

Idaho Asphalt Conference

Moscow, Idaho – October 27, 2011

Topic:
Cold Mix Technology



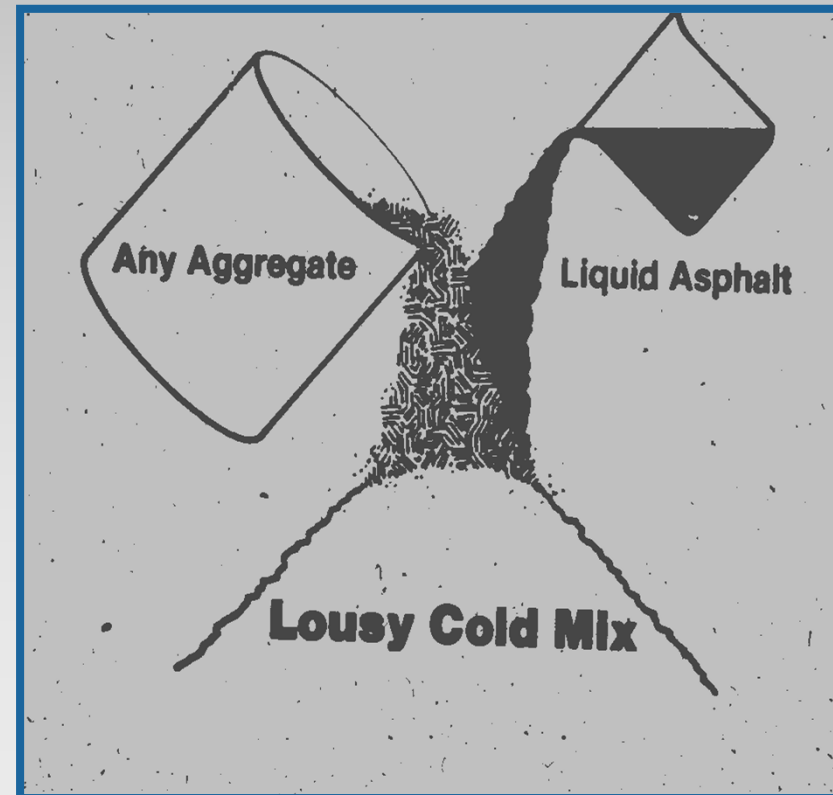
HIGH PERFORMANCE
= Cost Effectiveness



WHAT IS COLD MIX?



