Best Practices of Scrub Seals and Fog Seals

Southeast Pavement Preservation Partnership

Biloxi, MS

May 14, 2018

Scrub Seals

- Application of fine or coarse aggregate on a broomed layer of polymer modified rejuvenating asphalt emulsion.
- Purpose

Best Practices

- Materials
- Equipment
- Construction

Materials – Best Practice

1. Emulsion Selection
   - Use a polymer modified rejuvenating emulsion
   - There are different versions
   - Should have 3 different components
     - Asphalt
     - Polymer
     - Rejuvenator

Materials – Best Practice

1. Emulsion
2. Aggregate
   - Clean
   - Cubical
   - Angular
   - Durable

Materials – Best Practice

1. Emulsion
2. Aggregate
3. Design
   - Modified Kearby
   - Adjustment for cracks

Standard Practice for

Emulsified Asphalt Scrub Chip Seal Design

AASHTO Designation: R xxx-18

Technical Section: 5b, Bridge and Pavement Preservation

Release: Group 1 (April 2018)

1. SCOPE

1.1. This standard practice determines application quantities for applying aggregate chips and emulsified asphalt for scrub seals. A scrub chip seal is the application of emulsified asphalt, followed immediately by a scrub broom to push the emulsion into the cracks in the pavement finished with an application of a single layer of cover aggregate, with the option of including a fog seal to help with chip retention.

2. REFERENCED STANDARDS

2.1. *AASHTO Standards:*

- MP XX-15, Materials for Emulsified Asphalt Rejuvenating Scrub Seals
- T 19M/T 19, Bulk Density ("Unit Weight") and Voids in Aggregate
- T 84, Specific Gravity and Absorption of Fine Aggregate
- T 85, Specific Gravity and Absorption of Coarse Aggregate

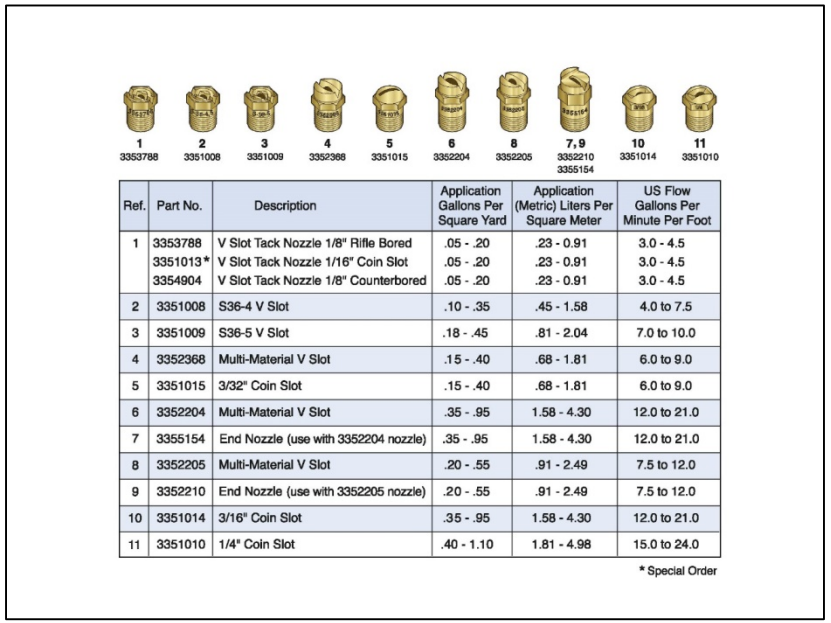
2.2. *State Agency Guidance Documents:*

- Minnesota Seal Coat Handbook (2006, MnDOT)
- Minnesota Pavement Distress Manual (2003, MnDOT)

