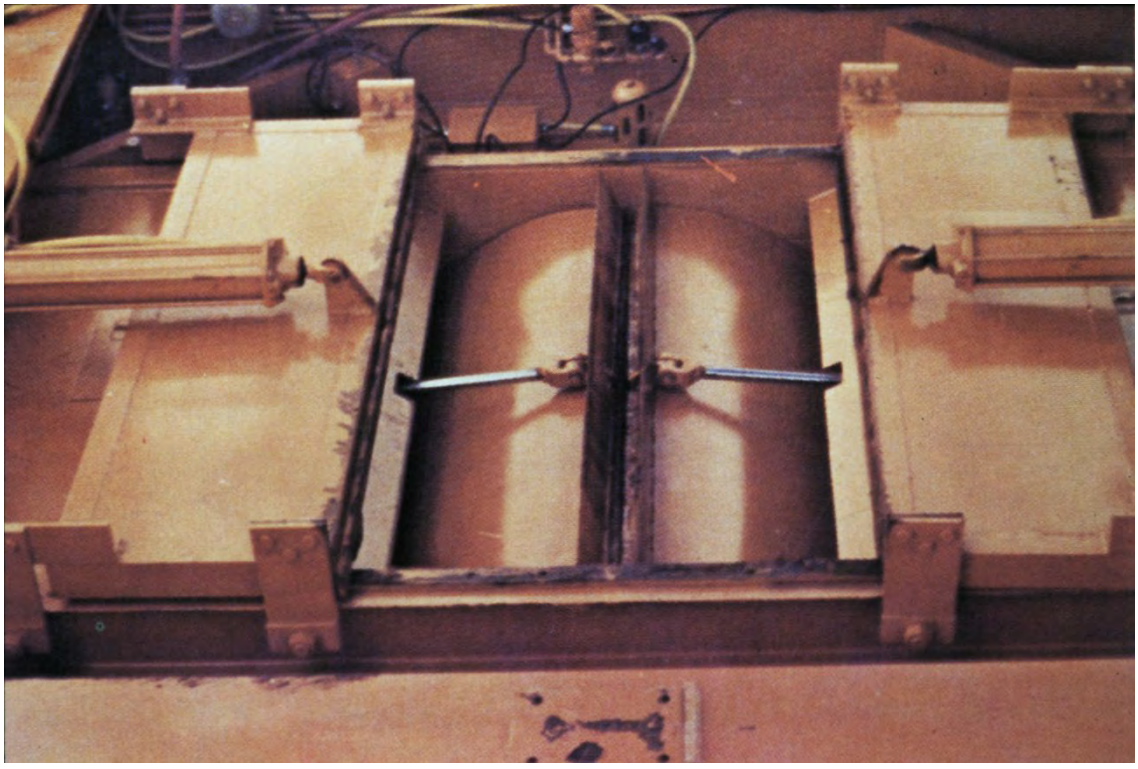
Slide 3



Slide 4



Slide 5. Surge Bin Cone



Slide 6

Slide 7

Slide 8

Slide 9

Slide 10

Slide 11

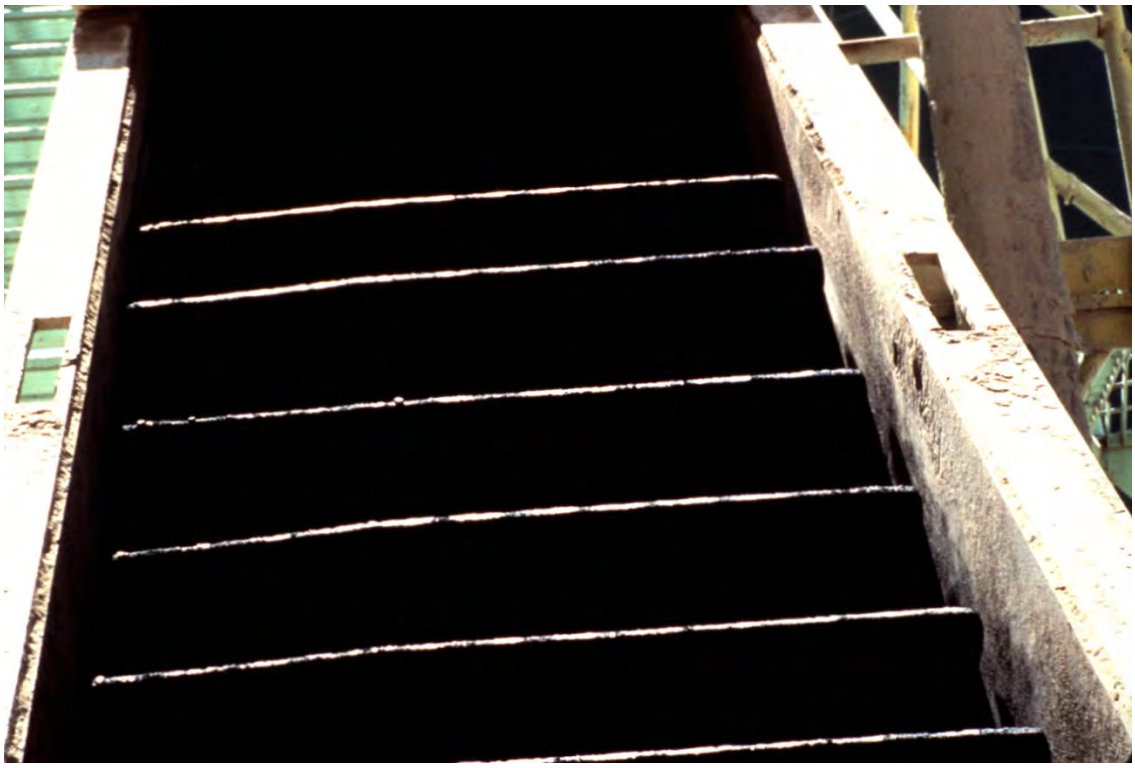
Slide 12

Slide 13

Slide 14

Slide 15

Slide 16. Conveying Devices



Slide 17

Slide 18

Slide 19

Slide 20

Slide 21

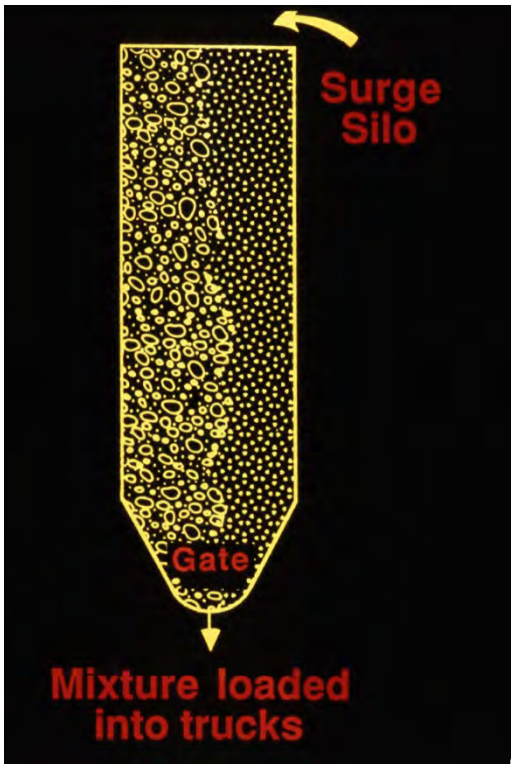
Slide 22

Slide 23

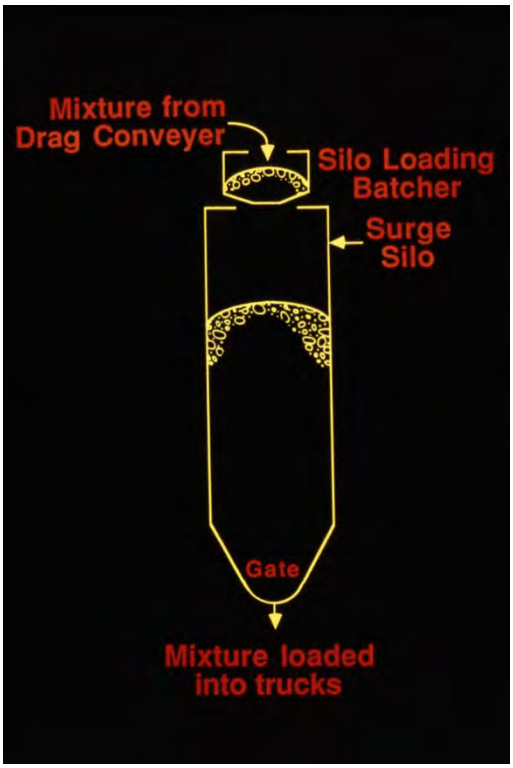
