Full Depth Reclamation
Additive Selection Guidelines

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Manatts
• PULVERIZATION
• MECHANICAL STABILIZATION
• BITUMINOUS STABILIZATION
• CHEMICAL STABILIZATION
- Wirtgen WR2500
- 610 Horsepower
- 8’ wide cut

- Can cut to a depth of 20”
- Operating weight = 70,000 lbs
- Foamed Asphalt System
- Cat RM-350 B
- 470 horsepower

- 8’ wide cut
- Can cut to a depth of 18”
- Operating Weight = 50,000 #
PULVERIZATION ONLY
Return to granular material
• Crushed aggregates
• Asphalt millings
• Crushed concrete
Bituminous Stabilization
Injection system

- Deep recycled layer
- Injection of water and/or fluid stabilizing agents
- Operating direction
- Milling drum
- Distressed pavement
- Granular material
All pavement structures with the passage of time wear out.
Reduced Moisture Susceptibility

Moisture infiltrates base:
- Through high water table
- Through capillary action
- Causes softening, lower strength, and reduced modulus

Full Depth Reclamation:
- Reduces permeability
- Helps keep moisture out
- Maintains high level of strength and stiffness even when saturated
Reduced Fatigue Cracking

Unstabilized Base:
- High deflection due to low base stiffness
- Results in high surface strains and eventual fatigue cracking

Full Depth Reclamation Base:
- Higher stiffness of full depth reclaimed base produces lower deflections
- Resulting in lower surface strains and longer pavement life
Short test sections for mix designs
Expansion Chamber

Diagram:
- Hot bitumen flows into a chamber.
- Cold water is sprayed into the chamber, causing foaming.
- Foamed bitumen is collected at the bottom.
• .0075mm (NO. 200 SIEVE)
• BEST TO HAVE 10% TO 15%
Larger aggregate stays clean.
Chemical Stabilization

- Portland Cement
- Hydrated Lime
- Fly ash
- Calcium Chloride
- Magnesium Chloride
How can FDR be used more effectively?

- **Full Depth Reclamation**: 6-10" FDR
- **Mill & Fill**: 1.5" Mill & Fill
- **Overlay**: 1.5" Overlay
Pavement Distress
Deformation

- Corrugations
- Ruts (shallow)
- Ruts (deep)
- Alligator cracking
- Longitudinal
- Wheel path
- Pavement edge
- Slippage
- Block cracking
- Longitudinal (joint)
- Transverse (thermal)
- Reflective
Maintenance Patching
Weak base or Sub-grade
General Guidelines

- Hydrated lime or Quicklime 2% to 4% by weight
- Plasticity index greater than 10
General Guidelines

- Class C Fly Ash
  8% to 14% by weight
- Portland Cement
  3% to 6% by weight
Emulsified or Foamed Asphalt 1% to 3% by weight
General Guidelines

- Calcium Chloride 1% by weight
- Combination of additives Lime/Fly Ash/Portland Cement
  Portland Cement/Calcium Chloride
References

Soil and Pavement Base Stabilization with Self-Cementing Coal Fly Ash  ACCA International


Full Depth Reclamation Manual, A Century of Advancement for the New Millennium  Asphalt Recycling & Reclaiming Association
To Safely Do
Every Job We Do
Better Than Anybody Else