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CONSTRUCTION

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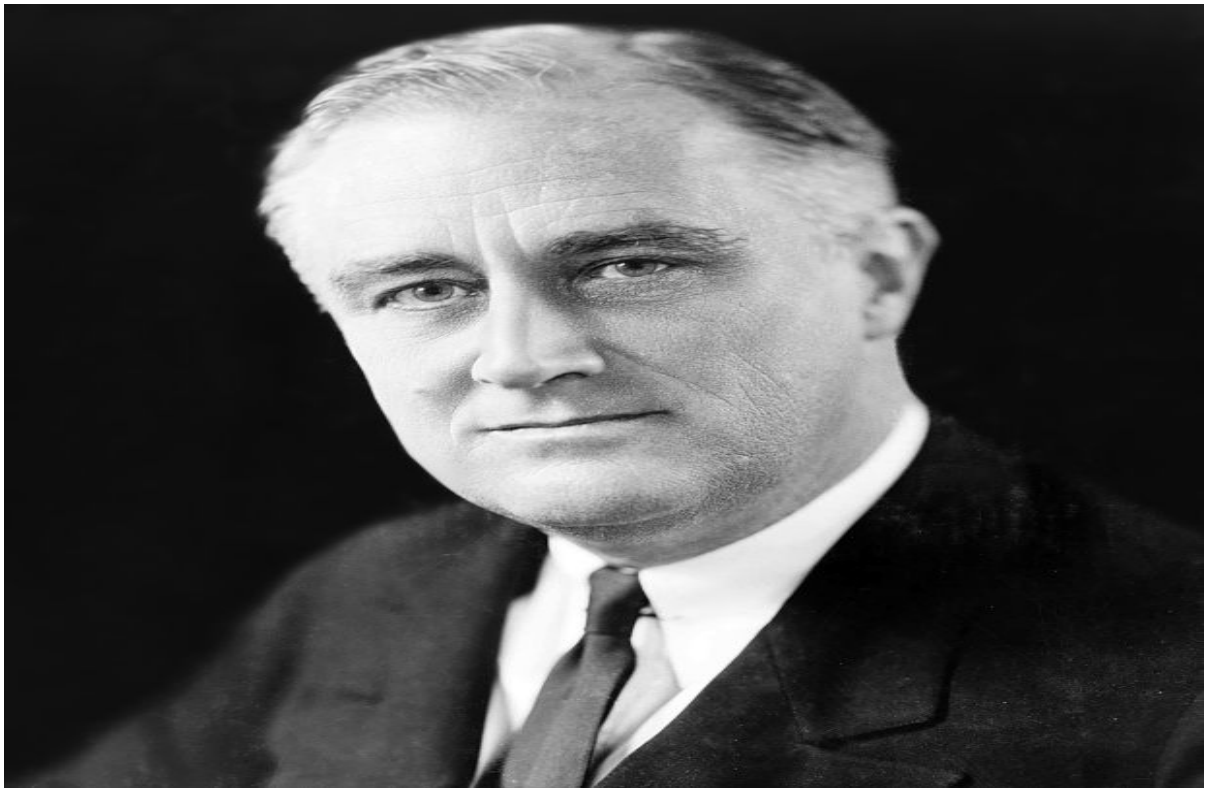
Gardening Reimagined

FDR



Full Depth Reclamation

A process that rebuilds worn out asphalt pavements by recycling the existing asphalt. The old asphalt and base materials are pulverized, mixed with an additive, and compacted to produce a strong, durable base for either an asphalt or concrete surface.