Slide 24

Slide 25

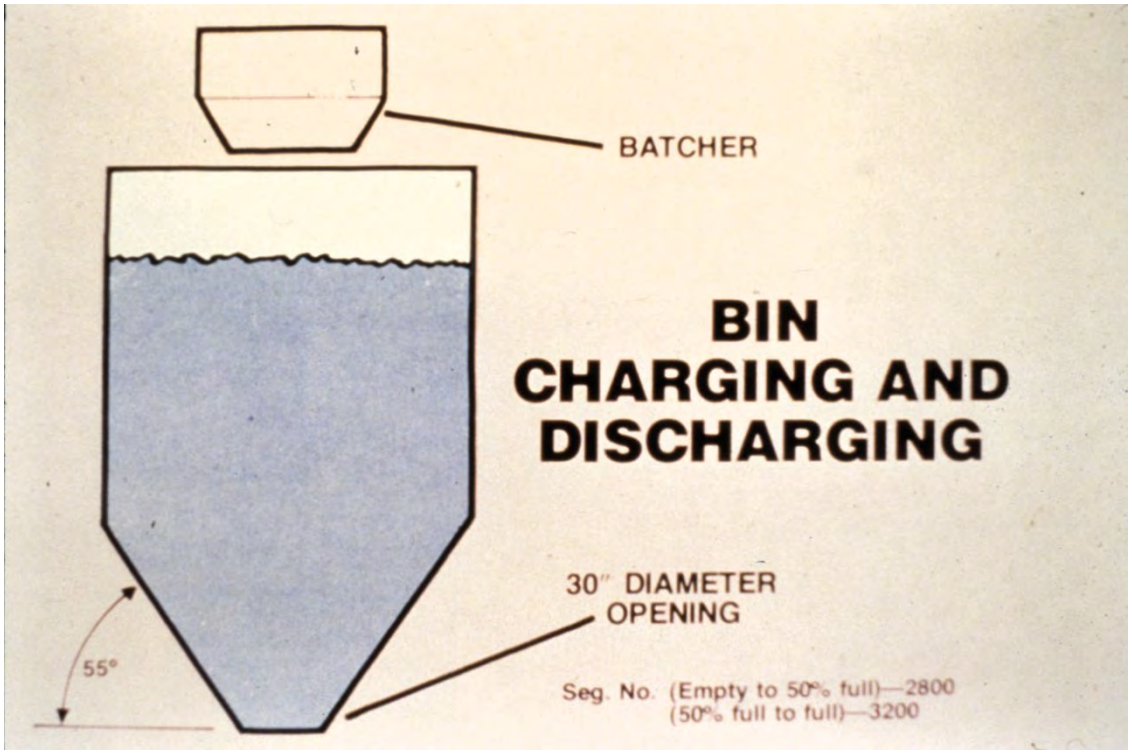
Slide 26



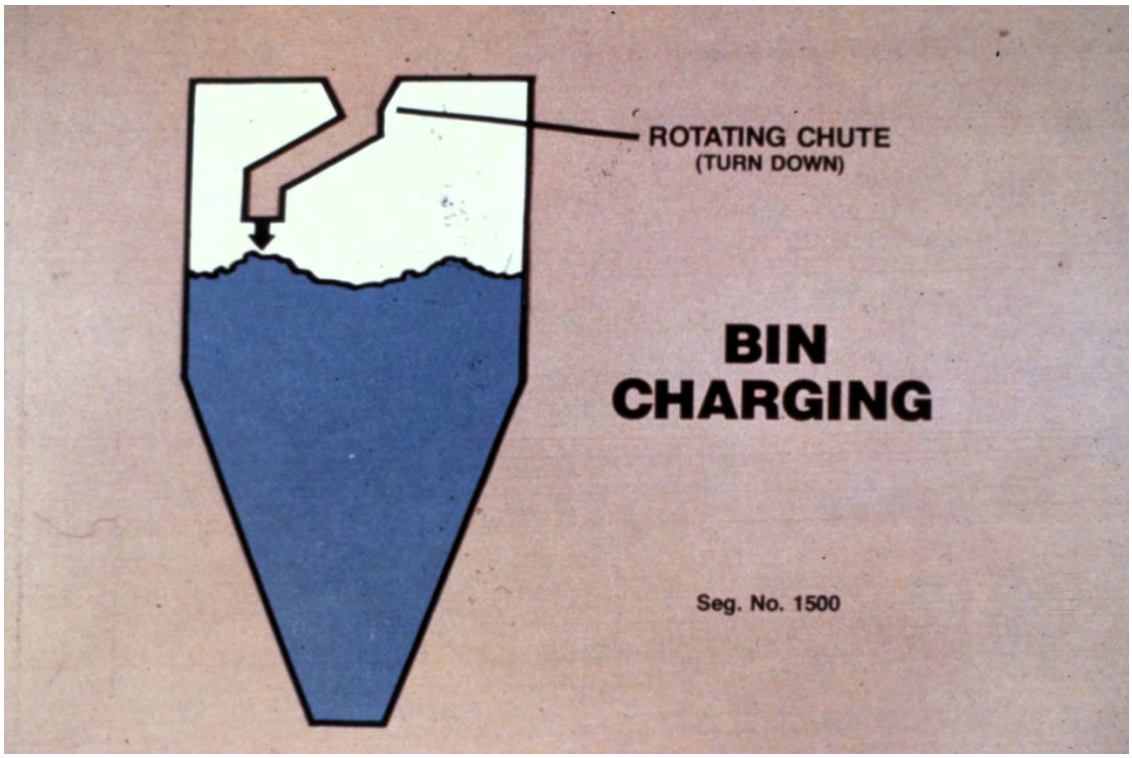
Slide 27



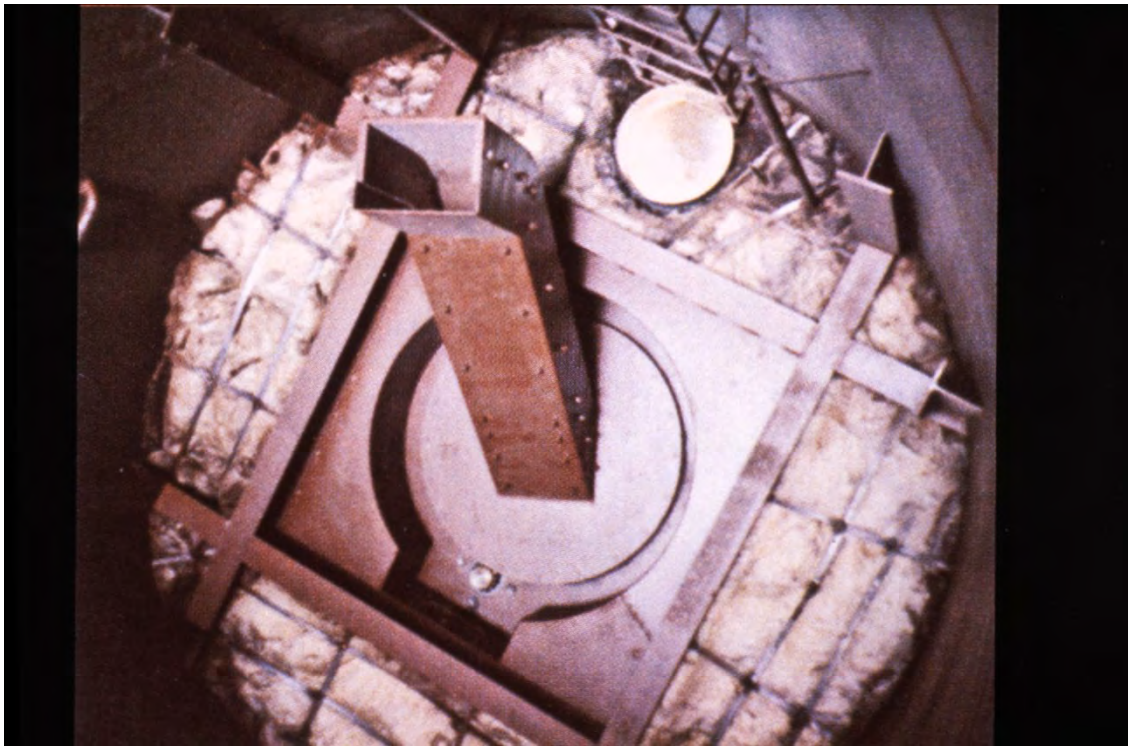
Slide 28



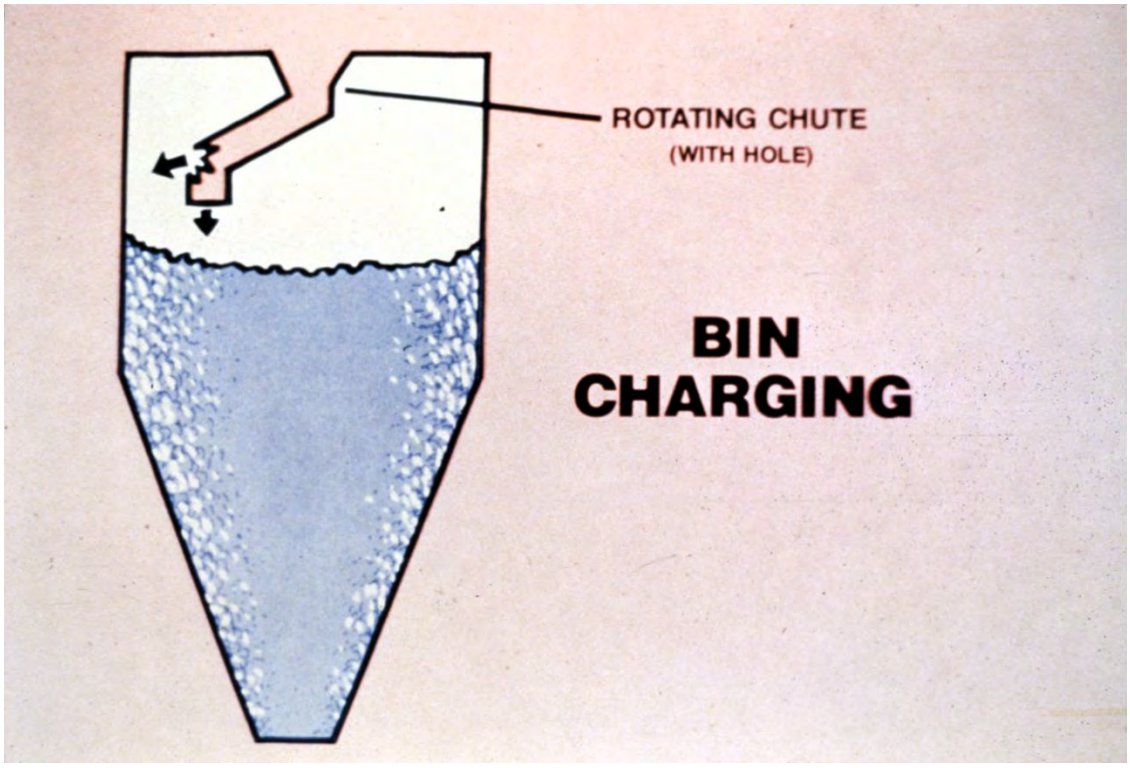
Slide 29. Bin Charging and Discharging



Slide 30. Bin Charging



Slide 31



Slide 32

Slide 33. Segregation

Slide 34. Surge and Storage Bins

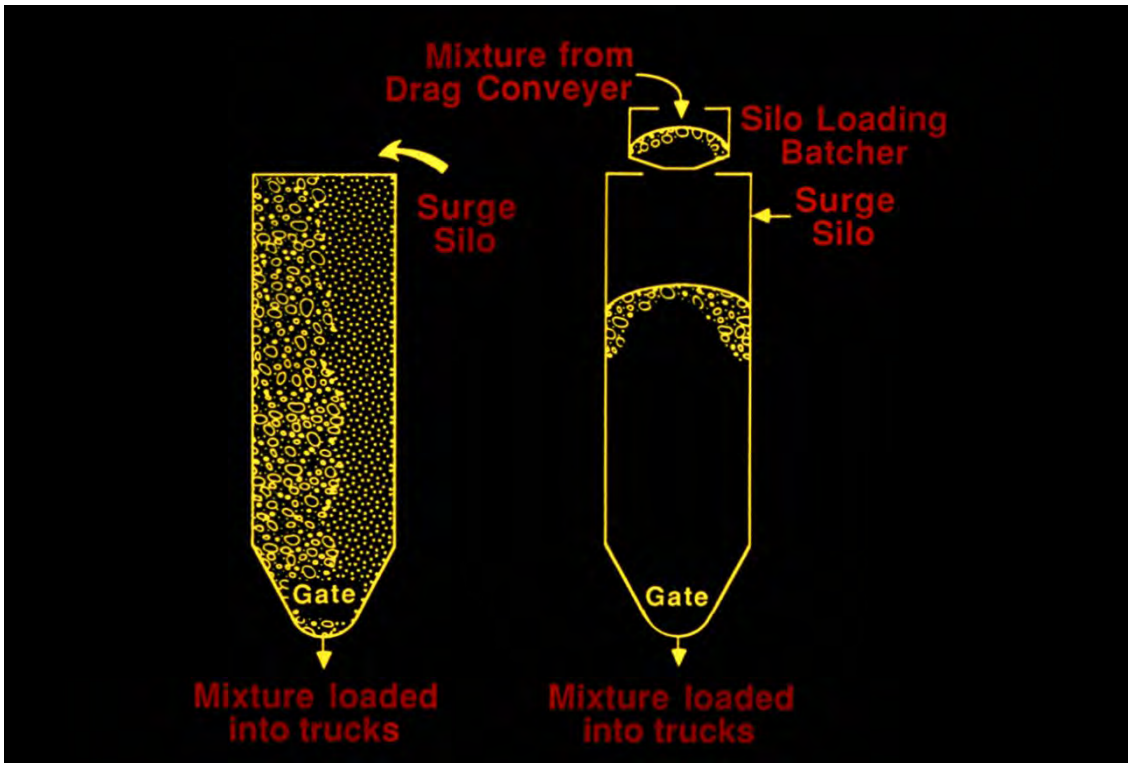