**Any one can
take liquid
asphalt and a
pile of
aggregate and
make a pile of
cold mix**



- **Aggregate**
- **Asphalt / Cutback**
- **Additives**

**HMA is designed
to pave roads.**

**High
Performance
cold mix is
engineered to
repair HMA
failures.**



AGGREGATES

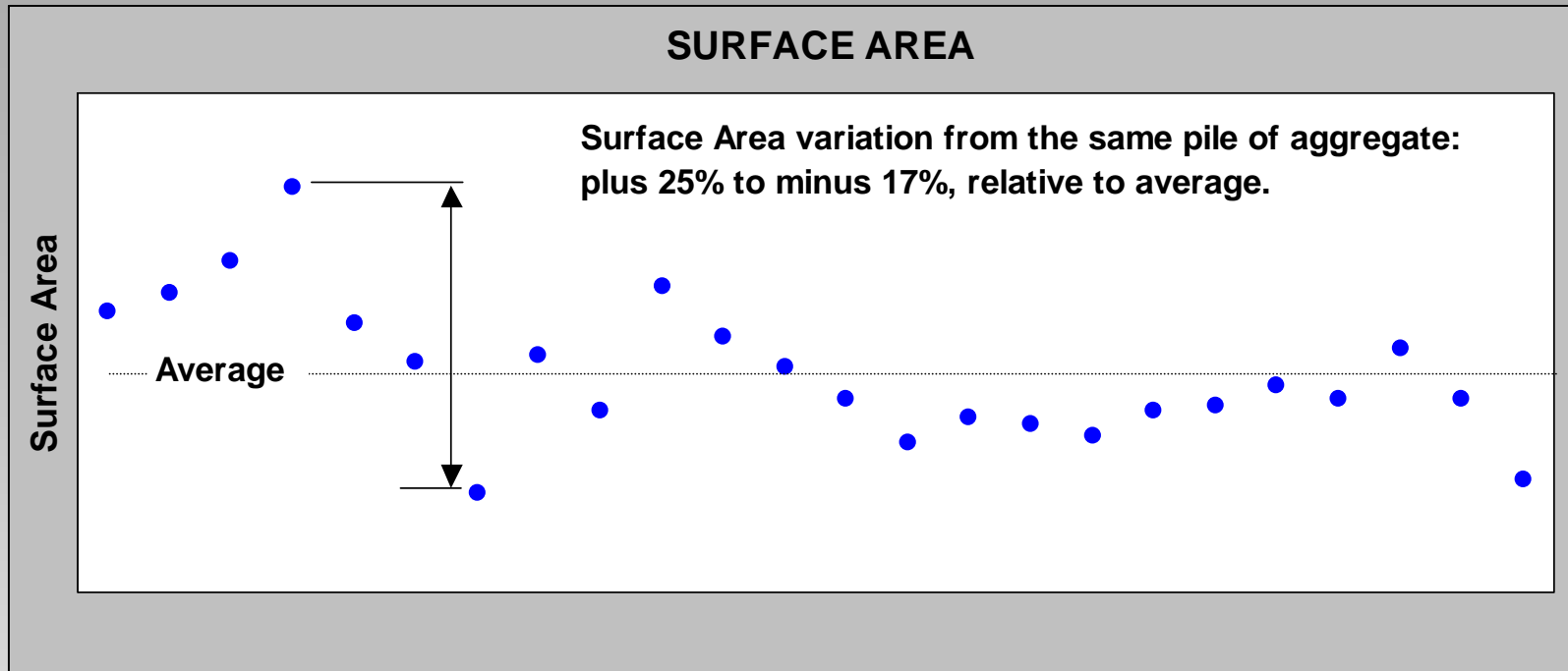


Because cold mix is about 95% aggregate you should be certain your cold mix stone is designed for patching holes.



- **GRADATION**
- **SOUNDNESS**
- **ABRASION**
- **ABSORPTION**
- **COATABILITY**
- **DUST (-200s)**
- **PH FACTOR**

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



Mid Performance



No additive



High Performance
in water



BEST in Class

Mid Performance
in water



No additive in
water



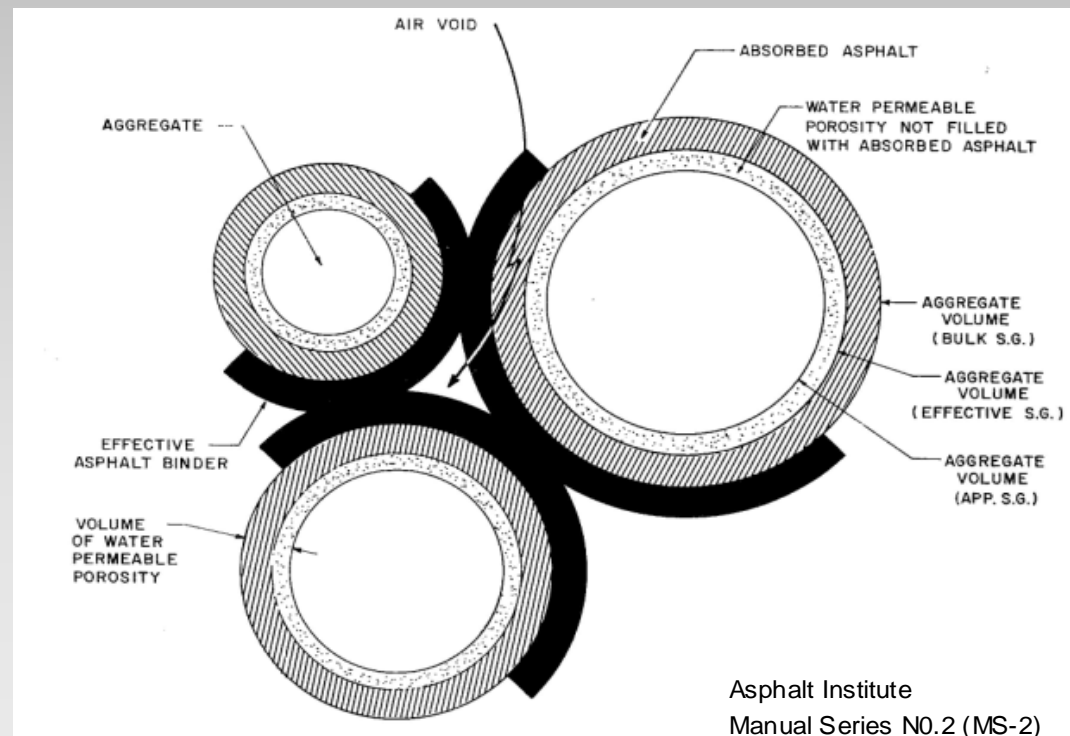
WORST in Class
(Many conventional cold mixes)