Agenda

- FDR Process Start to Finish
  - Equipment, Materials, Applications, Limitations, Break even point, & Productions

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Equipment

- Typical Equipment
  - Blade
  - Padfoot roller (Sheeps foot roller)
  - Smooth drum roller
- Specialized Equipment
  - Spreader trucks
  - Reclaimers

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Materials & Typical Applications

Type & Typical Trial % of Stabilizer (by weight)	Characteristics of Reclaimed Pavement Materials
Hydrated Lime or Quicklime (2 to 6%)	Reclaimed asphalt pavement (RAP) having some amount of silty clay soils from sub-grade with a plasticity index of greater than 10.
Class C Fly Ash (8 to 14%)	Materials consisting of 100% RAP or blends of RAP and underlying granular base or soil. The soil fraction can have plasticity or be similar to soils acceptable for lime treatment.
Portland Cement (3 to 6%)	Materials consisting of 100% RAP or blens of RAP and underlying granular base or non plastic or low plasticity soils. There should be sufficient fines to produce and acceptable aggregate matrix for the cement trated base (CTB) produced.
Emulsified Asphalt (1 to 3%)	Materials consisting of 100% RAP or blens of RAP and underlying granular base or non plastic or low plasticity soils. The max. percent passing the No. 200 sieve should be less than 25%, the plasticity index less than 6 or the sand equivalent 30 or greater, or the product multiplying the P.I. and the percent passing the No. 200 being less than 72.

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Materials Continued

- Portland Cement
  - Used in ranges of 3% to 7%. Commonly used for strength gains, drying soils, and stabilizing rock. Widely available across the state
- Quicklime
  - Used in ranges of 2%-5%. Very potent and is great for drying and small strength gains, always readily available in the KC & STL.
- Code L
  - Used at an average rate of 5%-7% spread rate by weight of in place soils. Higher dosage rate, not always readily available, comes out of St. Gen.

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When is FDR Applicable?

- Flexural distresses in wheel lanes
- Pavement condition index below 55
- Excessive rutting or alligator cracking
- Excessive patching (20% or more)
- Need to widen roadway
- Need to increase structural design
- Need to correct asphalt pavement cross slope

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Flaking or Chipping asphalt

Cracking & Heaving


Green Energy

Mill & Overlay

Remove & Replace

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Typical FDR Applications

- Aggregate roads
- Aggregate staging areas/lots
- Asphalt roads
- Asphalt parking lots
- Airport taxiways
- Tennis courts
- Asphalt running tracks
- ALL THINGS ASPHALT



Benefits of FDR

- To reduce your risk
- To reduce the cost
- To increase the strength
- To save on repairs and maintenance
- To do something good for the environment

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FDR In Action



FDR STEPS

- Project evaluation – mix design
- Initial pulverization – Avg 8” to 12”
- Compaction and initial grading
- Stabilization/additives: cement, asphalt emulsion, foamed asphalt, fly ash, or lime.
- Grade & compact
- Cure
- Surface – asphalt, micro, chipseal, concrete.