Slide 35. Basic Forms of Segregation

Slide 36. Down the Road – Truck to Truck

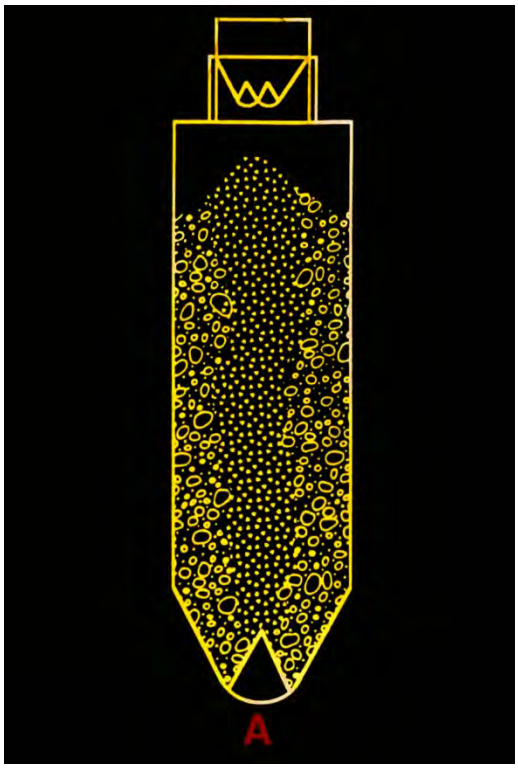
Slide 37. Longitudinal – Side to Side

Slide 38. Truck to Truck Intermittent

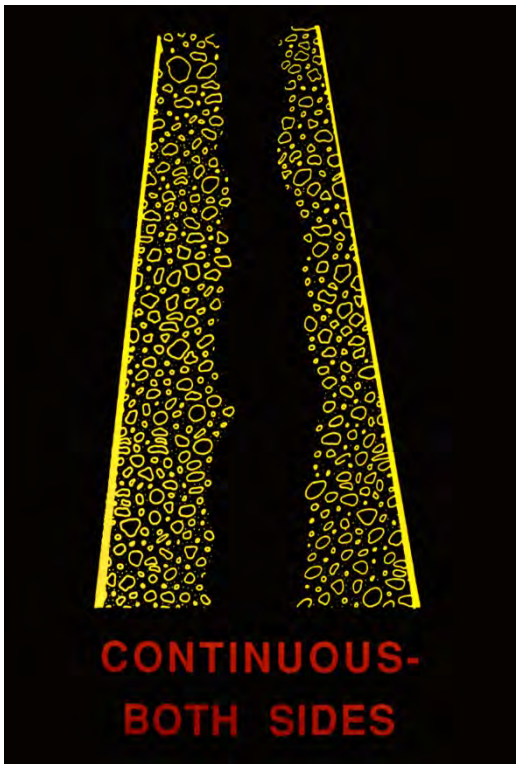
Slide 39. Truck to Truck Continuous



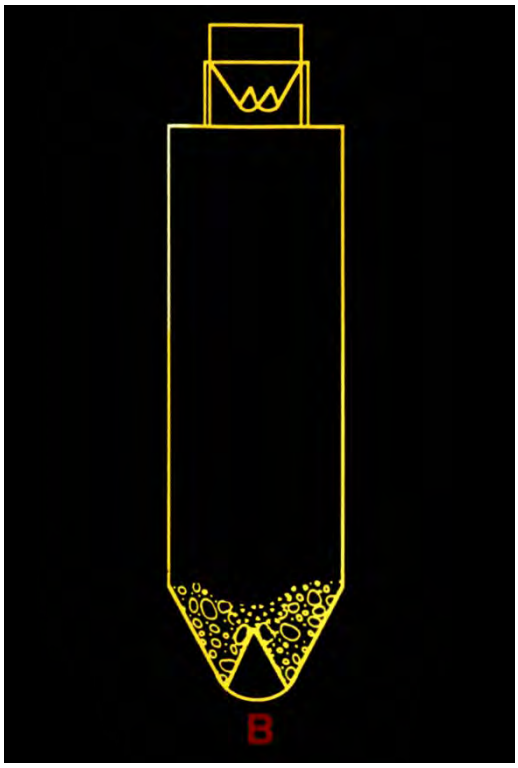
Slide 40



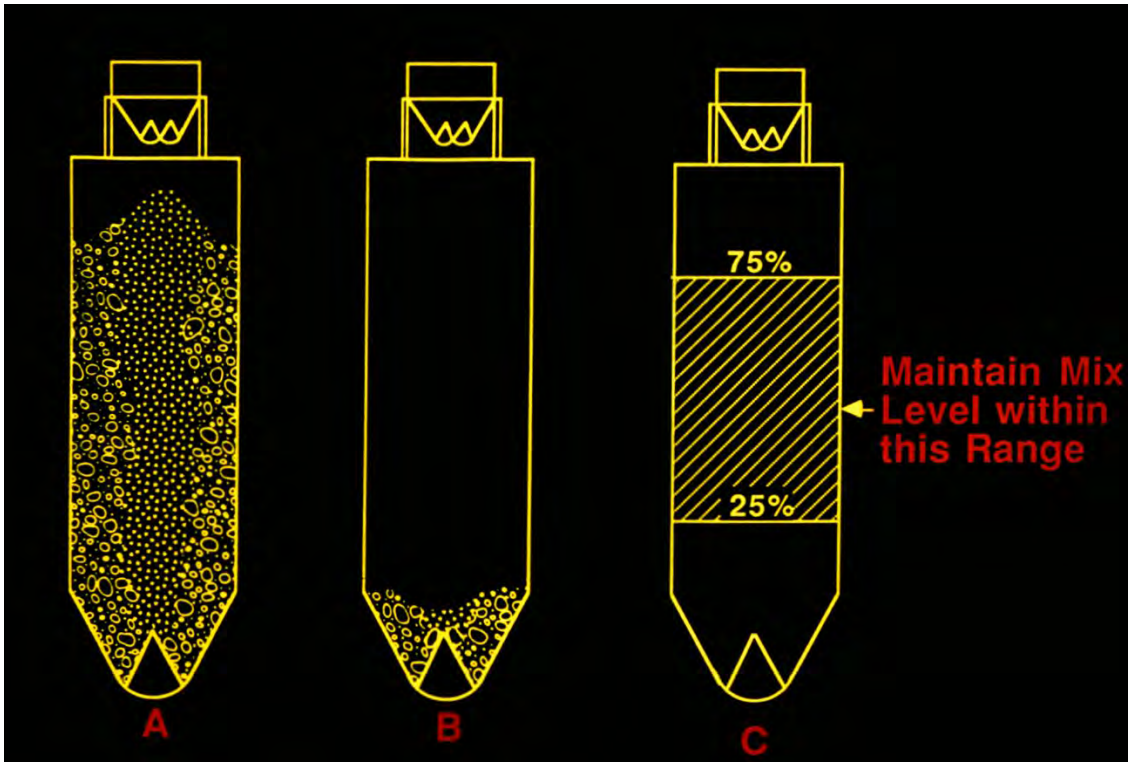
Slide 41



Slide 42