3. TERMINOLOGY

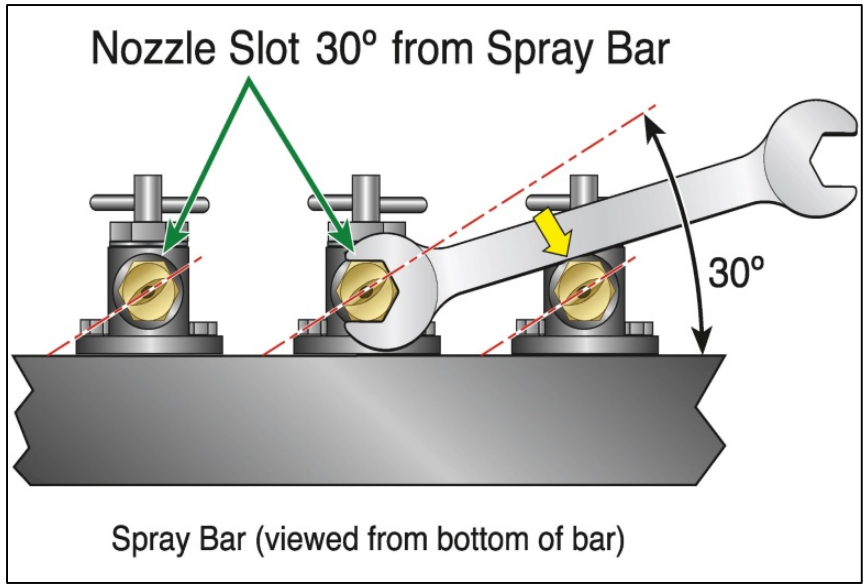
Equipment – Best Practices

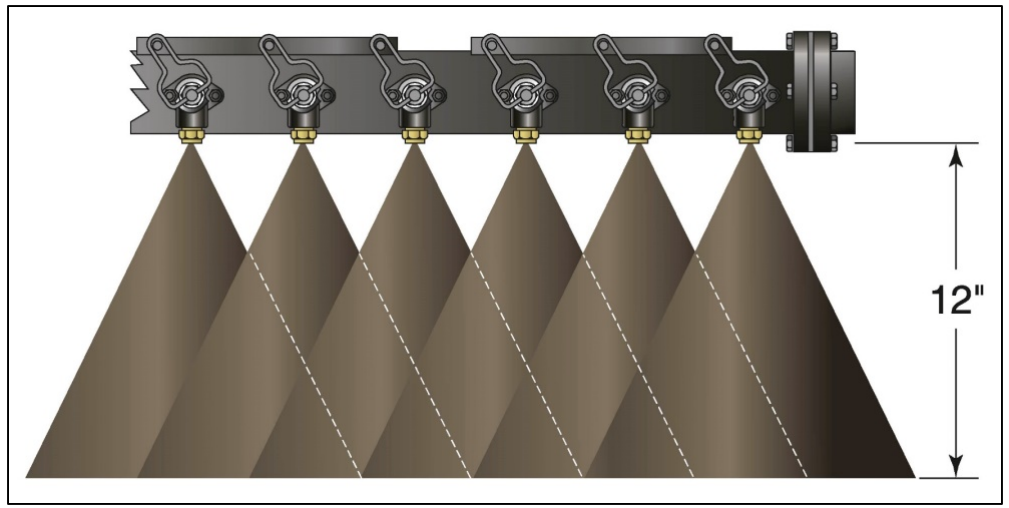
1. Distributor Setup
   - Spray bar height
   - Nozzle size
   - Nozzle angle
   - Spray bar pressure



Ref.	Part No.	Description	Application Gallons Per Square Yard	Application (Metric) Liters Per Square Meter	US Flow Gallons Per Minute Per Foot
1	3353788	V Slot Tack Nozzle 1/8" Rifle Bored	.05 - .20	.23 - 0.91	3.0 - 4.5
	3351013*	V Slot Tack Nozzle 1/16" Coin Slot	.05 - .20	.23 - 0.91	3.0 - 4.5
	3354904	V Slot Tack Nozzle 1/8" Counterbored	.05 - .20	.23 - 0.91	3.0 - 4.5
2	3351008	S36-4 V Slot	.10 - .35	.45 - 1.58	4.0 to 7.5
3	3351009	S36-5 V Slot	.18 - .45	.81 - 2.04	7.0 to 10.0
4	3352368	Multi-Material V Slot	.15 - .40	.68 - 1.81	6.0 to 9.0
5	3351015	3/32" Coin Slot	.15 - .40	.68 - 1.81	6.0 to 9.0
6	3352204	Multi-Material V Slot	.35 - .95	1.58 - 4.30	12.0 to 21.0
7	3355154	End Nozzle (use with 3352204 nozzle)	.35 - .95	1.58 - 4.30	12.0 to 21.0
8	3352205	Multi-Material V Slot	.20 - .55	.91 - 2.49	7.5 to 12.0
9	3352210	End Nozzle (use with 3352205 nozzle)	.20 - .55	.91 - 2.49	7.5 to 12.0
10	3351014	3/16" Coin Slot	.35 - .95	1.58 - 4.30	12.0 to 21.0
11	3351010	1/4" Coin Slot	.40 - 1.10	1.81 - 4.98	15.0 to 24.0

