

An Introduction to Slurry Seal and Microsurfacing Systems

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Industry Goals

- Improve Agency Awareness
- Educate Decision Makers
- Set Product Expectations
- “Raise the Bar” of Materials & Guidelines
- Improve Quality of Finished Product

Topics we will cover:

- Slurry Seal & Microsurfacing Systems
 - History
 - Considerations for use
 - Aggregate
 - Emulsion
 - Mix Design
- Application & Equipment



Slurry Seal – What is it?

- Developed in the 1930's in Germany
- A coating consisting of fine crushed aggregate, emulsified asphalt and water was applied to roadways
- Emulsion serves as a binder to hold the aggregate together and to adhere to the roadway
- Appeared to be an economical way to maintain asphalt roadways.

Microsurfacing – What is it?

- Slurry Seal was expanded upon in the late 1960's and early 1970's in an attempt to use slurry in thicker applications that could be applied in narrow courses in wheel ruts to avoid not having to replace expensive traffic delineation on the autobahns.
- High quality aggregates and advanced emulsions were incorporated
- A stable product when applied in multi-stone thickness resulted.

Where to use Slurry Seal Treatments

- On Newer Pavements
- Both low and high volume roads
- Parking Areas
- Airports
- Bike Paths
- Pavement Delineation
- Preventative Maintenance Program

Where to use Microsurfacing Treatments

- Surface Treatments For High Volume Collectors And Arterials As Well As Highways
- Rut Filling Applications
- Double Applications For Addressing Surface Irregularities
- Night Work
- Areas Where Fast Traffic Times Are Of Concern
- Concrete Bridge Decks
- Airports

What Makes Micro Different than Slurry?

- Higher Polymer Content in the Emulsion
- Fast Setting Chemicals- Allows Faster Break
- Higher Quality Aggregate Required
- Slurry Pavers with the Capability to mix the Micro
- Augured Boxes
- Higher Quality Control required with the system
- This semi liquid surface profiling material that transitions to a dense cold mix material is able to support traffic as quick as one hour after placement

When to use Slurry Seal and Microsurfacing Treatments

Applications

- Where and When Can We Apply Slurry Seal?
 - Best Practice = Preventative Maintenance
 - Band Aids = Raveled or Distressed Asphalt
 - Worst Case Scenario = Buys You Time

Estimated Service Life of Slurry Seal and Microsurfacing Treatments

- PCI = 80 Good Condition 7-10 years
- PCI = 60 Fair Condition 5-7 Years
- PCI = 40 Poor Condition 2-5 Years

Factors to consider

- Existing Pavement Condition
- Surface Preparation, Weeding, Crack Sealing, Patch Repairs, Cleaning and Striping removal.
- Traffic Levels and Traffic Control Requirements
- Climate and Weather Conditions
- Day or Night Application
- Power Steering Scuffing
- Reflective Cracking
- Ravel or shedding of product
- Urban vs. Rural Settings
- Availability of Staging Locations
- Availability of Materials/Contractors

Benefits

- Extends Service Life of Existing Pavements
- Improved Ride Quality
- Improved Skid Resistance
- Seal Pavement / Restore Loss Of Matrix
- Improve Appearance
- Striping Delineation / Contrast

Factors That May Affect Service Life

- Rock and Emulsion Characteristics
- Volume of Traffic
- Studded Tire Wear
- Snow & Ice Removal Efforts
- Contractor Workmanship



Sweeping



Manhole Covering



Application



Handwork

Slurry Seal and Microsurfacing Systems

Aggregate

Different Sizes

- Type 1 (1/8")
 - Low Traffic Areas
 - Aesthetically Pleasing
- Type 2 (1/4")
 - Most versatile
 - Corrects Moderate Raveling, Oxidation and Improves Skid Resistance