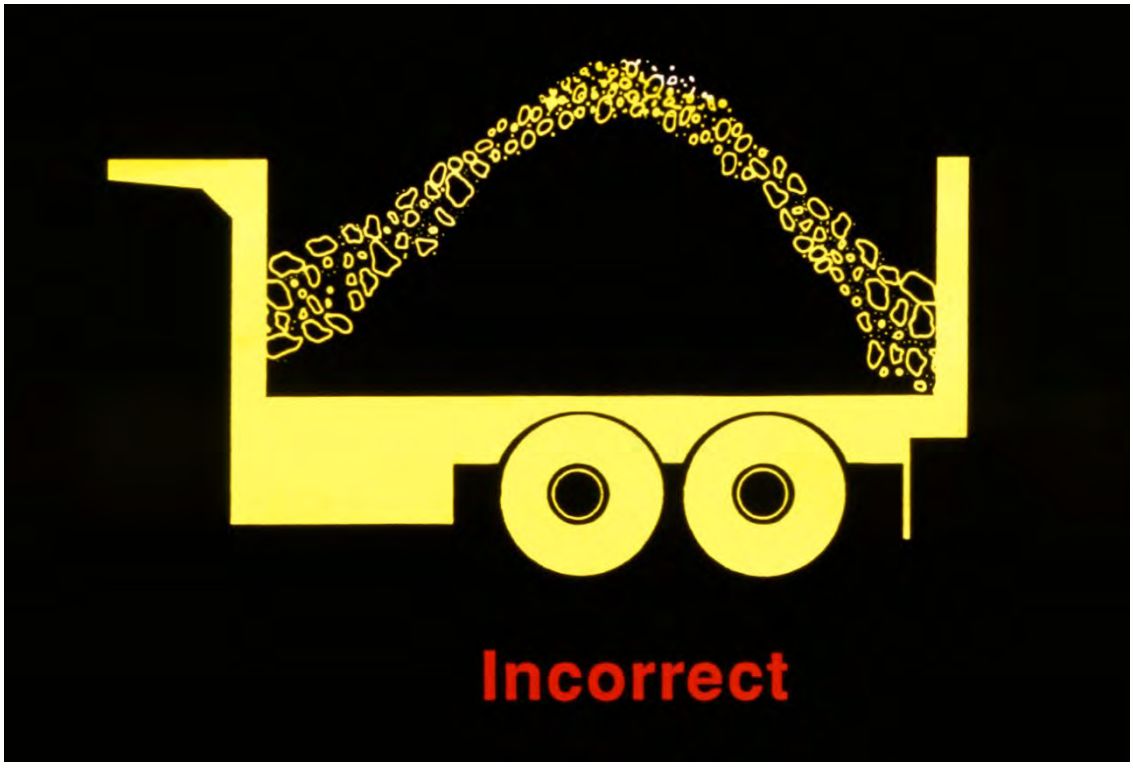


Slide 43

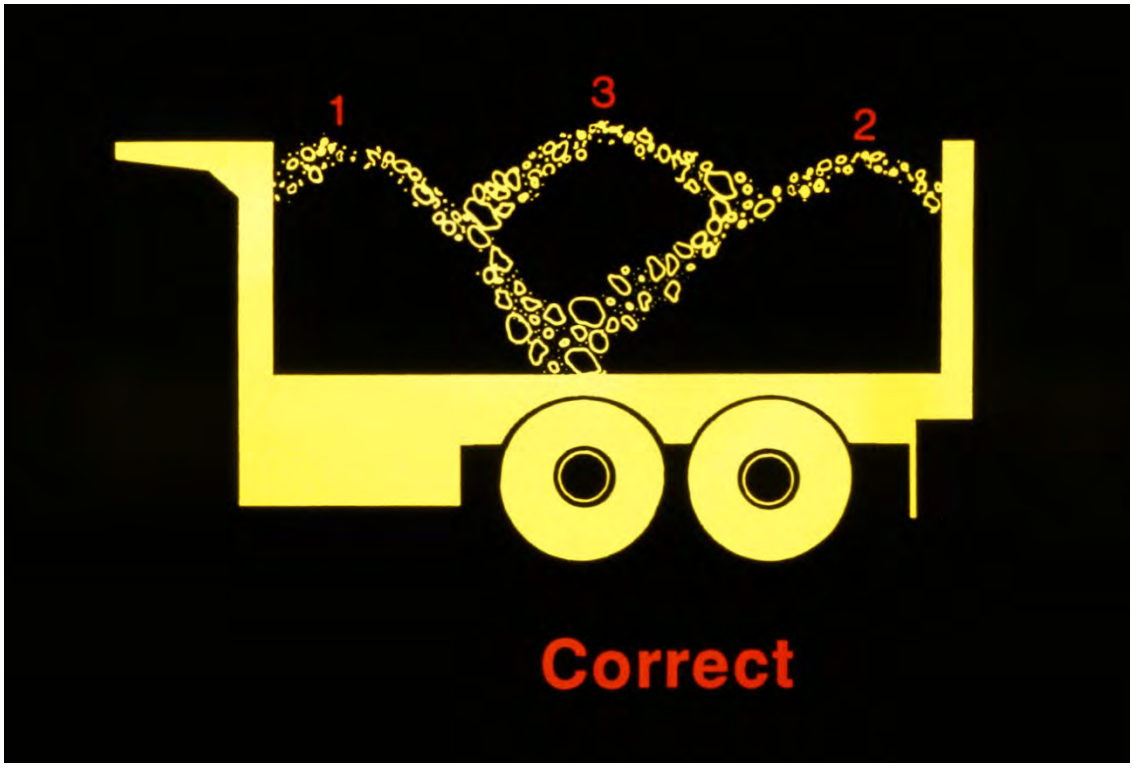


Slide 44

Slide 45



Slide 46

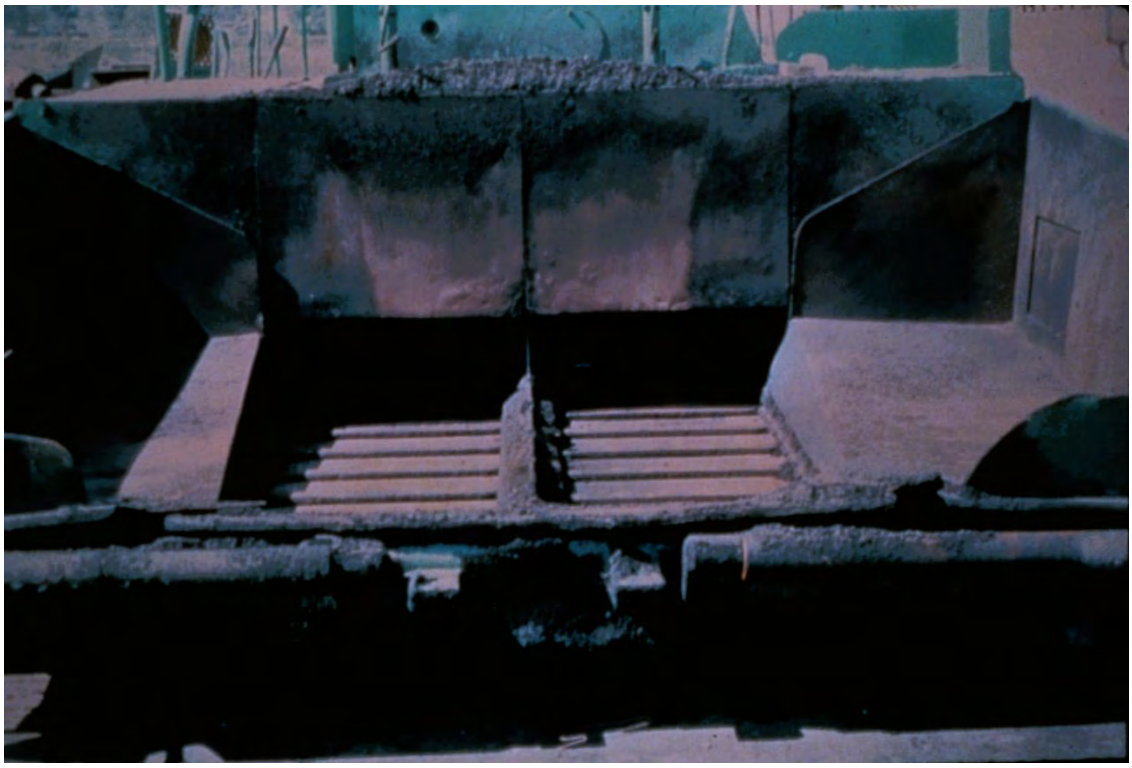


Slide 47

Slide 48

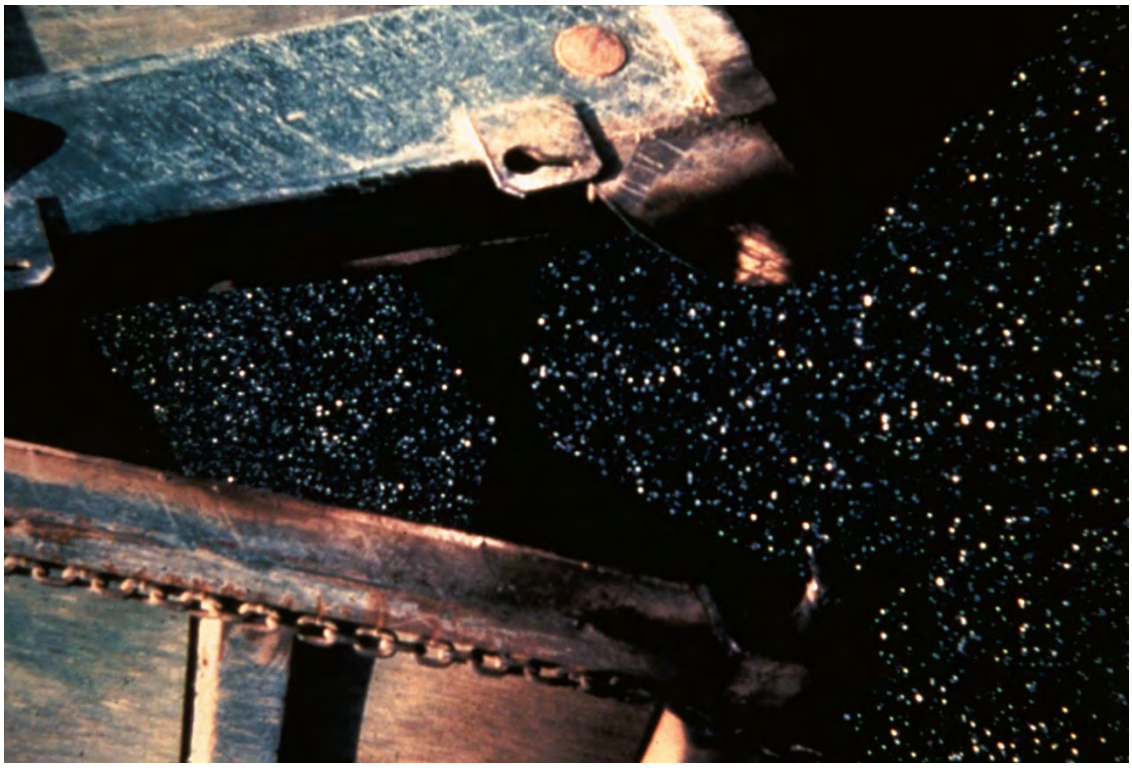
Slide 49

Slide 50

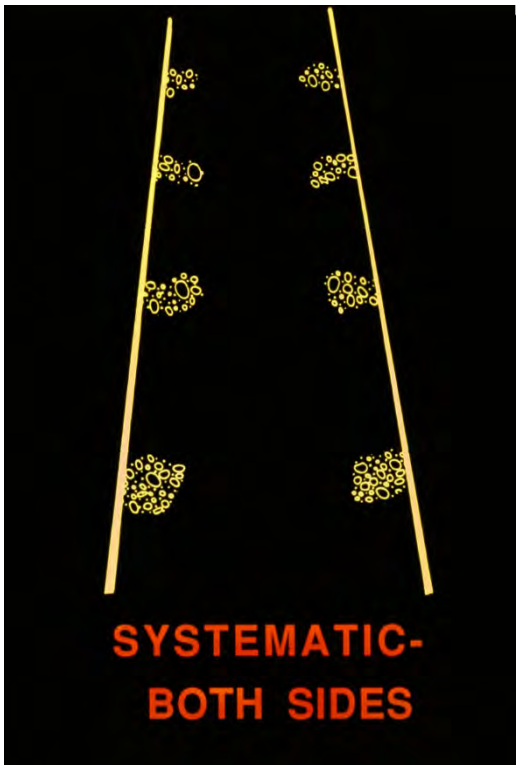


Slide 51

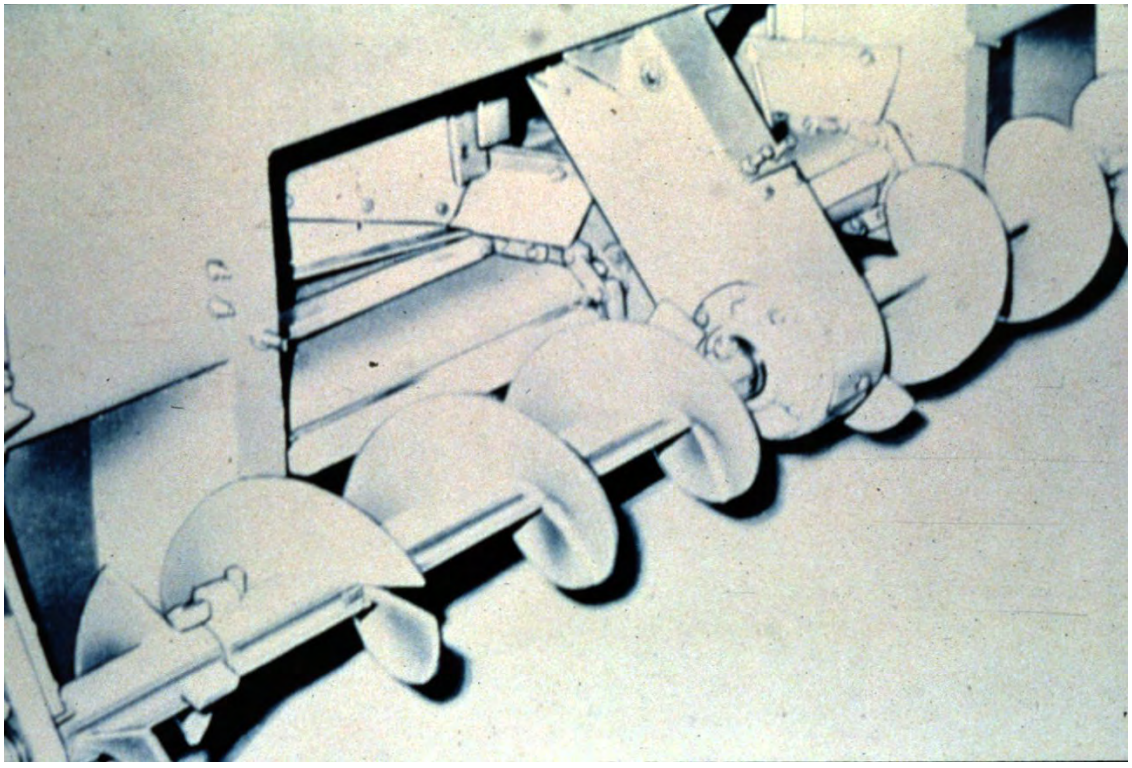
Slide 52



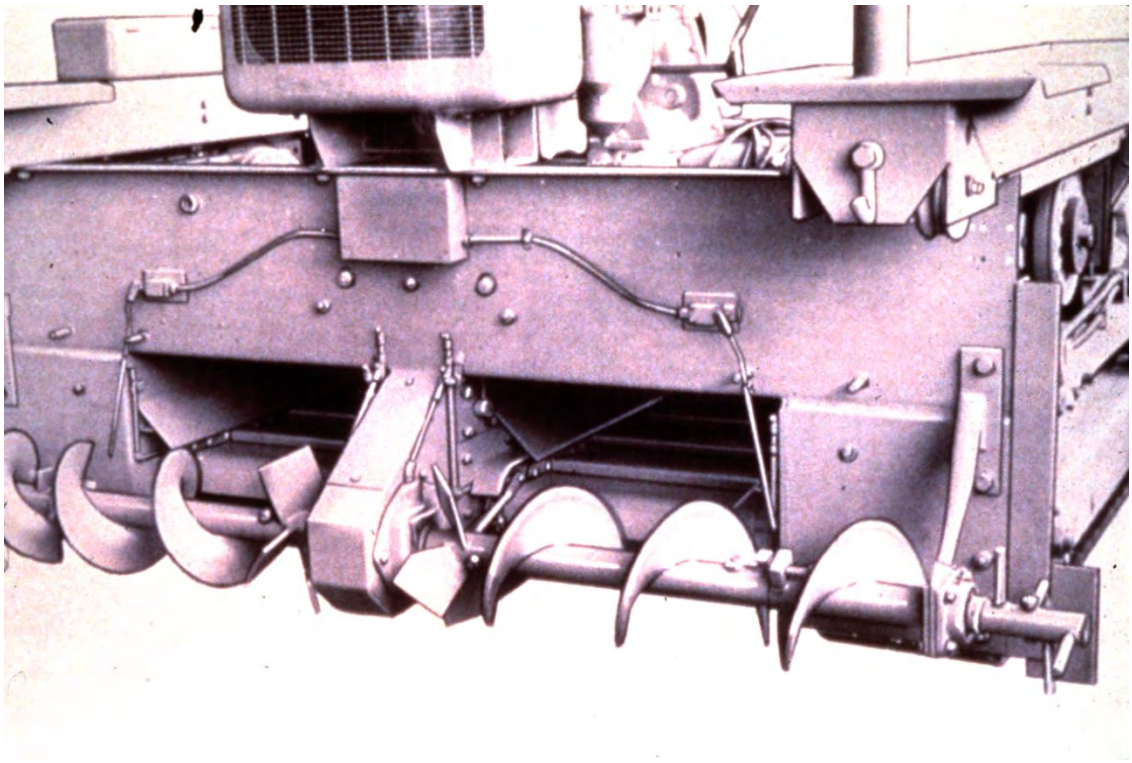
Slide 53



Slide 54