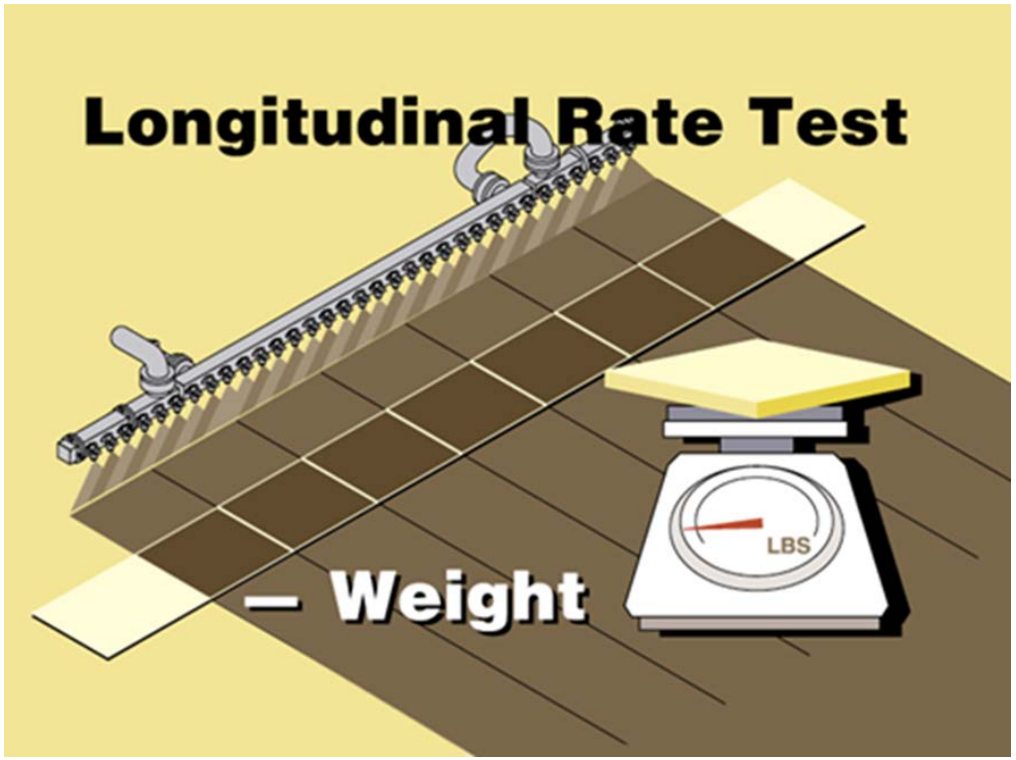
* Special Order





Equipment – Best Practices

1. Distributor Setup
2. Calibration



Asphalt Distributor

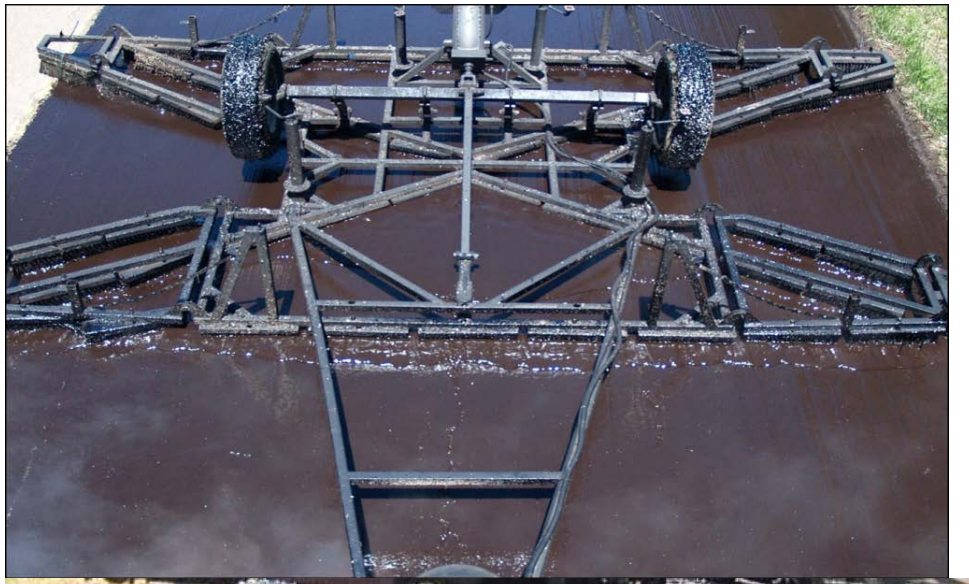
Chip Spreader

Equipment – Best Practices

1. Distributor Setup
2. Calibration
3. Broom Sled

Construction – Best Practices

1. Broom Setup



Cores