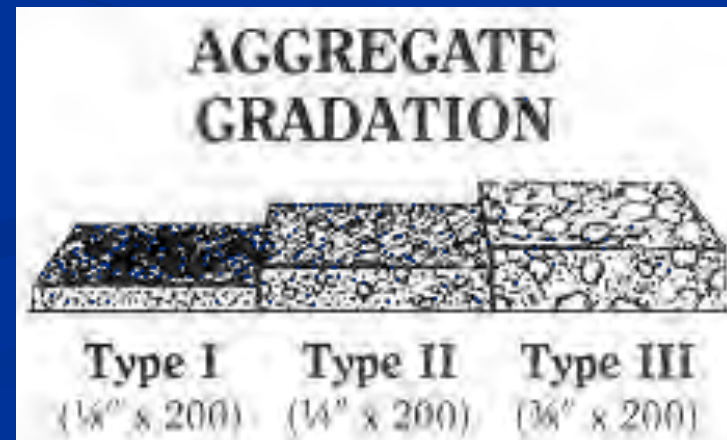
Slurry Seal and Microsurfacing Systems

Aggregate continued...

■ Different Sizes

■ Type 3 (3/8")

- Geared for Arterials and Collectors
- More Aggressive Friction Coarse for Skid Resistance
- Holds up to Heavy Traffic Loads



Slurry Seal and Microsurfacing Systems

Aggregate continued...

- Aggregate Qualities and Predictors of Success
 - Sand Equivalency
 - Fines Durability
 - Abrasion Resistance
 - Absorption Rates
 - Specific Gravity
 - Sodium Soundness



Slurry Seal and Microsurfacing Systems

Aggregate continued...

■ Application Rates

- Expressed as Dry Pounds of Aggregate per Square Yard

- Typical Application Rates

■ Type 1	8-12 #/SY
■ Type 2	9-18 #/SY
■ Type 3	15-24 #/SY
■ Type 3 Micro	18-36 #/SY

Slurry Seal and Microsurfacing Systems

Aggregate continued...

■ Application Rates

■ Factors That Determine Application Rates

- Aggregate Gradation
- Specific Gravity
- Surface Texture

■ Considerations for Specifying Application Rates (or Gradation of Aggregate)

- What type of streets are we affecting?

Slurry Seal and Microsurfacing Systems

Aggregate continued...

■ Potential Issues

- Consistency
- Gradations / Oversize
- SE of Aggregate
- Contamination - Plant / Trucker
- Stockpile Contamination

Slurry Seal and Microsurfacing Systems

Emulsions

- What is an Emulsion
 - Asphalt, Water and an Emulsifier
- Terminology
 - Charge
 - Speed of Set
 - Modifiers
 - Examples
 - SS, CSS, CMS, CQS, CRS
 - LM-CQS or PM-CRS

Slurry Seal and Microsurfacing Systems

Emulsions continued...

■ How Are They Manufactured

- Base Stocks
- Emulsifiers
- Modifiers
 - Polymers
 - Latex



Slurry Seal and Microsurfacing Systems

Emulsions continued...

■ Potential Issues

- Consistency
- Base Stock
- Emulsion Temperatures
- Stability
- Plant or Trucker Contamination
- Field Problems



Unsound Pavement

11/2/96



Unsound Pavement



Improper Surface Preparation

11/19/96



Improper Mix design

Slurry Seal and Microsurfacing Systems

Mix Designs

- What are they?
 - Formulations for a Specific Aggregate and Emulsion
 - Provides a Band for:
 - Grading
 - Optimal Asphalt Content (Residual Asphalt)
 - Testing Criteria Helps Predicts:
 - Workability
 - Successful Service Life