Slide 55



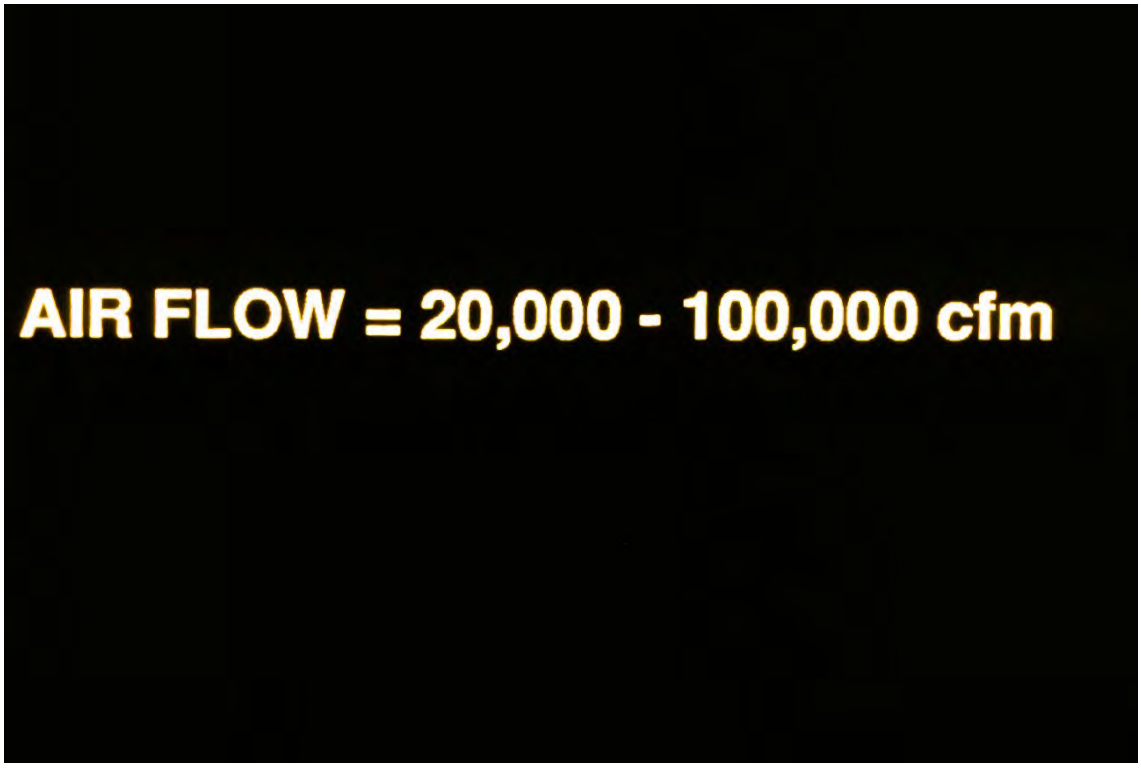
Slide 56

Slide 57

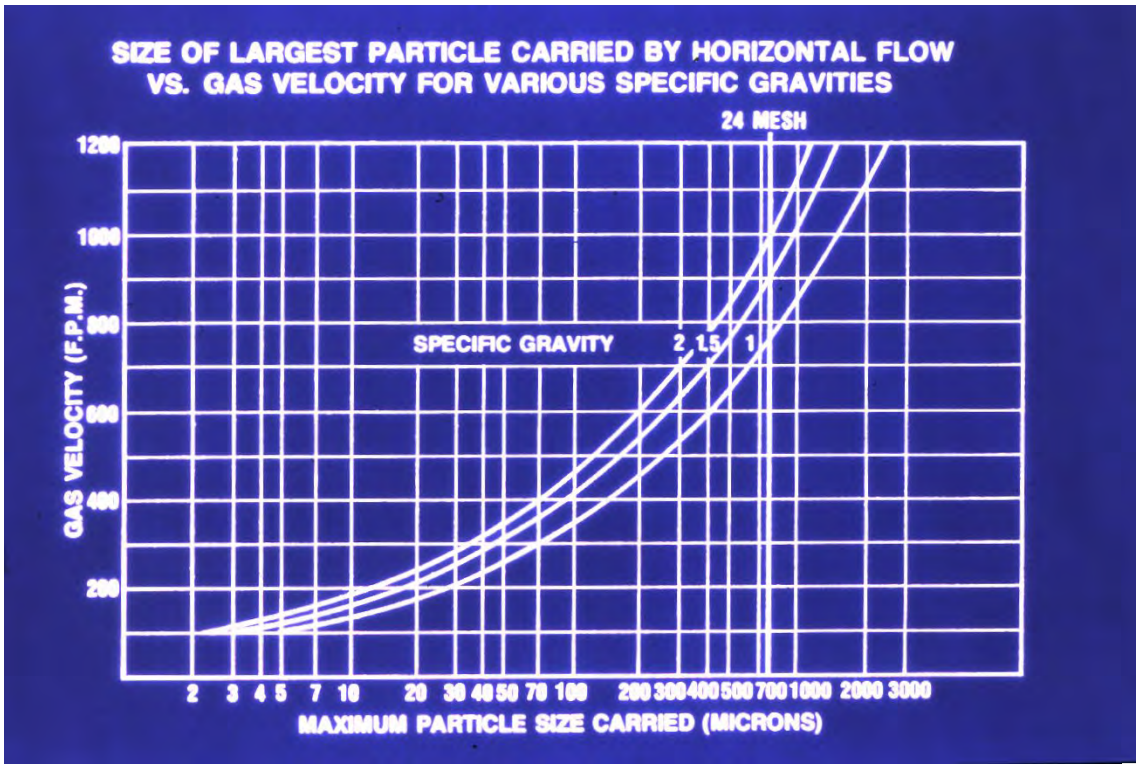
Chapter 9. Air Pollution Control System

Slide 1

Slide 2. Dust Collectors

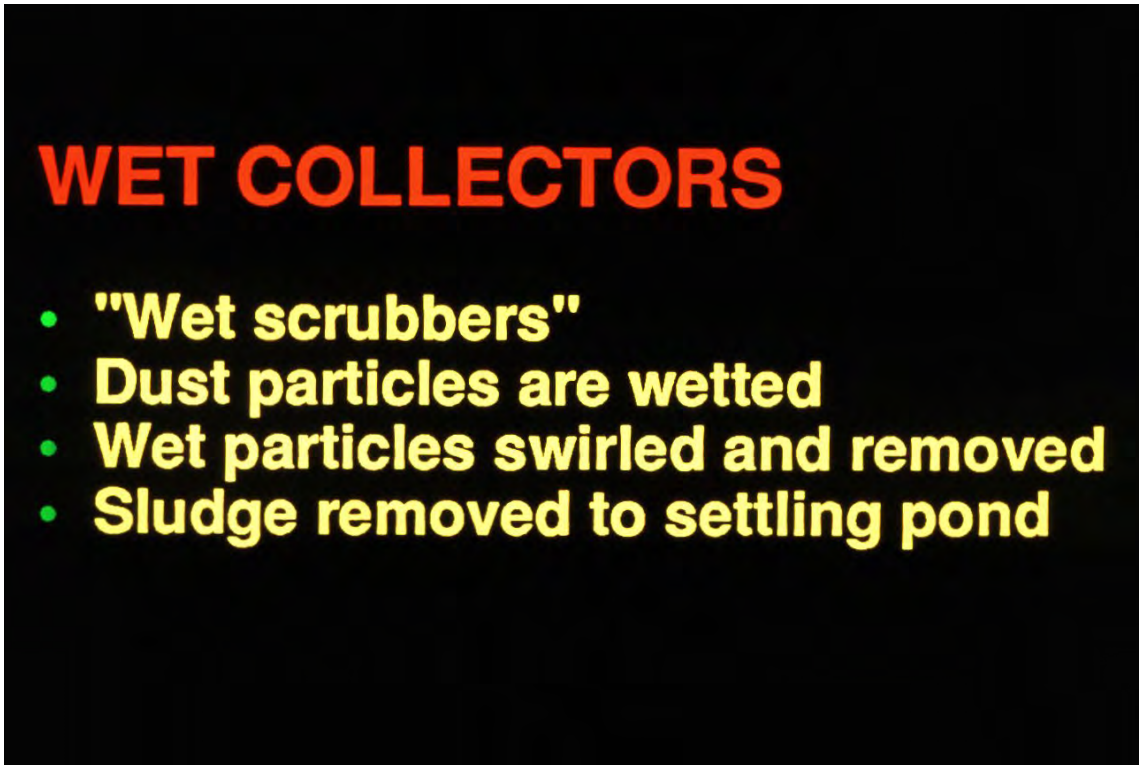


Slide 3. Air Flow

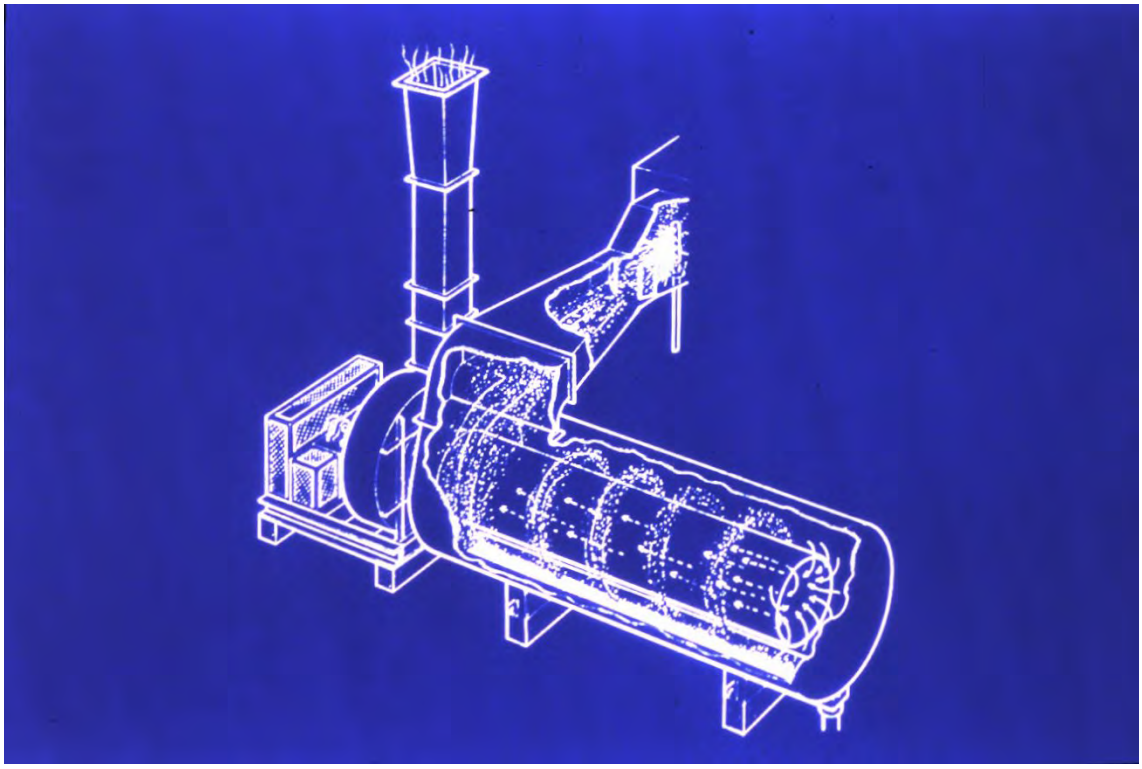


Slide 4. Size of Largest Particle Carried by Horizontal Flow vs. Gas Velocity for Various Specific Gravities [Graph]