Core Separated Along Crack

Construction – Best Practices

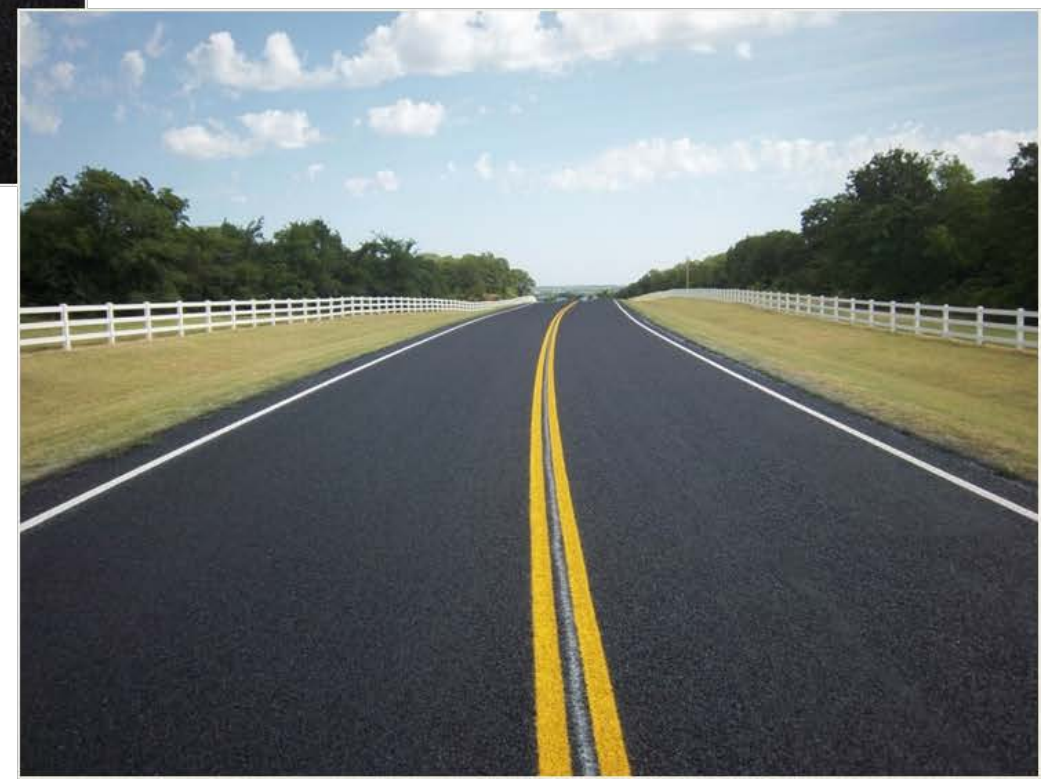
1. Broom Setup
2. Weather

Construction – Best Practices

1. Broom Setup
2. Weather
3. Application Rates

Fog Seals

- Light application of low residue asphalt emulsion.
- Purpose



Best Practices

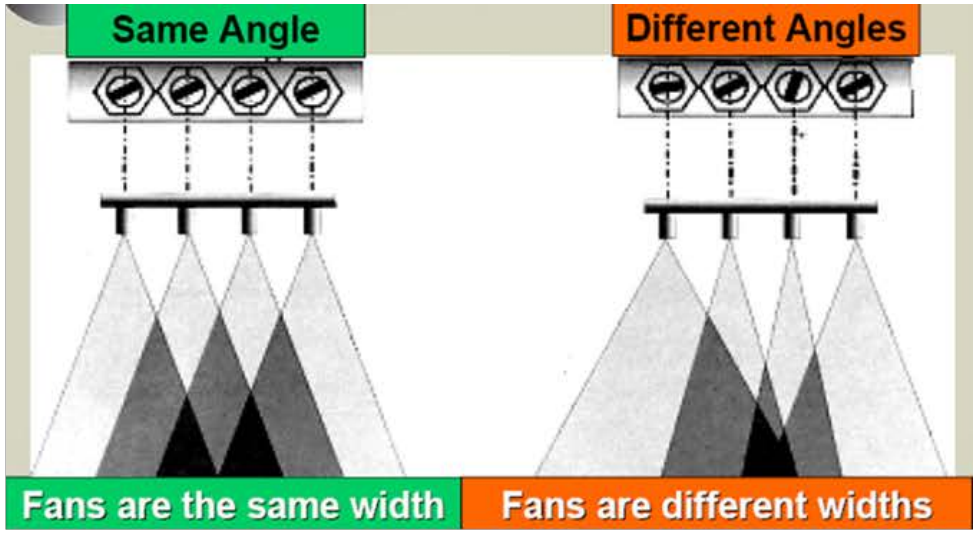
- Material
- Equipment