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Mix Design

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Pulverize Asphalt

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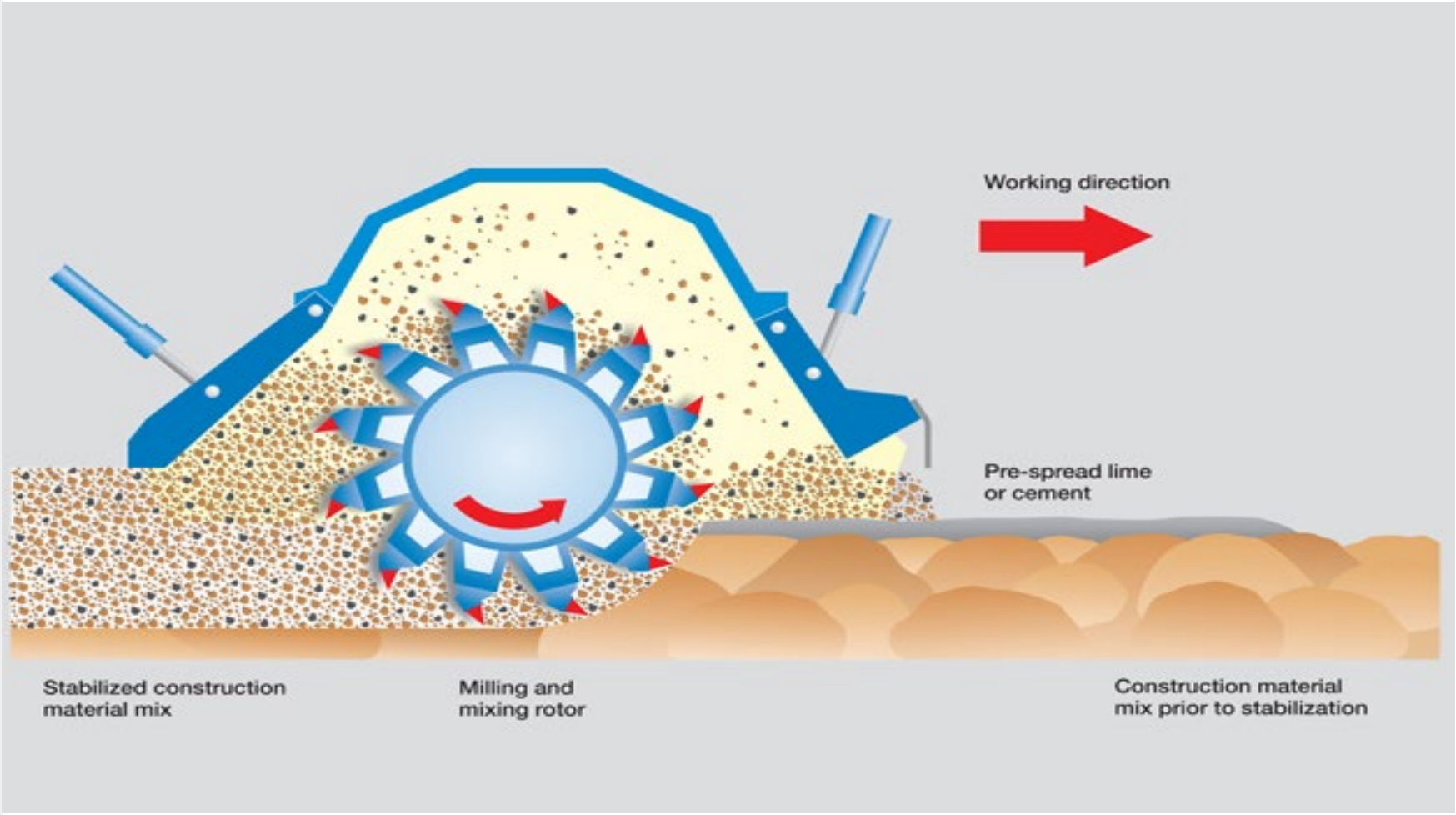