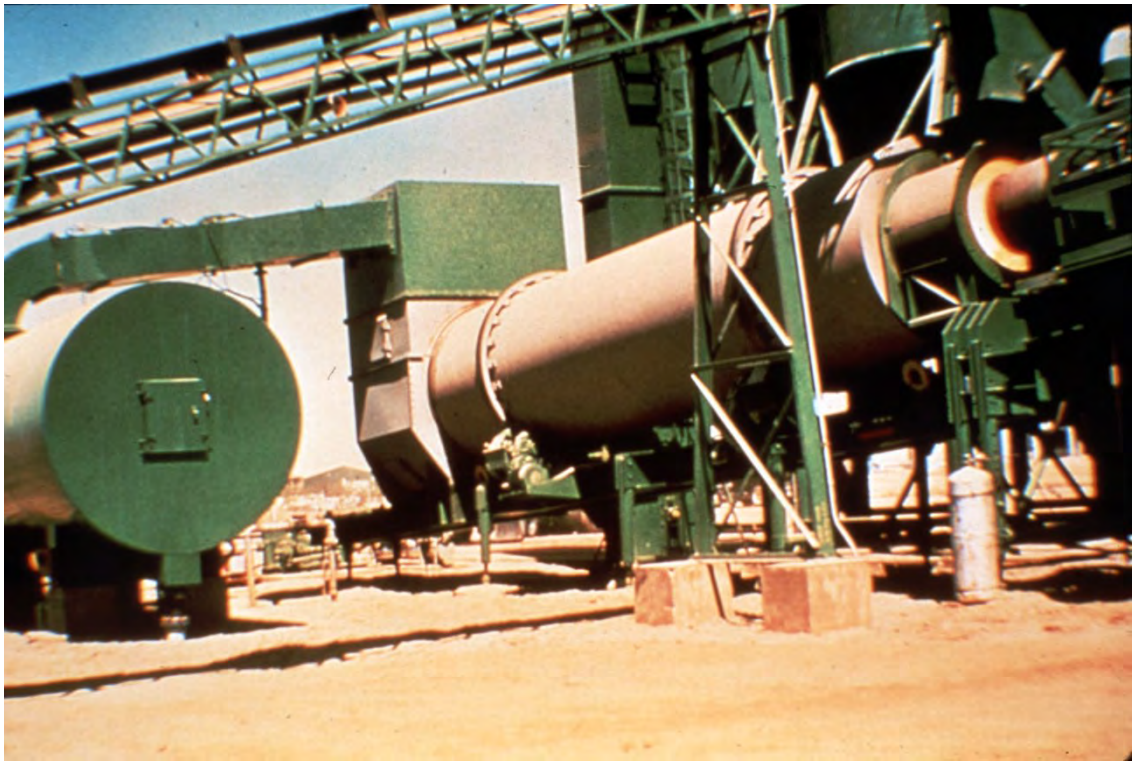
Slide 5. Dry Collectors



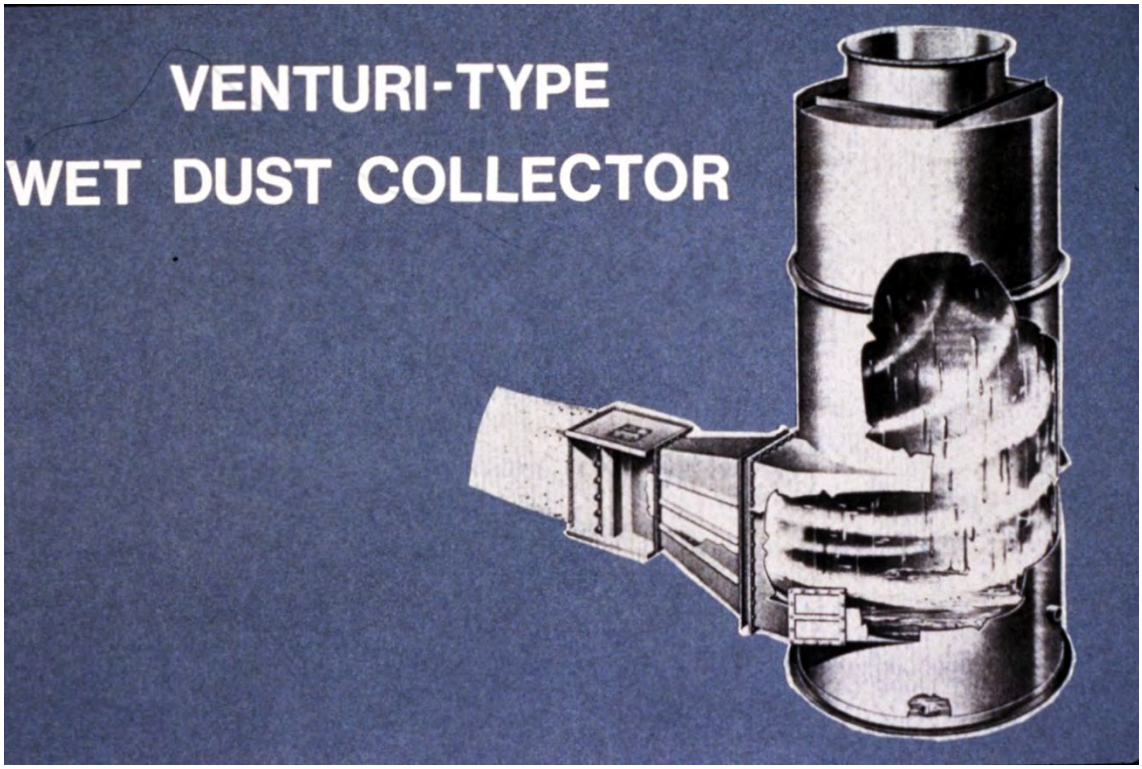
Slide 6. Wet Collectors



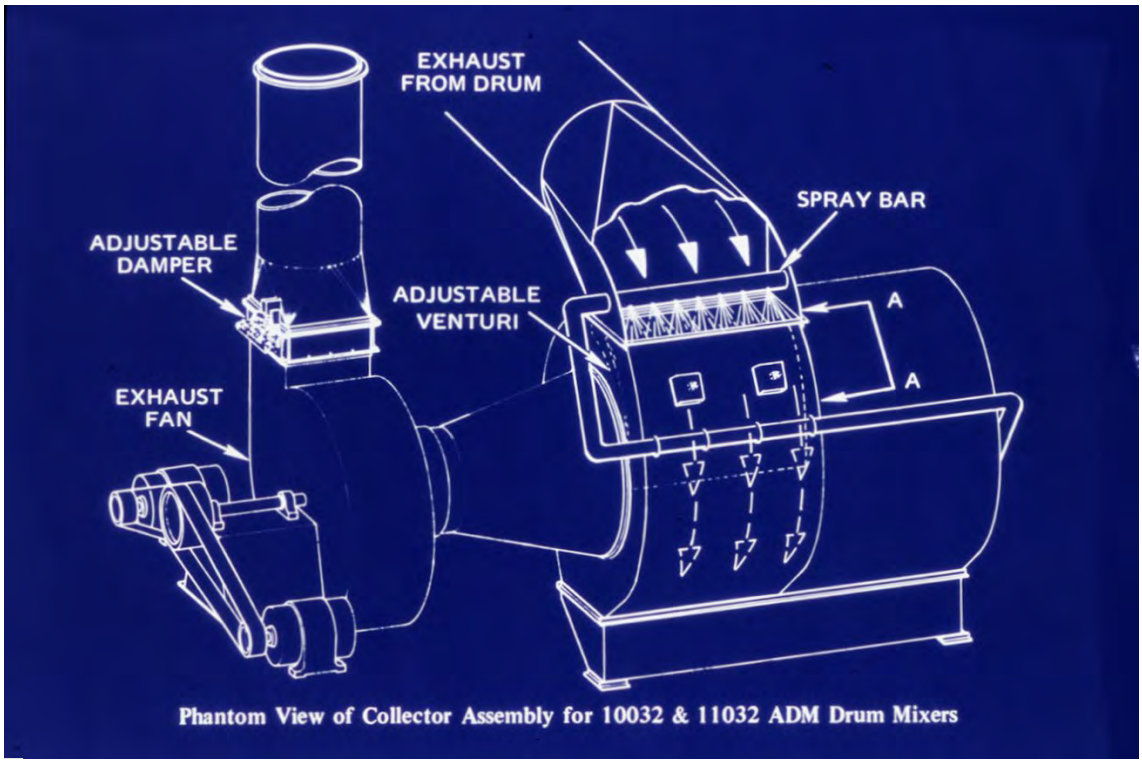
Slide 7



Slide 8



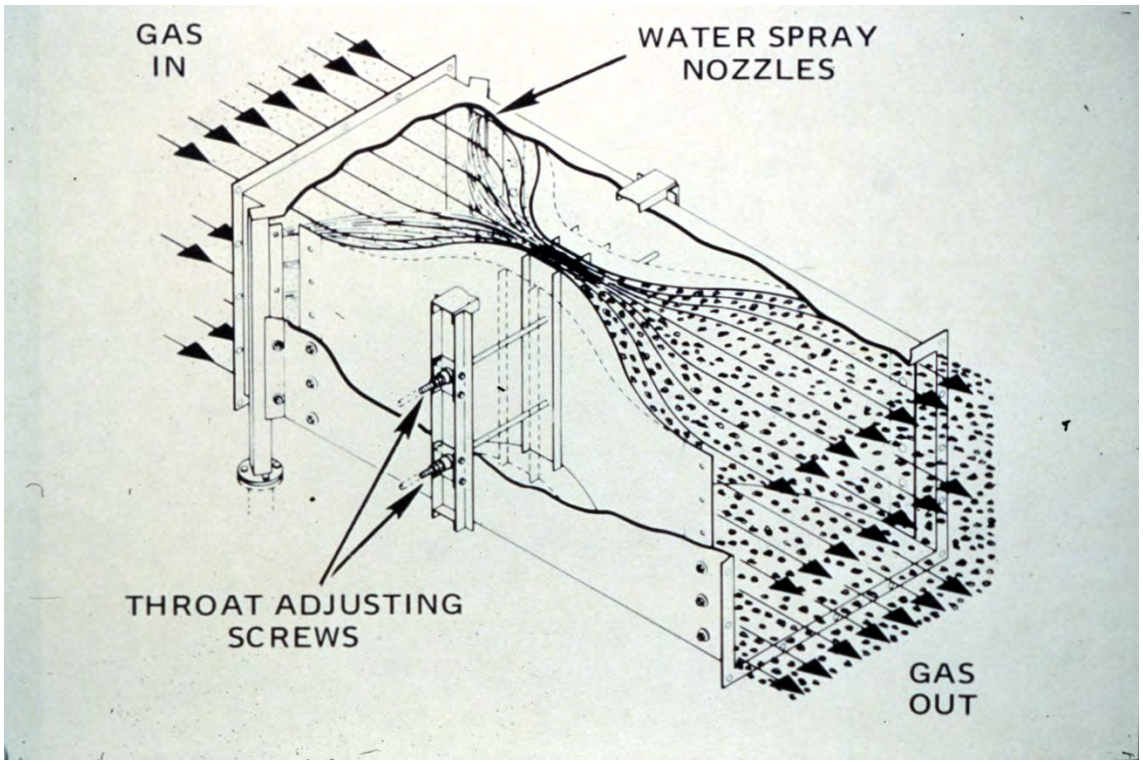
Slide 9. Venturi-Type Wet Dust Collector



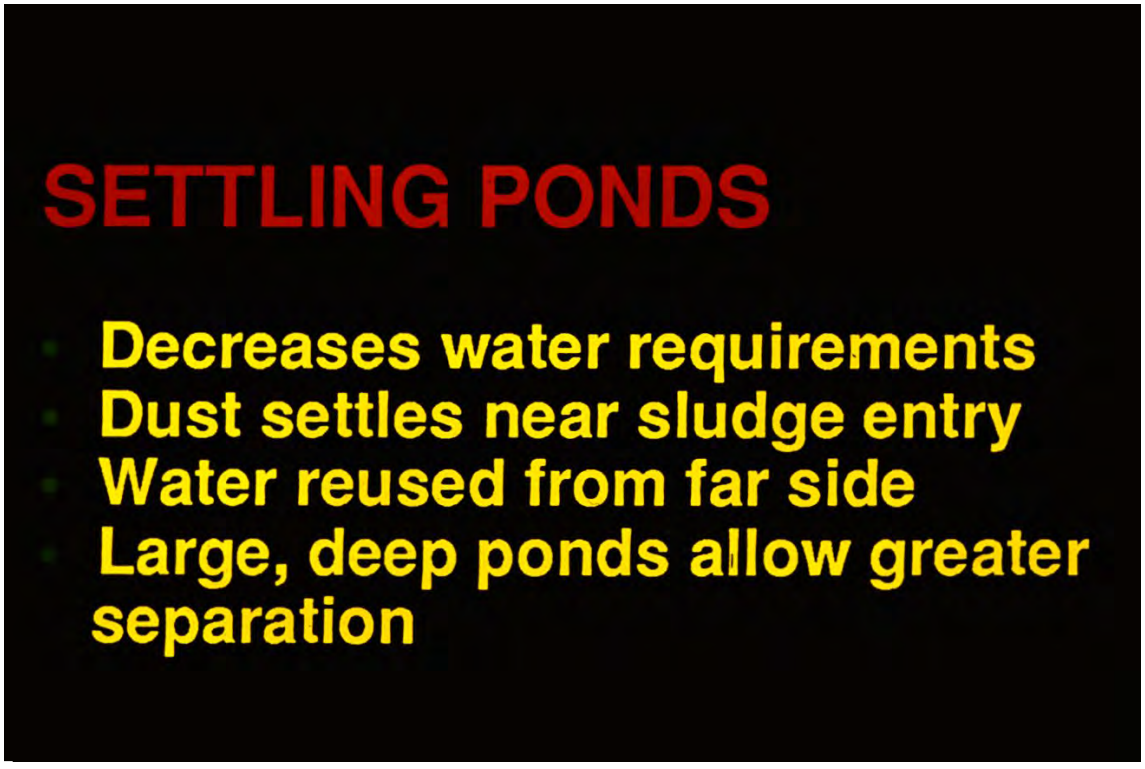
Slide 10. Phantom View of Collector Assembly