- Construction/Application

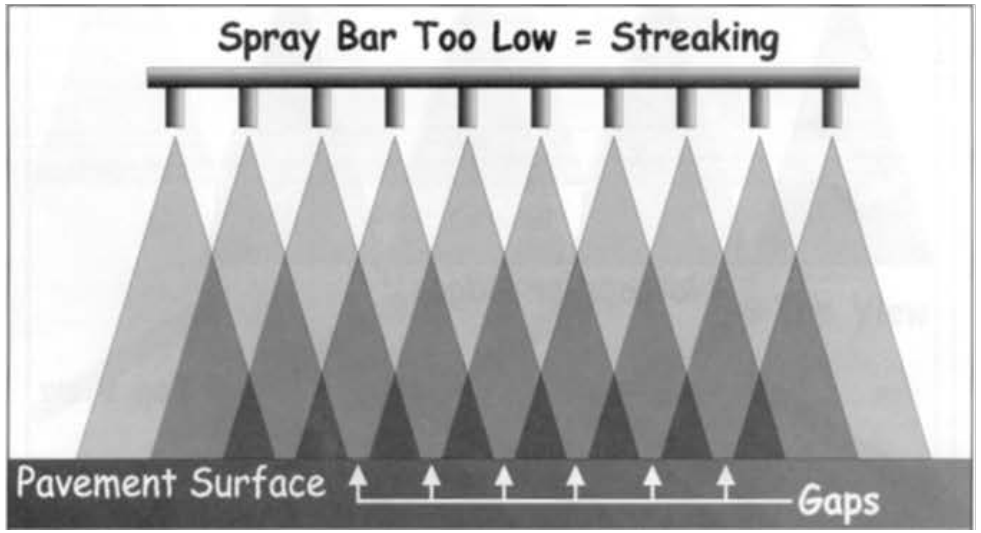
Material – Best Practices

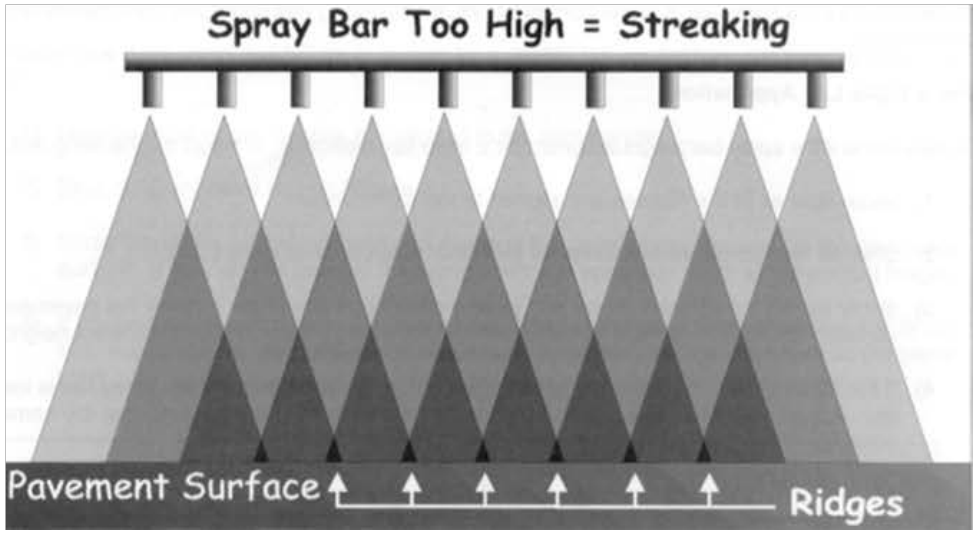
1. Determine which fog seal is needed
2. Use a diluted or “ready to shoot” emulsion
   - Use clean water
   - Dilute typically to 50/50
   - Let the emulsion supplier dilute
3. Amount of residue when testing