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



Asphalt Institute
Manual Series NO.2 (MS-2)

- **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 ravel 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.

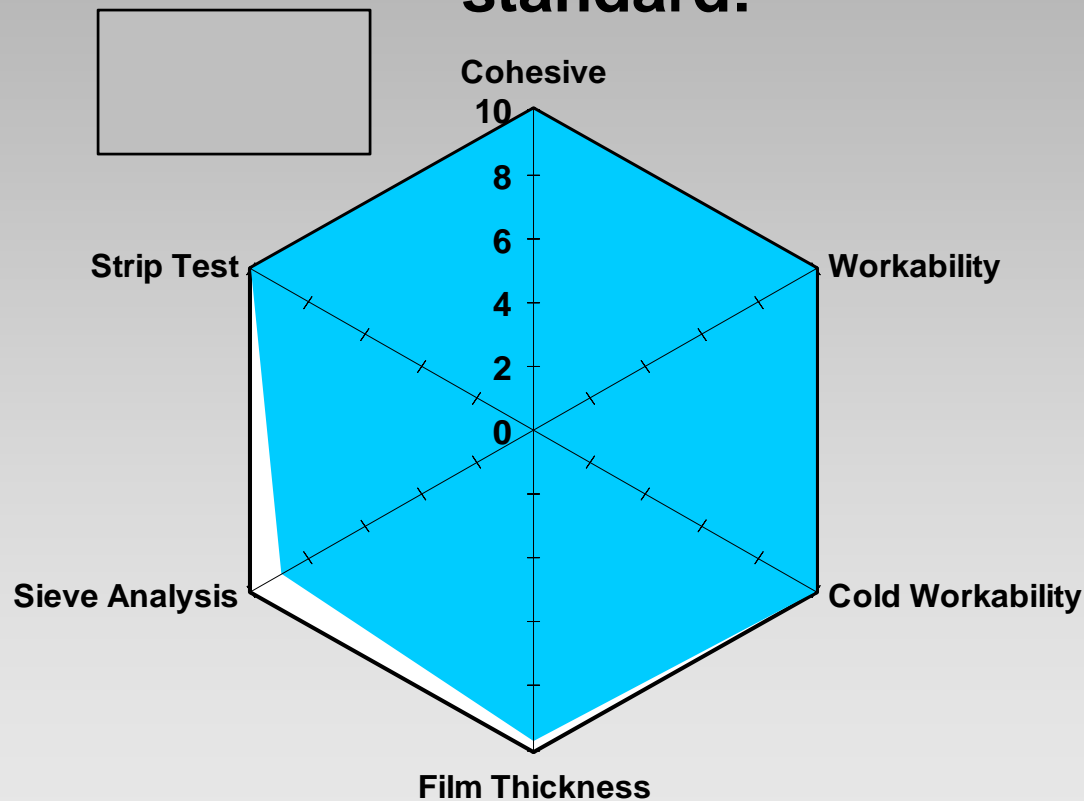
- **Sieve Analysis**

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**

