Idaho Asphalt Conference

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Topic:
Cold Mix Technology
Any one can take liquid asphalt and a pile of aggregate and make a pile of cold mix.
COMPONENTS IN TODAY’S COLD MIX

- Aggregate
- Asphalt / Cutback
- Additives

HMA is designed to pave roads.

High Performance cold mix is engineered to repair HMA failures.
Because cold mix is about 95% aggregate you should be certain your cold mix stone is designed for patching holes.
By studying and understanding each of these aggregate characteristics, a specific A/C blend with proper additives can be designed to work with a specific aggregate.
Data from a single 10,000 ton aggregate pile. Variations in aggregate quality are normal. The critical element is managing variation. High-performance cold mix is engineered to perform in advance and optimized during production.
TESTS WE PERFORM ON ASPHALT

ASTM
D-5    PENETRATION
D-95   PERCENT WATER
D-402  DISTILLATION
D-1310 FLASH POINT
D-2170 KINEMATIC VISCOSITY
D-2171 ABSOLUTE VISCOSITY
D-2172 EXTRACTION
D-1664 COATING & STRIPPING
D-3142 SPECIFIC GRAVITY
     (HYDROMETER)
D-70   SPECIFIC GRAVITY
     (PYCNOMETER)
HIGH-PERFORMANCE ADDITIVES

High Performance in water  Mid Performance in water  No additive in water

BEST in Class  WORST in Class
(Many conventional cold mixes)
Engineered design balancing aggregate, asphalt and additives are required to maintain the effective film thickness for a specific aggregate. Optimum performance requires prequalification of all components and confirmation of composition through post analysis.

Proper design optimizes the ratio of asphalt to aggregate through proper gradation and detail analysis before and after production.

A system process is required to achieve permanent performance.
• **Cohesion & Adhesion**
  Measures the ability of the material to bond to itself and to the surrounding pavement. Performance related to the capability of the material to remain in place. Maintaining adequate adhesion and cohesion will determine the degree to which material ravels from the pothole.

• **Workability & Stability**
  Measures the force required to move and apply the material at greater than 72°F. Workability and Stability must be balanced so that the material can be applied and yet stable enough to handle traffic loads. These are a function of gradation, viscosity, and application temperature.

• **Cold Workability**
  Measures the force required to move and apply the material in cold weather, less than 32°F.
• **Film Thickness**
  Measures the thickness of the asphalt surrounding the aggregate. Testing for the effective film takes into account aggregate gradation and absorption characteristics. Film thickness determines shelf life, cohesion, and workability.

• **Sieve Analysis**
  Aggregate analysis, proper sizing and distribution, surface texture and absorption characteristics. Performance related to proper compaction and load carrying capability. This also affects the cohesion, Workability.

• **Stripping**
  Measures the separation of asphalt from the aggregate. Performance relates to water handling characteristics of material in wet environment (i.e. heavy rain)
Product ratings are composed of six major performance parameters compared to an absolute standard:

- Cohesive
- Cold Workability
- Workability
- Film Thickness
- Sieve Analysis
- Strip Test

All parameters are interdependent, overall field performance deteriorates rapidly if any one parameter fails.
PERFORMANCE PARAMETERS

- Cohesive
- Workability
- Cold Workability
- Film Thickness
- Sieve Analysis

EZ-Street
Lab No: 8772
Score: 76.7/C+

PERFORMANCE PARAMETERS

- Cohesive
- Workability
- Cold Workability
- Film Thickness
- Sieve Analysis

Perma Patch
Lab: 9183
Score: 60.1/D−
A 10% change in failure rate will result in an 8% change in total cost.

A $10 change in price per ton will result in a 1% change in total cost.

Cold mix failure rate controls the total cost of repair by a factor of 8 to 1.
EFFECTIVE PATCHING COST

- Equipment
- Labor
- Overhead

Represent 60-80%

Material, 20-40%

Material cost is not the controlling component when applying cold mix.
TRUE COST

WHAT IS THE TRUE COST OF YOUR COLD MIX?

Three of four factors that can be controlled:
✓ Cold mix quality
✓ Application technique
✓ Area around the pothole

One factor that cannot be controlled:
✓ Weather

Total cost will be the result of your approach to those factors that can be controlled.
QUESTIONS?
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THANK YOU