

Wyoming DOT Perspective on Adhesion and Cohesion Determination

Pavement Performance Prediction Symposium

Western Research Institute

Cheyenne, Wyoming

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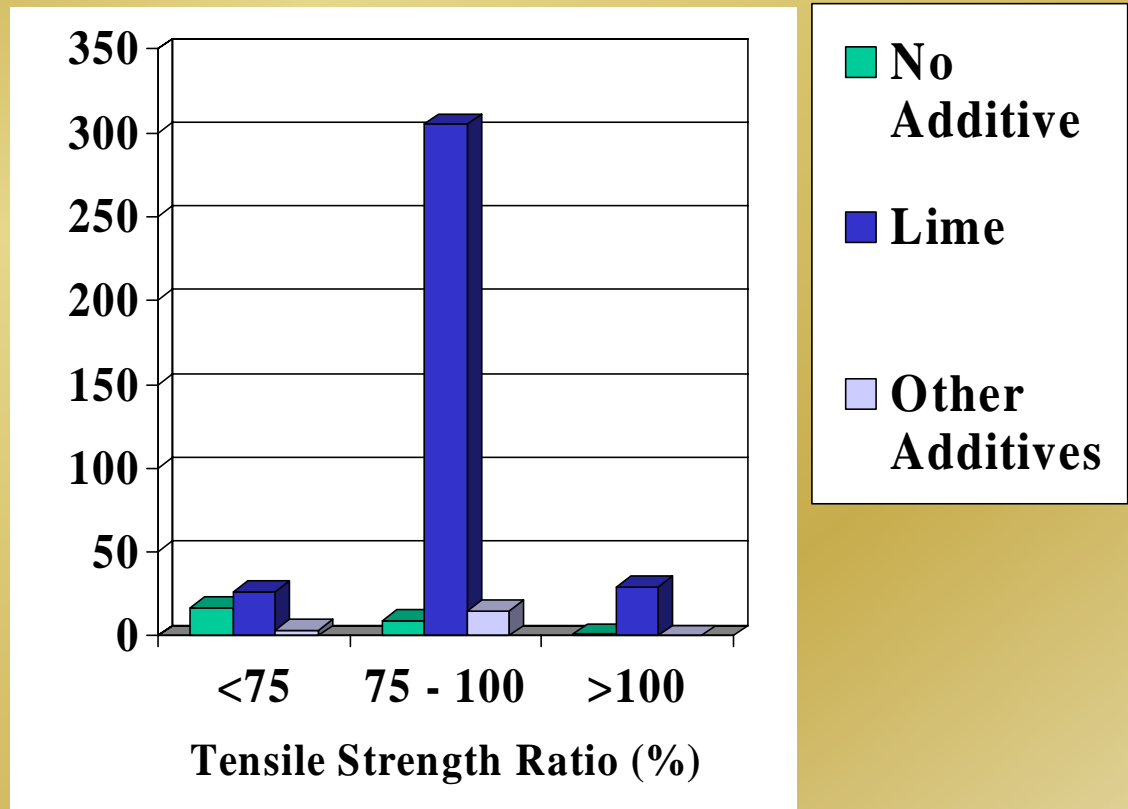
Bruce Morgenstern, P.E.

Wyoming DOT Perspective

- No current, direct testing for adhesion and cohesion
- AASHTO T 283
 - Stripping Susceptibility (adhesion indirectly?)
 - Tensile Strength Ratio (TSR)