Slide 11

Slide 12



Slide 13



Slide 14. Settling Ponds

Slide 15

Slide 16

Slide 17

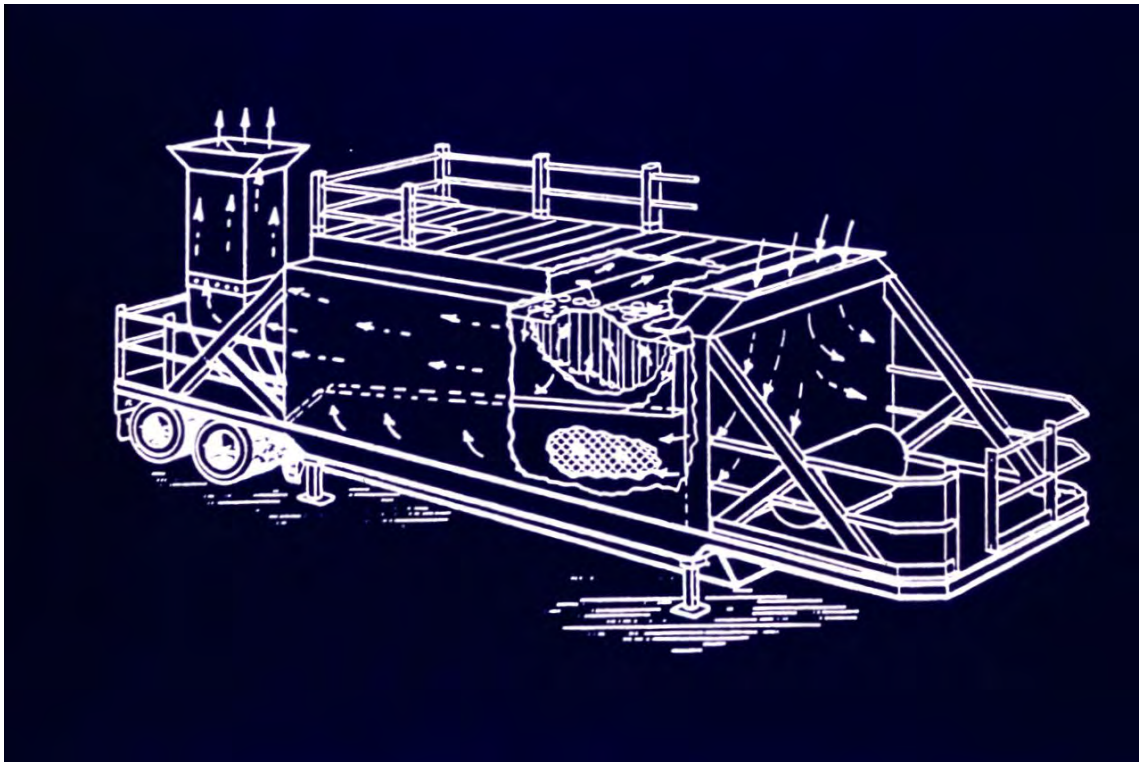
Slide 18

Slide 19

Slide 20

Slide 21

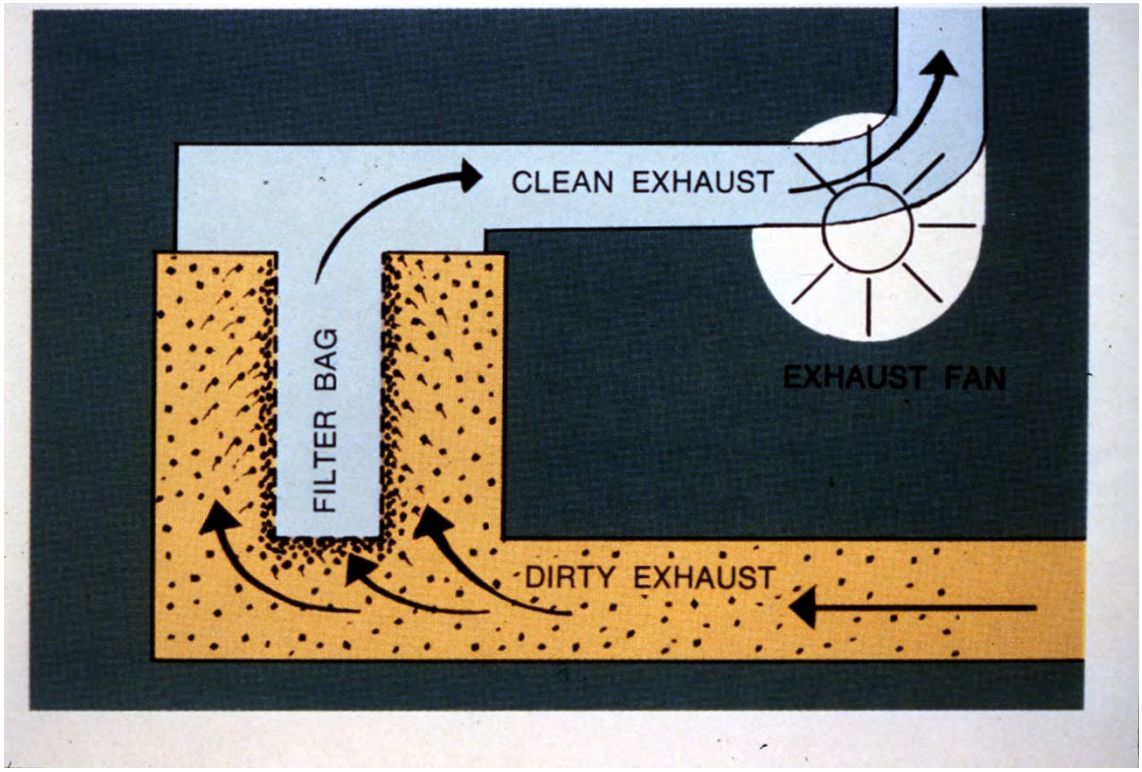
Slide 22



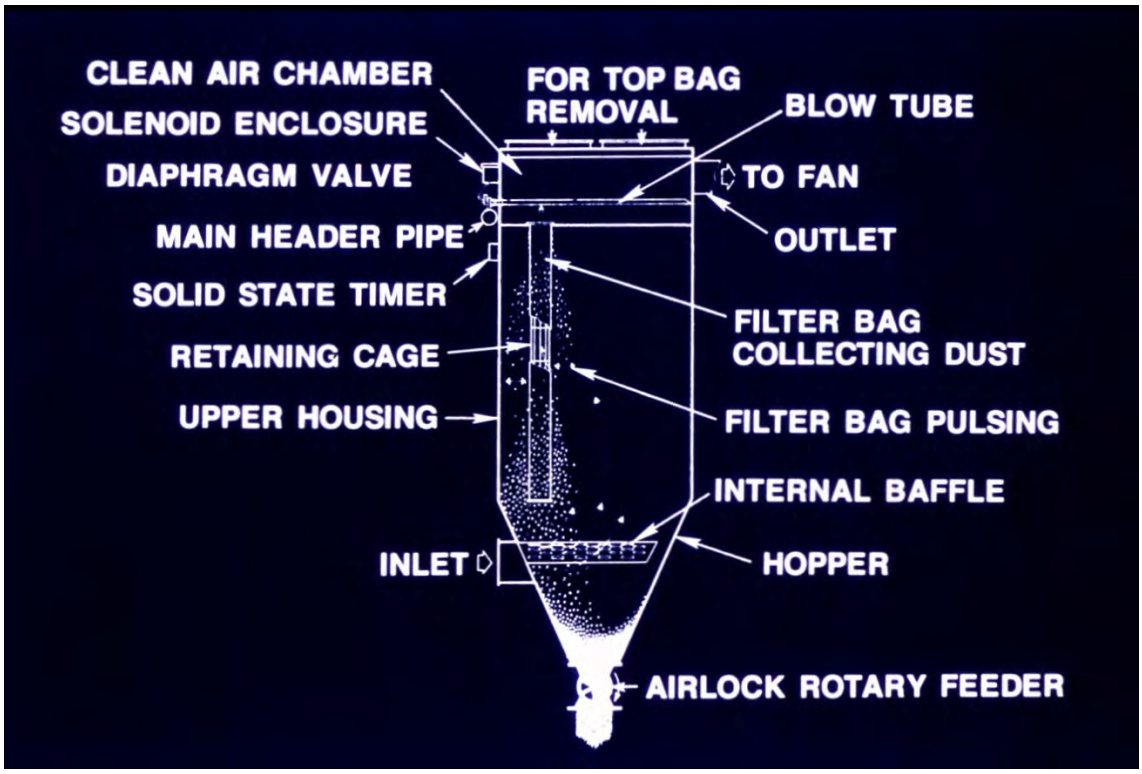
Slide 23

Slide 24

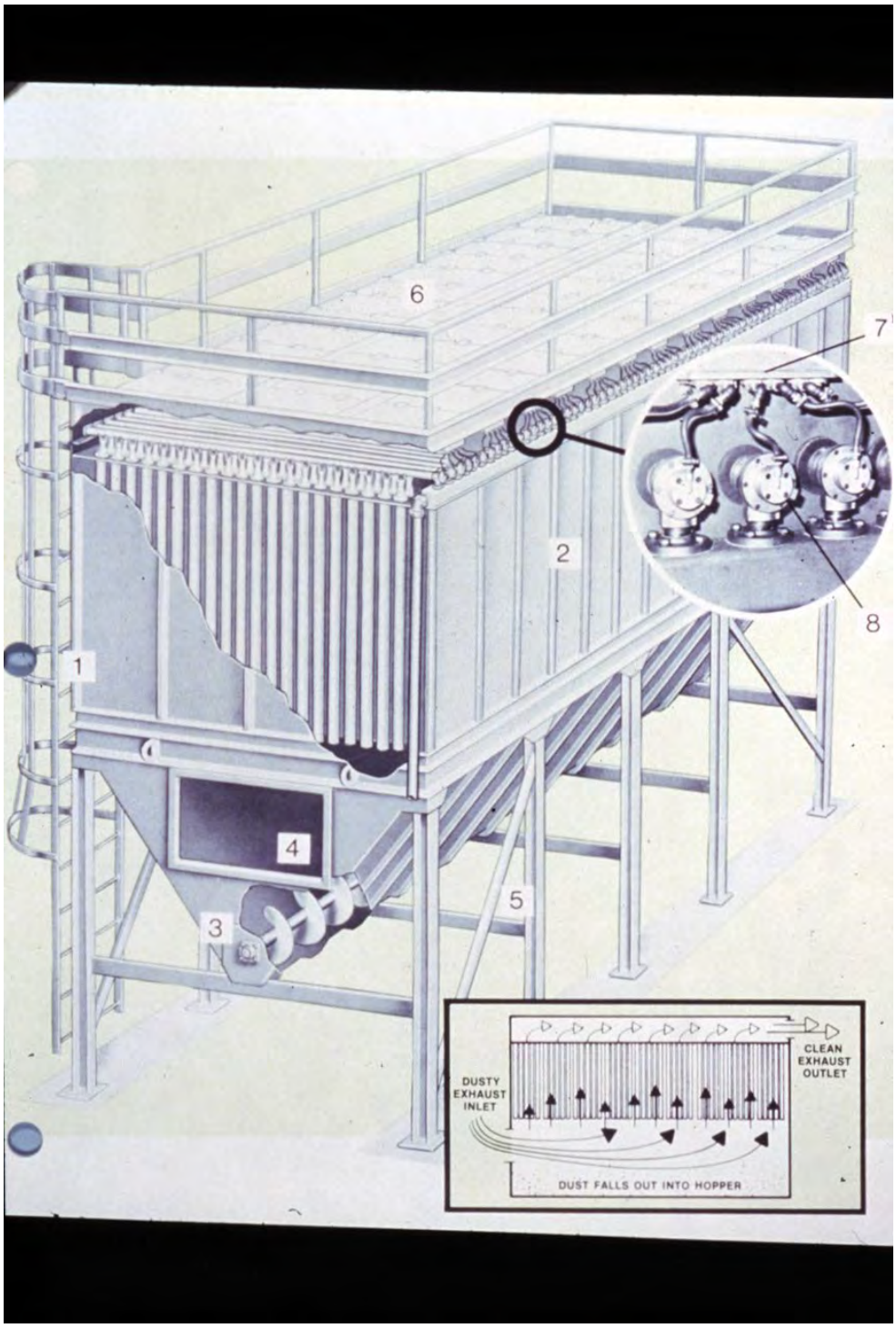
Slide 25. Fabric Filters



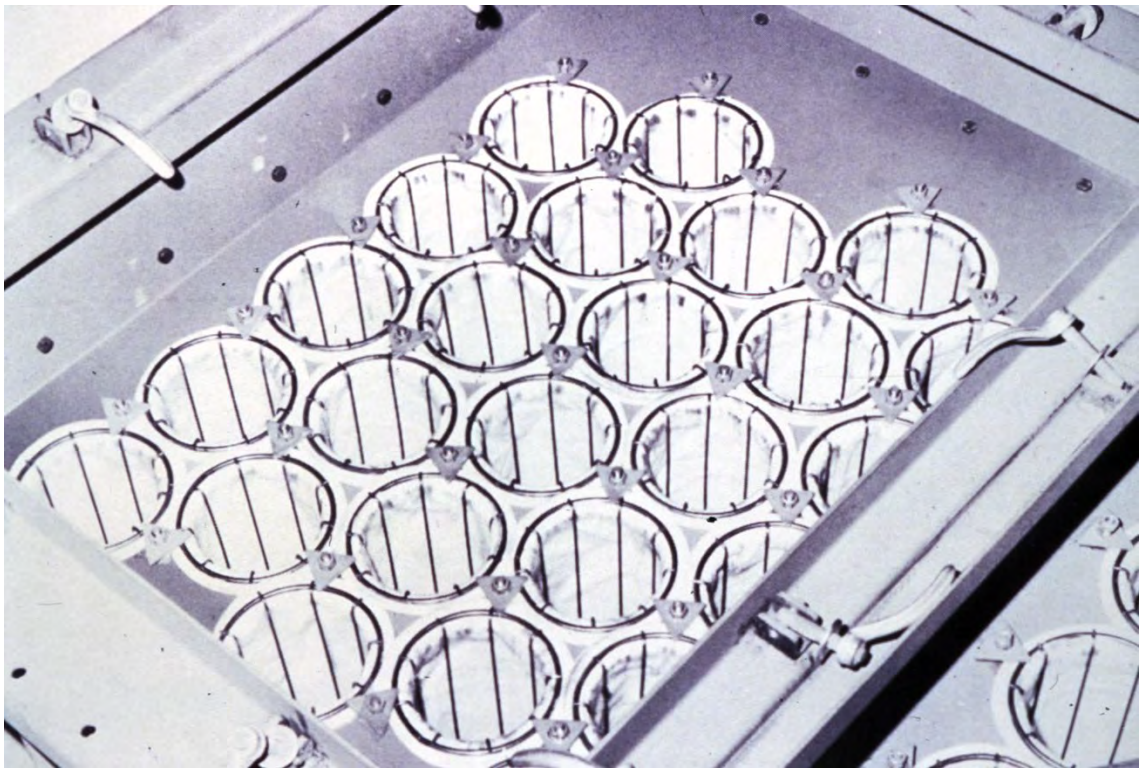
Slide 26


CLEAN AIR CHAMBER
SOLENOID ENCLOSURE
DIAPHRAGM VALVE
MAIN HEADER PIPE
SOLID STATE TIMER
RETAINING CAGE
UPPER HOUSING
FOR TOP BAG REMOVAL
BLOW TUBE
TO FAN
OUTLET
FILTER BAG COLLECTING DUST
FILTER BAG PULSING
INTERNAL BAFFLE
HOPPER
INLET
AIRLOCK ROTARY FEEDER