Equipment – Best Practices

1. Distributor Setup
   - Spray bar height
   - Nozzle size
   - Nozzle angle
   - Spray bar pressure

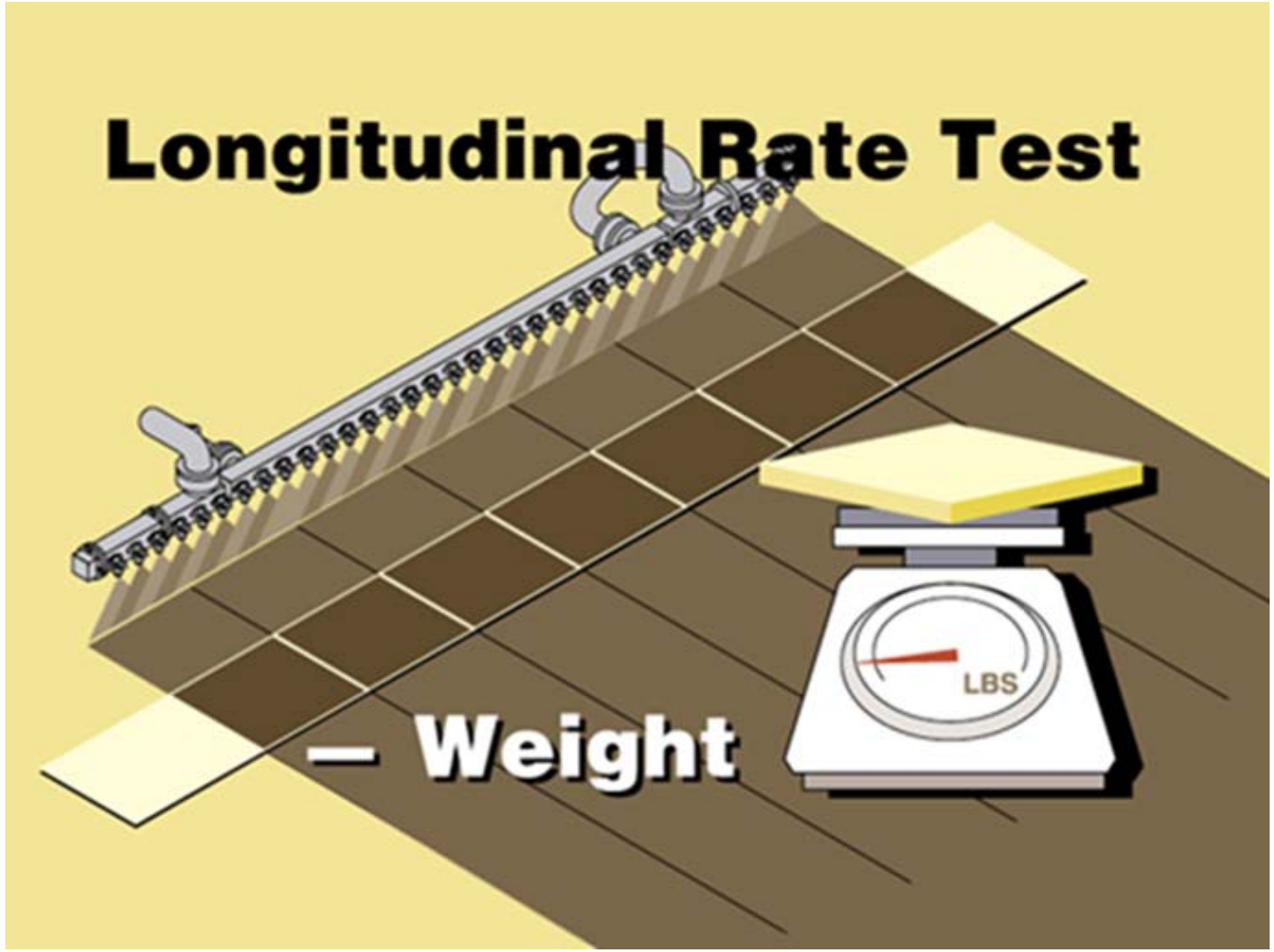






Equipment – Best Practices

1. Distributor Setup
2. Calibration



Equipment – Best Practices