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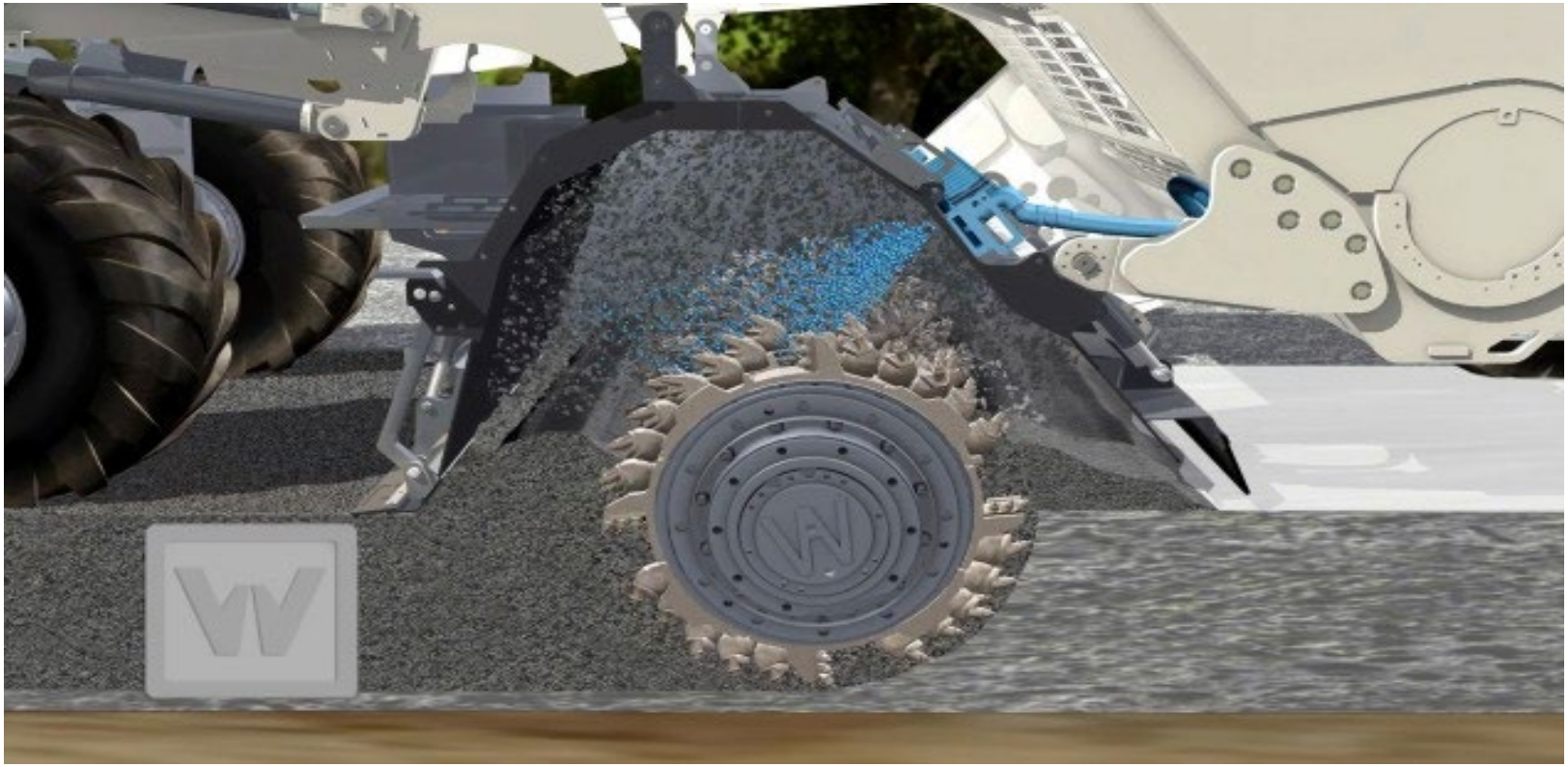

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Initial Compaction & Grading

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CAT
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Add Stabilizing Agent

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OSHKOSH
FORCE

Incorporate Stabilizer

Hydrate Cement – Direct Inject H2O


WIRTGEN
US DOT #4214099

Final Compaction & Grading


670 B

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Compaction Is Critical!!

Initial

- Single drum vibratory
- 10 ton Pad-foot
- 96 to 98% Max Dry

Finish

- Single or double drum roller
- Operating in static mode

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Cure



Structural Layer Coefficients

- Dry pulverization 0.11 per inch
- Bituminous stabilized 0.20 per inch
- Cement stabilized base 0.25 per inch
- Asphalt binder 0.40 per inch
- Cold-in-place 0.35 per inch

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6” Cement FDR with chip seal surface

Structural Coefficient = 2.175

2” Asphalt overlay

Structural Coefficient = .80

FDR treated base, with chip seal surface is almost 3x stronger than a 2” overlay.

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Boone County, Missouri
Gibbs Road

- 10,000 Square Yards
- 9-inches of treated base
- 6% Portland Cement
- 3-inch wearing surface
- 40% SAVINGS

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City of Desloge, Missouri
School Street

- 3,900 Square Yards
- 6-inches of treated base
- 4% Portland Cement
- 2-inch wearing surface
- 35% SAVINGS

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FDR vs. New Base

Based on One Mile, 24ft Wide, 6in Base

Number of Trucks Needed: 12 vs. 180

- New Roadway Material (Tons): 300 vs. 4,500
- Material Landfill (cy): 0 vs. 2,700
- Diesel Fuel Consumed (Gal): 500 vs. 3,000

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Thank You!

FDR Video can be viewed at

Byrneandjones.com