Slide 27

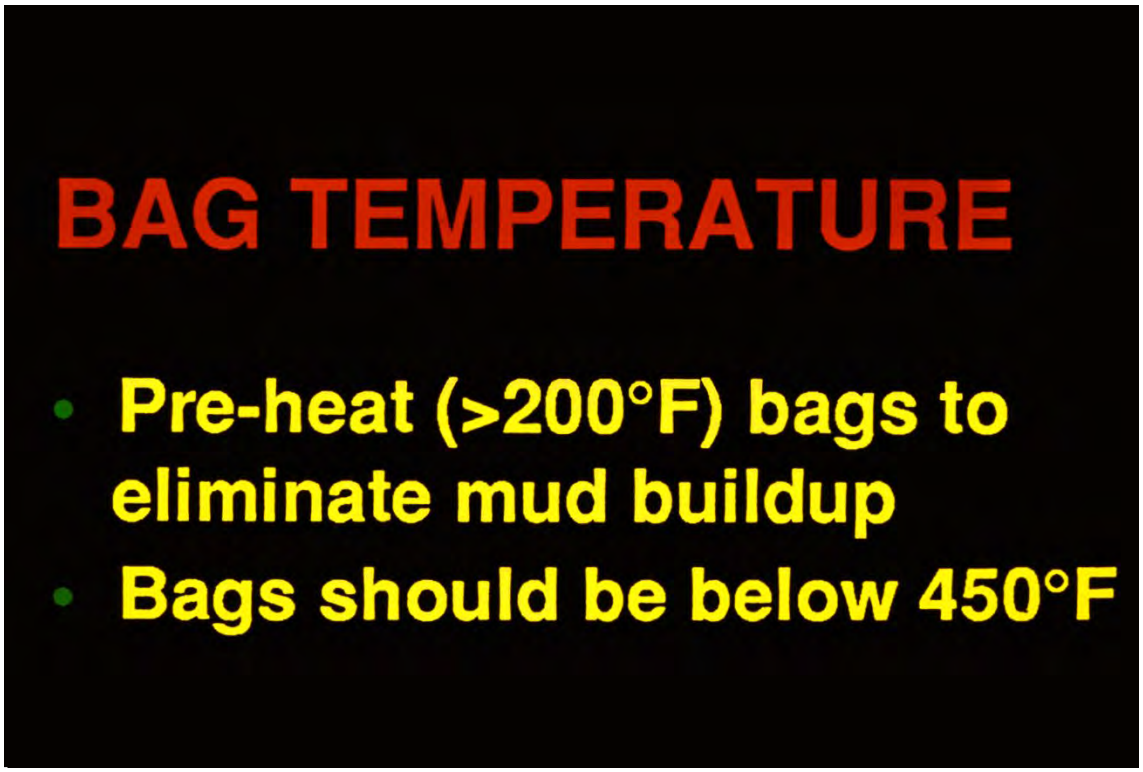

6
7
2
8
1
4
5
3
CLEAN
EXHAUST
OUTLET
DUSTY
EXHAUST
INLET
DUST FALLS OUT INTO HOPPER

Slide 28

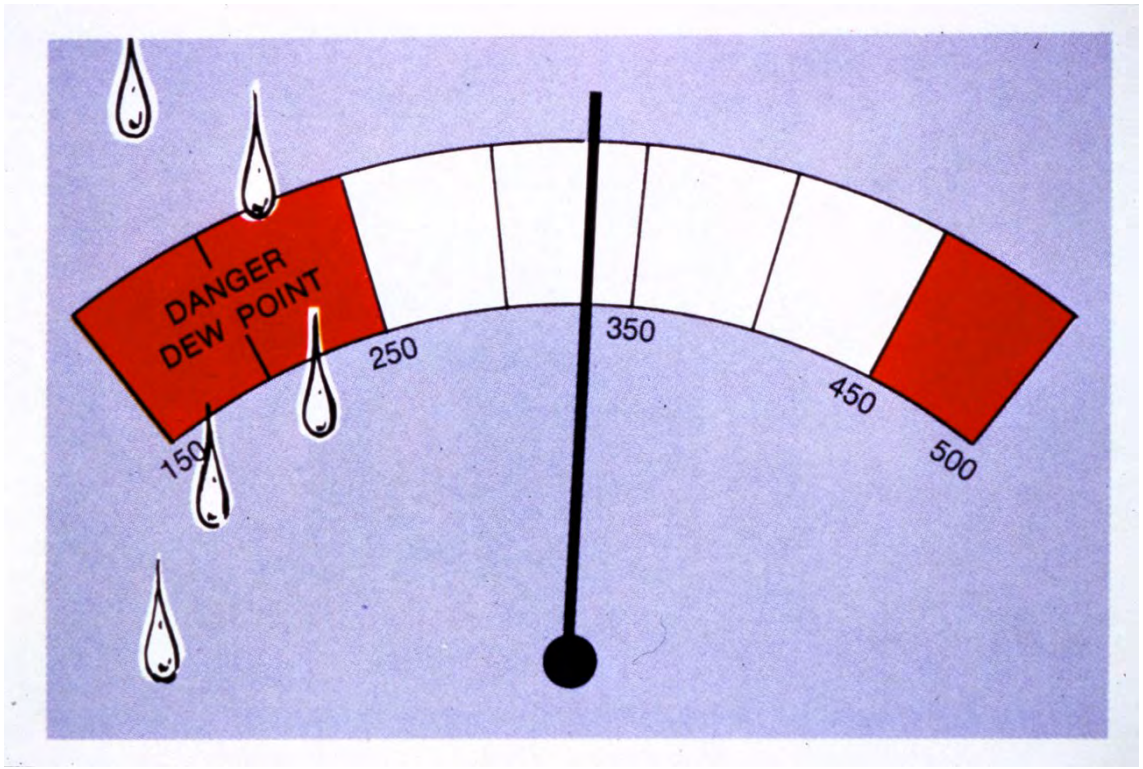


Slide 29

Slide 30. 6:1 Ratio

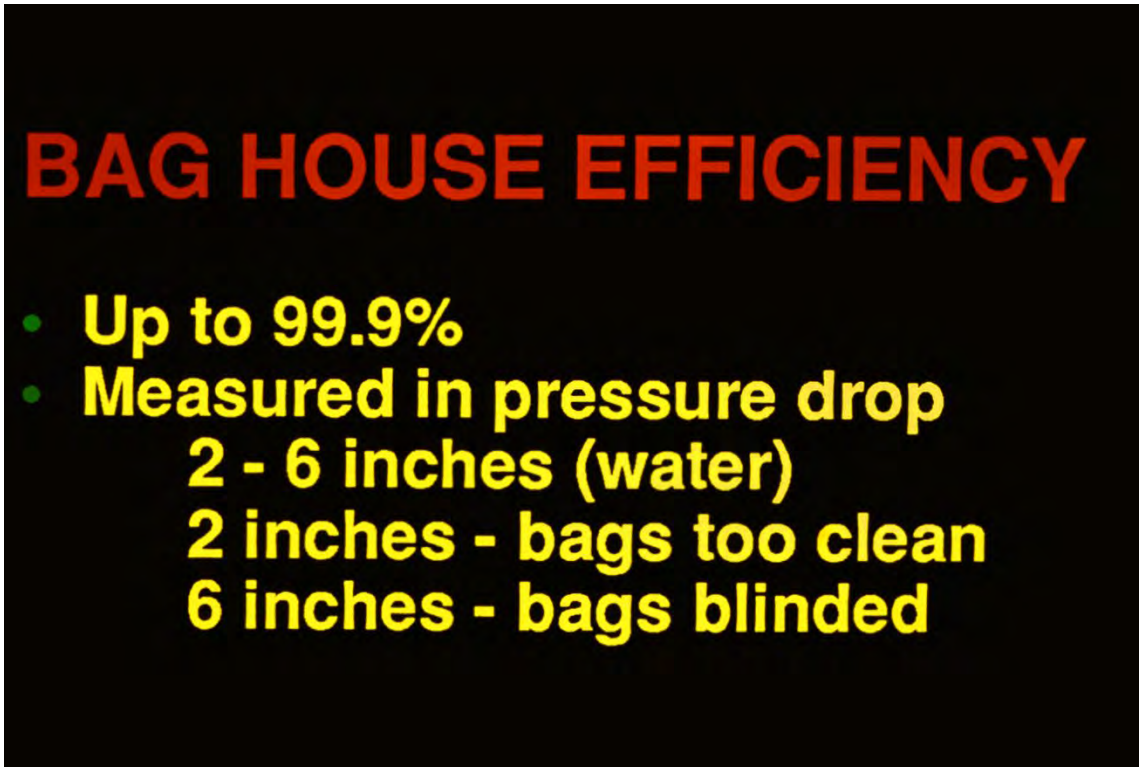


Slide 31. Bag Temperature

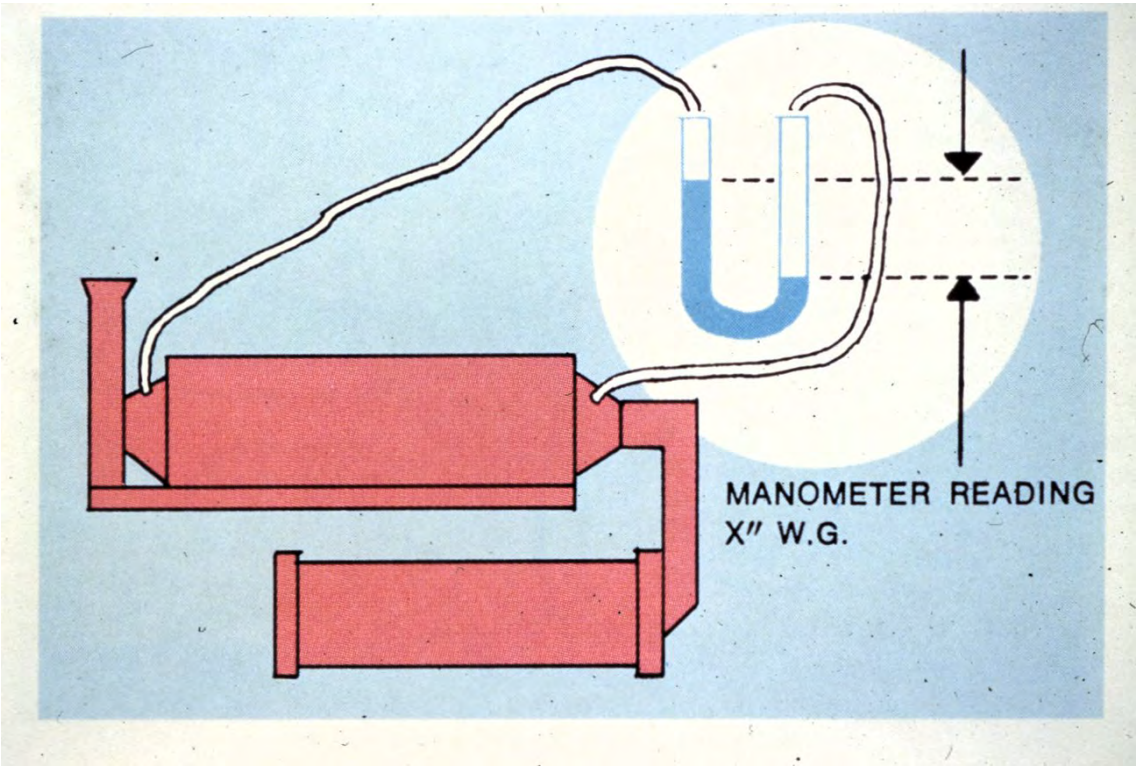


Slide 32

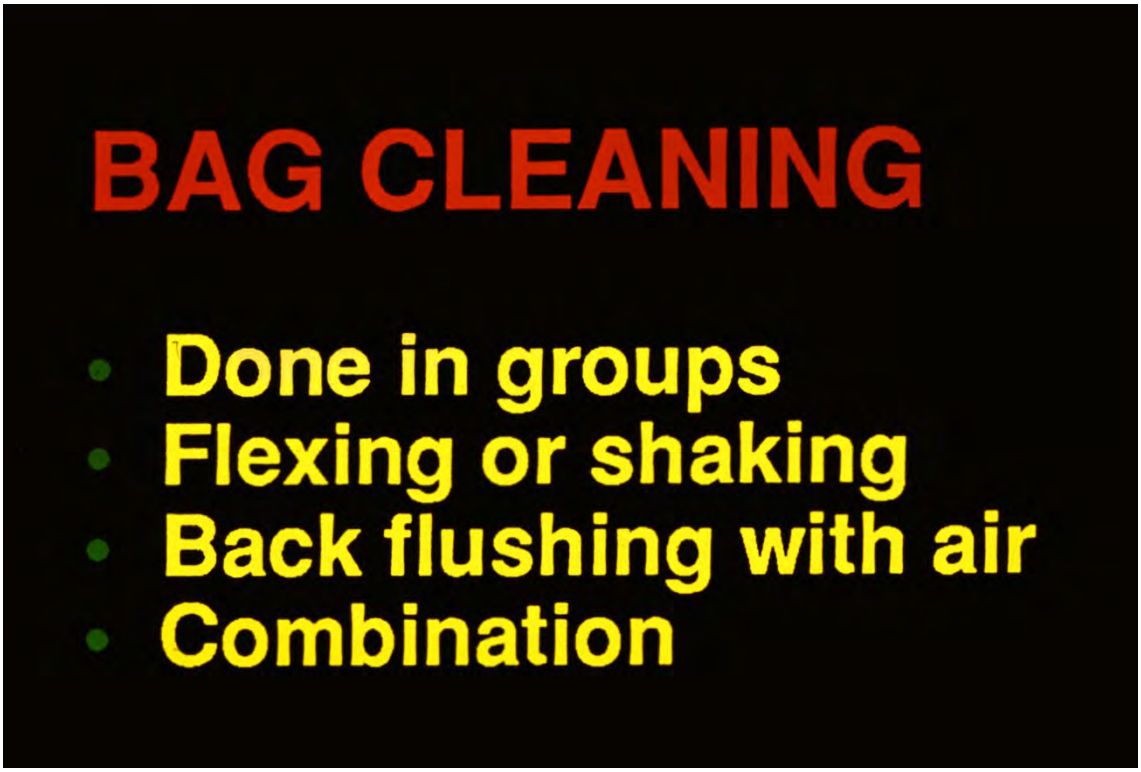
Slide 33. Filter



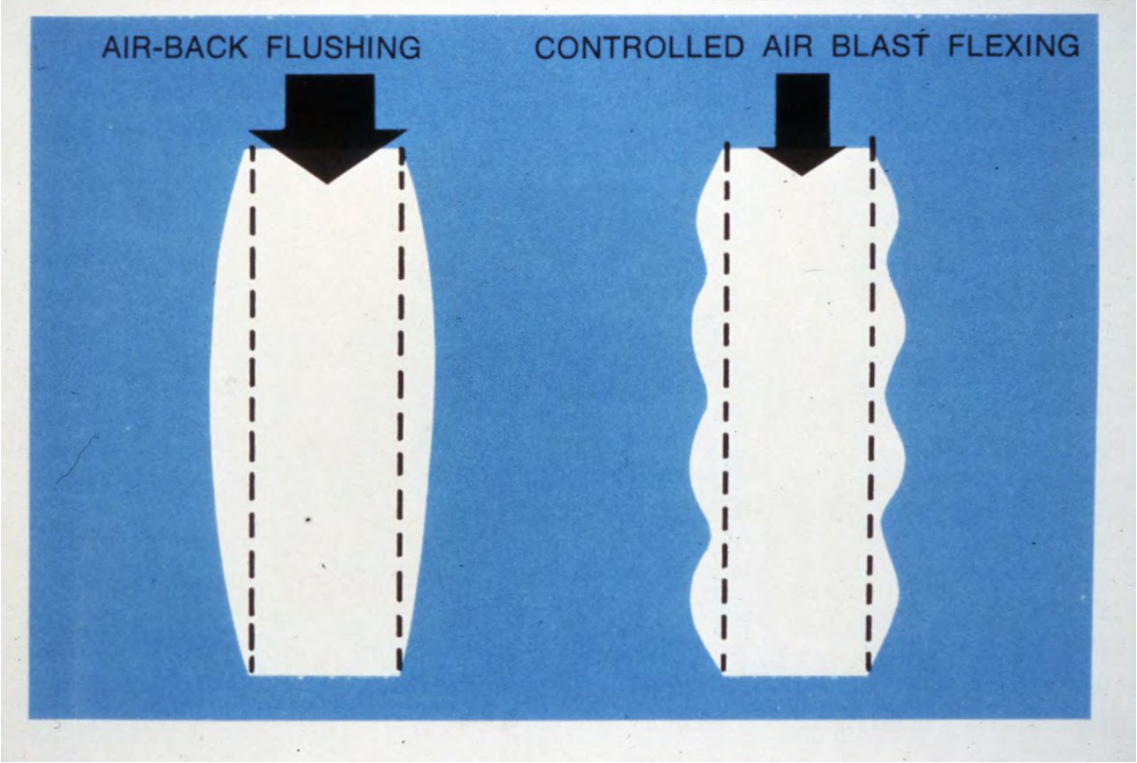
Slide 34. Bag House Efficiency



Slide 35



Slide 36. Bag Cleaning



Slide 37

Slide 38

Slide 39. Combination Dust Collectors