Slurry Seal and Microsurfacing Systems

Applying Slurry Seal

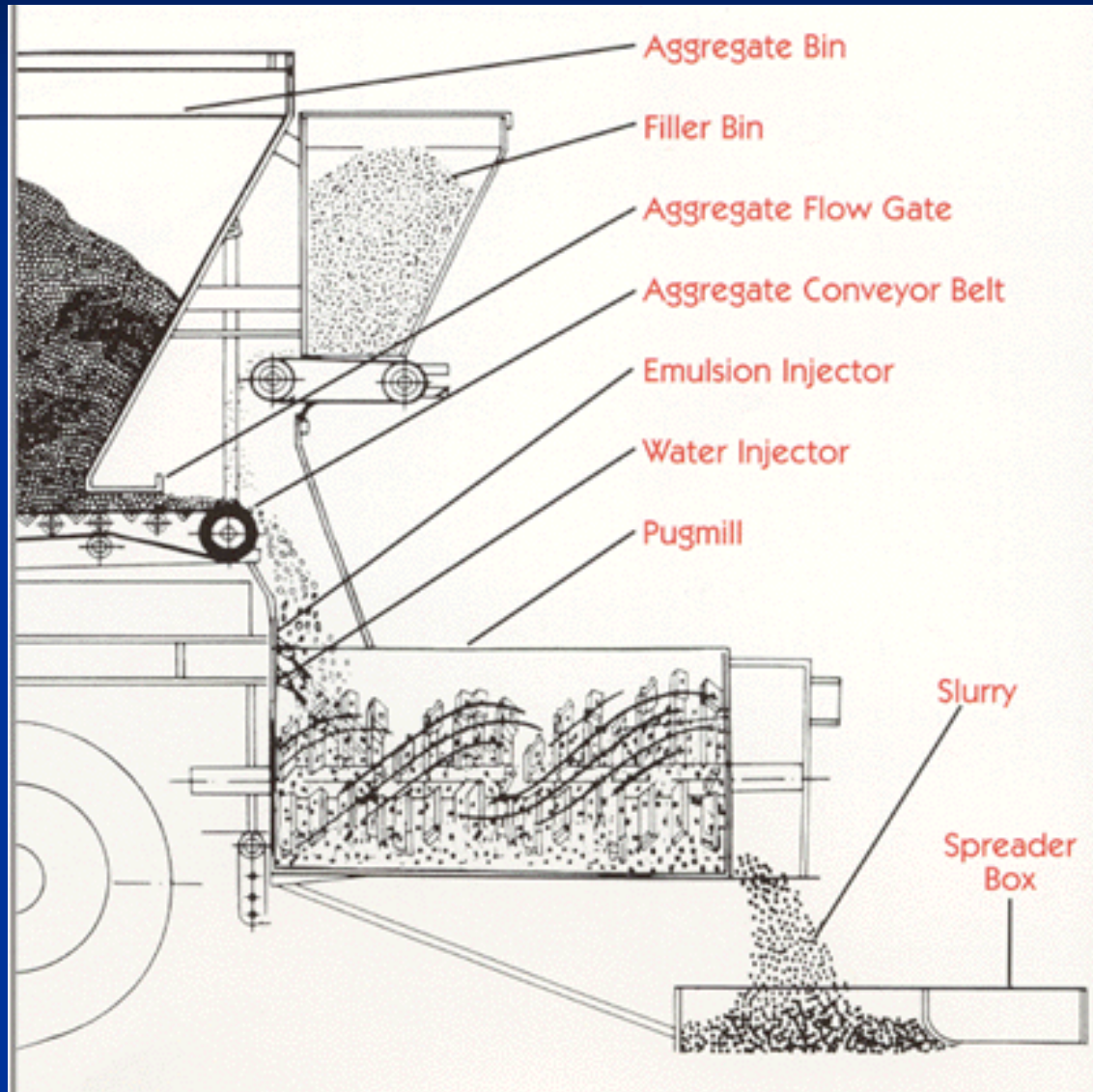
- Crew Makeup
- Equipment Types

Slurry Seal and Microsurfacing Systems

Applying Slurry Seal

- Crew Make up
 - Superintendent
 - Operator
 - Line Driver
 - Shuttle Person
 - Squeegee Person
 - Traffic Control

Equipment



Equipment

Equipment Types and Methods

- Mobile Mixers



Equipment

Equipment Types and Methods

- Continuous Mixers
- Common With Micro
- Reduces Transverse Joints





Truck Mounted Machines, shuttle truck getting ready to switch out with emptying slurry truck behind it









Typical Style Loader Used for Loading
Aggregate



Shuttle Person Loading Emulsion.

Equipment

Spreader Boxes:

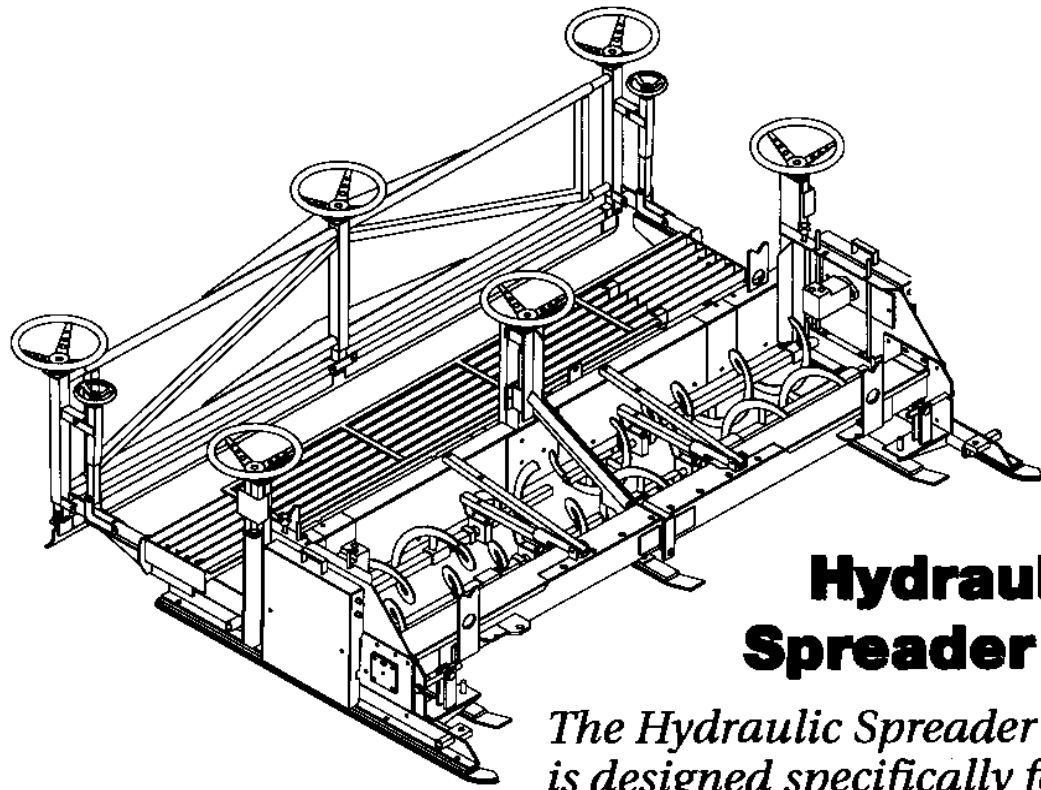
- Conventional
- Auger Box
 - Single and Dual
- Rut Box
- Drags such Burlap and Fabric Are Used to Achieve Different Surface Textures



Equipment

Spreader Boxes:





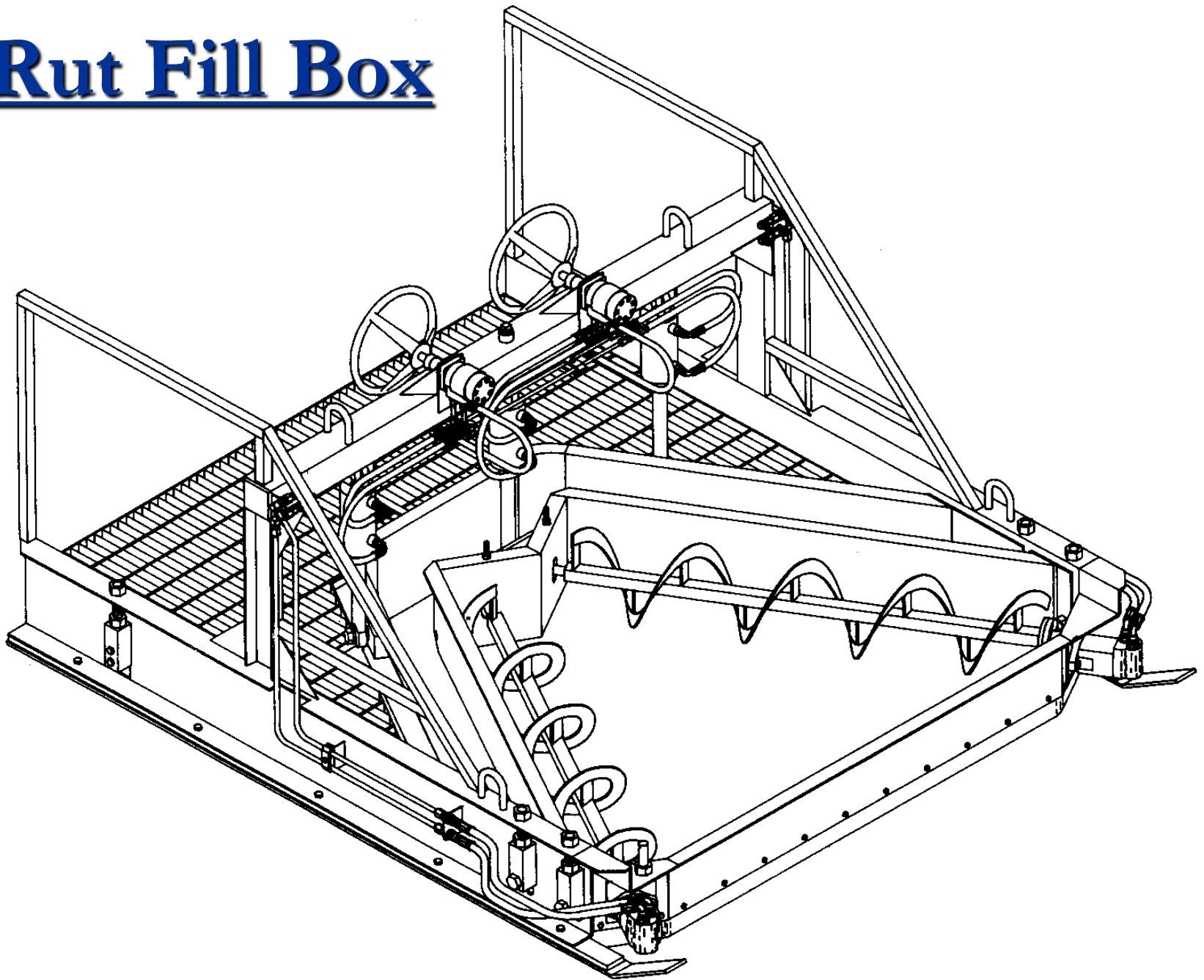
Hydraulic Spreader Box

The Hydraulic Spreader Box is designed specifically for microsurfacing and quick set slurry seal mixes. Widths are hydraulically adjusted from 8 to 14 feet (2.4 to 4.3m) in 6 inch (15cm) increments. The primary and secondary strikeoff heights are adjustable at three places. Auger bearings are polyethylene, providing low maintenance and economical replacement. Inside skids produce cleaner longitudinal joints. Widths to 16 feet (4.9m) are available by special order. Adjustable pitch rear strikeoff available (shown).

Auger Boxes
required for
Microsurfacing.

Augers push
material to outer
edges of the box
as well as keep
mix from
segregating.

Rut Fill Box





Equipment

Calibrations

- Volumetric Calibrations Used to Mix Components per the Mix Design
- Trial Runs to Demonstrate Workability and Gate Settings that Yield Oil Contents per the Mix Design
- When Should Calibrations be Performed?
 - Annually
 - Using New Aggregate

Hammer Lane Stockton



Average of 35 # Pounds Dry



Traffic Times were less than 2 Hours



1 Year After Placement





80,000 ADT Per Day

The image shows a wide, multi-lane highway with several cars driving. On the right side of the road, there is a large sign for a Walmart Supercenter. The sign is blue with white text and features the Walmart logo. Below the main sign, there are smaller signs that read "Food Center", "Pharmacy", "Pet Center", and "Open 24 Hours". The sky is overcast with grey clouds. In the foreground, there is a brick-paved shoulder and some greenery with yellow flowers. A tall street lamp is visible on the right side of the road.

Packer Way Sparks, NV 2007

















Packer Way Today (8 Yrs Later)









Wyoming Hwy 80





Summary

- Slurry Seal and Microsurfacing Are Tools For Your “Toolbox” For Preventative Maintenance or Asphalt Repair
- Systems Can Be Selected To Tackle A Large Array of Conditions
- Systems Can Be Used In Conjunction With Other Programs Such As Crack Sealing, Chip Seals and Scrub Seals

Summary

- To Receive Further Information
 - Contact Other Agency Representatives Who Have Utilized These Systems In Their Preventative Maintenance Programs
 - Contact Intermountain Slurry Seal, Inc. or Other Contractors and Suppliers
 - Visit the International Slurry Surfacing Association Website (www.slurry.org)

Questions?