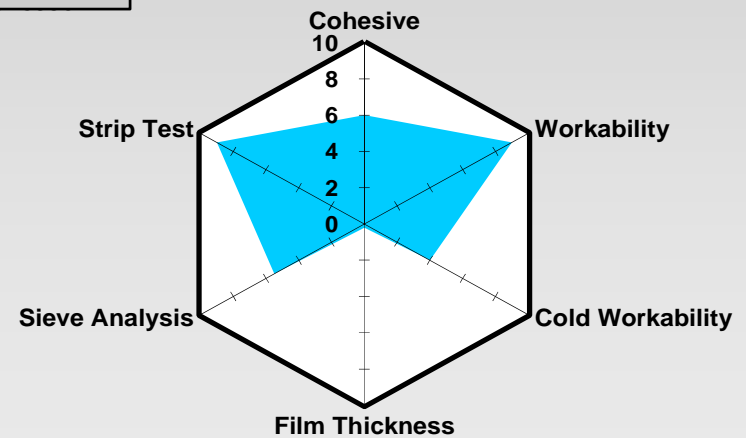
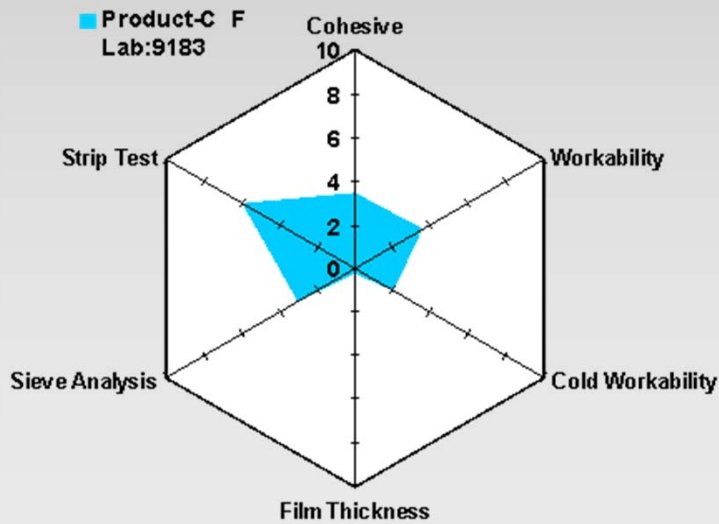
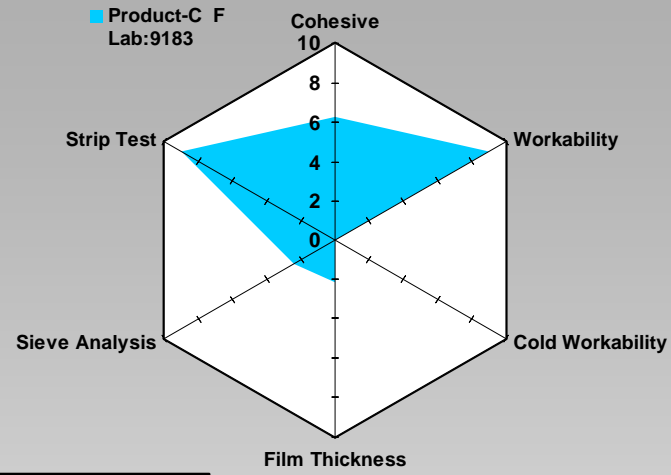
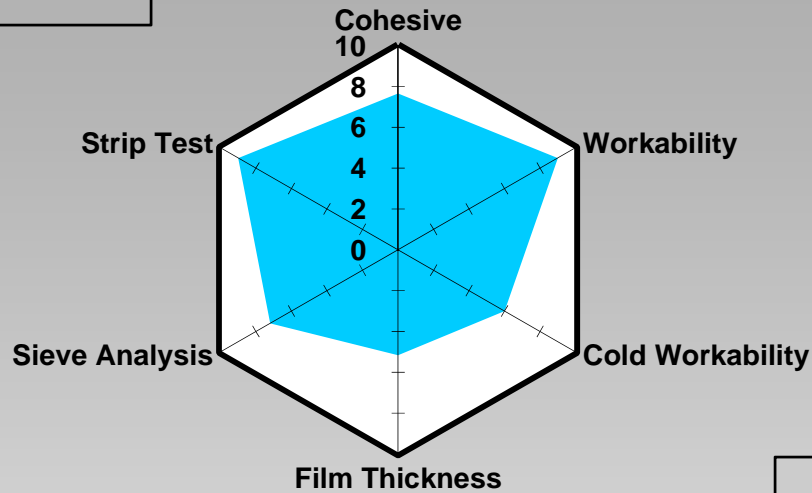
Measures the separation of asphalt from the aggregate. Performance relates to water handling characteristics of material in wet environment (i.e. heavy rain)