1. Distributor Setup
2. Calibration
3. Test Strip

Construction – Best Practices

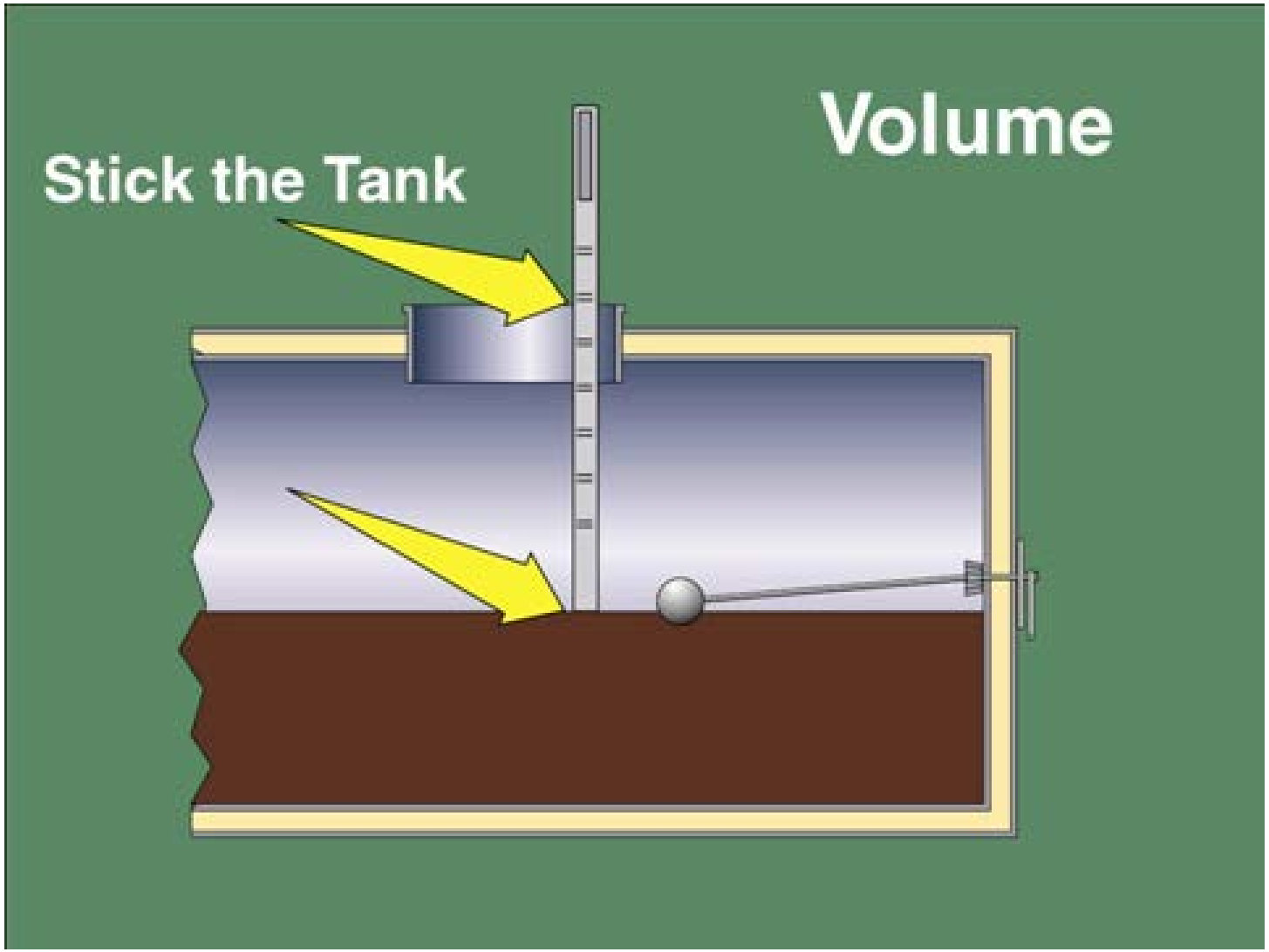
1. Weather

Construction – Best Practices

1. Weather
2. Traffic Control

Construction – Best Practices

1. Weather
2. Traffic Control
3. QA/QC



Any Questions?