Product ratings are composed of six major performance parameters compared to an absolute standard:



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

PERFORMANCE PARAMETERS

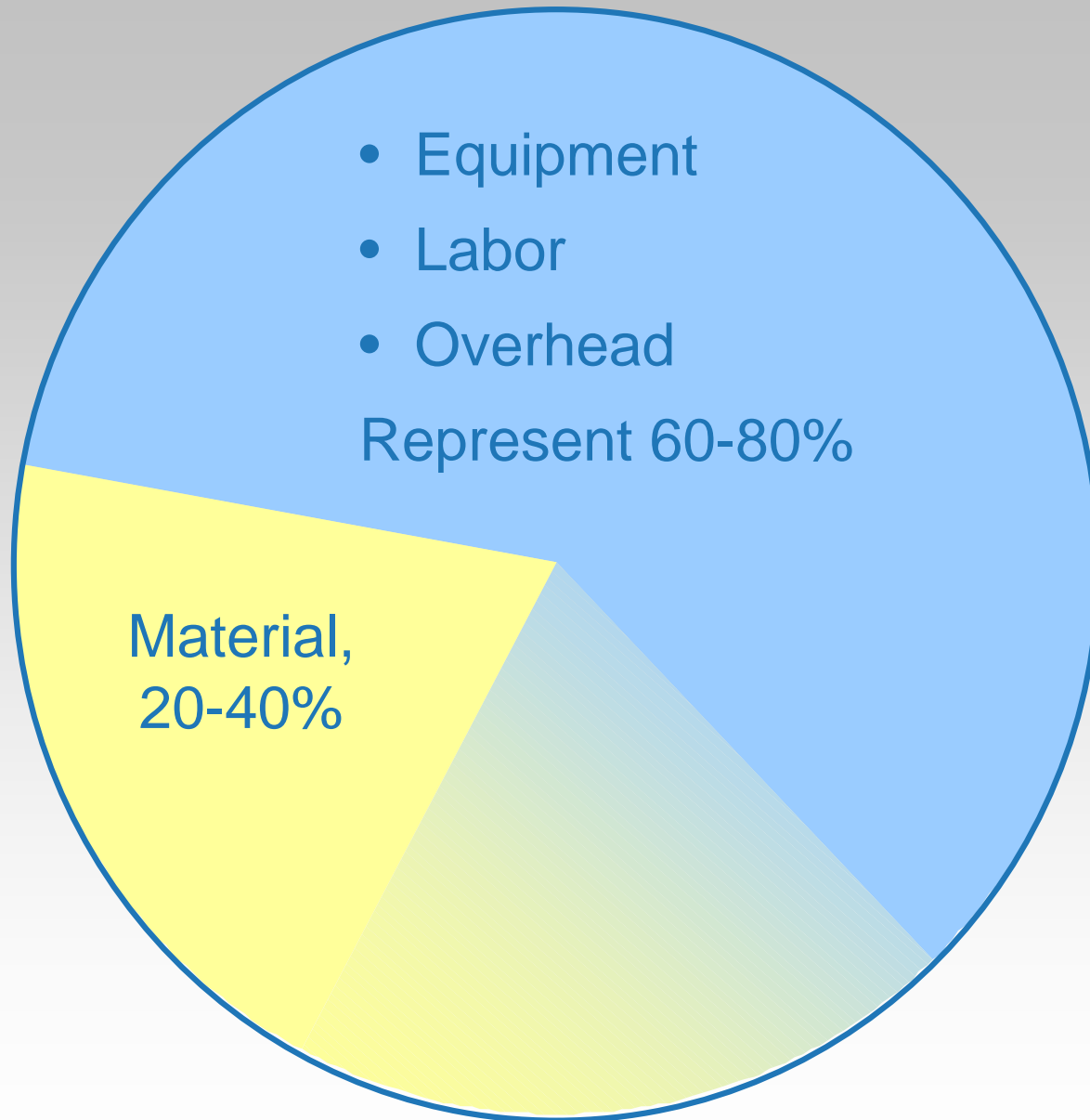




A 10% change in failure rate will result in an 8% change in total cost.

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.



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

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