AASHTO T 283 Testing

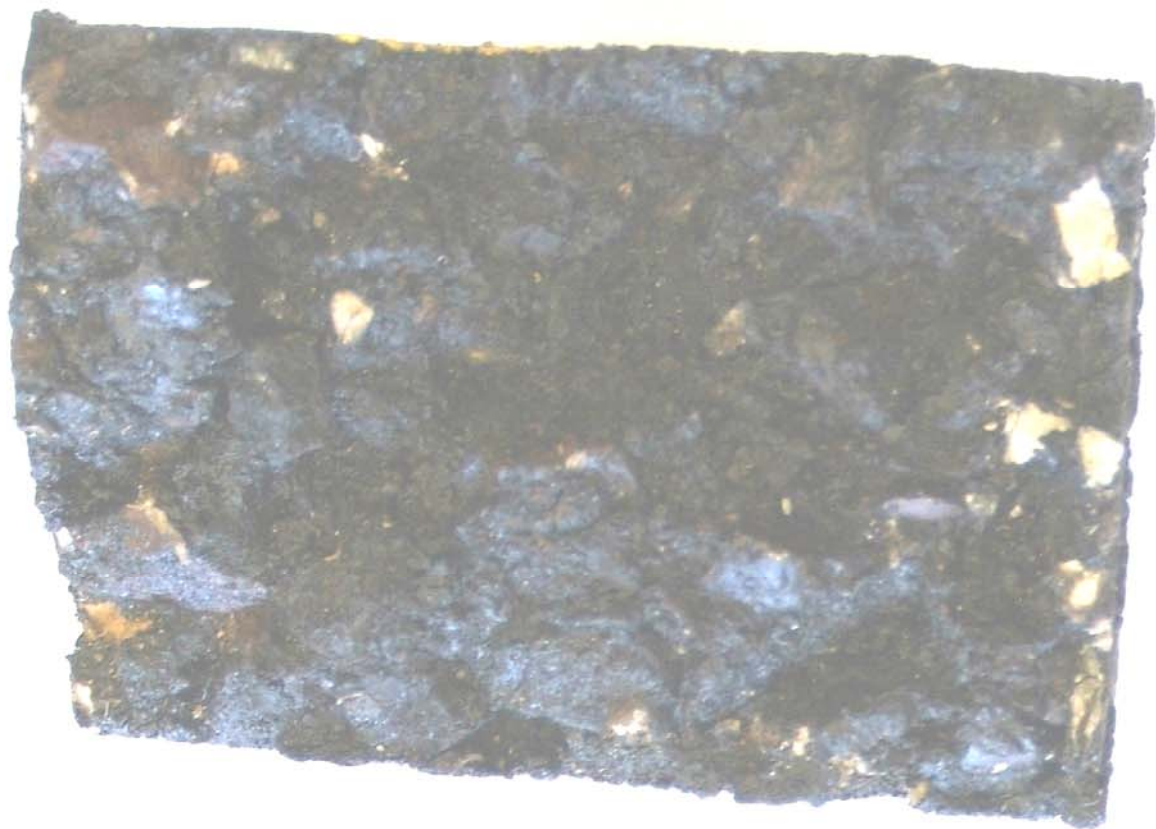
- 400 Tests
 - Nov 1995 to Apr 2005
 - 200+ aggregate sources
 - 25+ binders (9 suppliers)
- Samples
 - 4-inch compacted (Marshall, SGC)

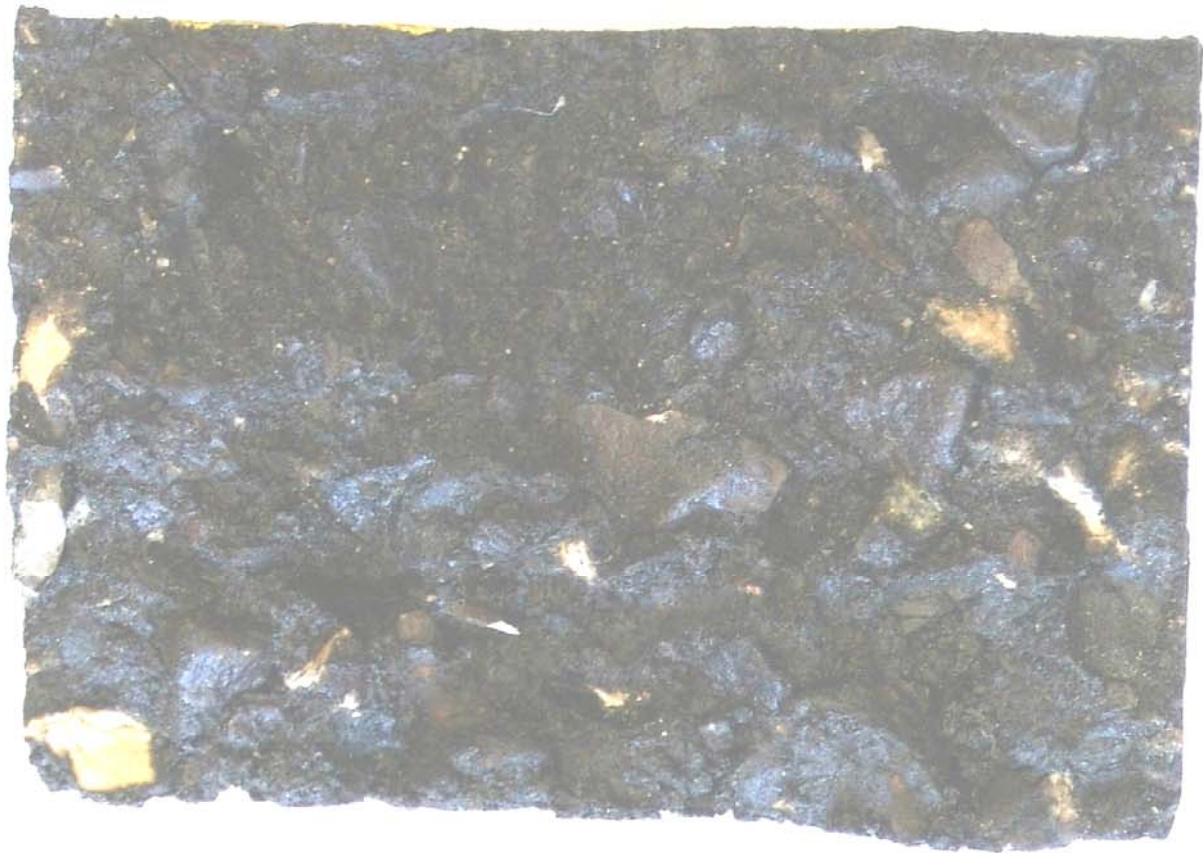


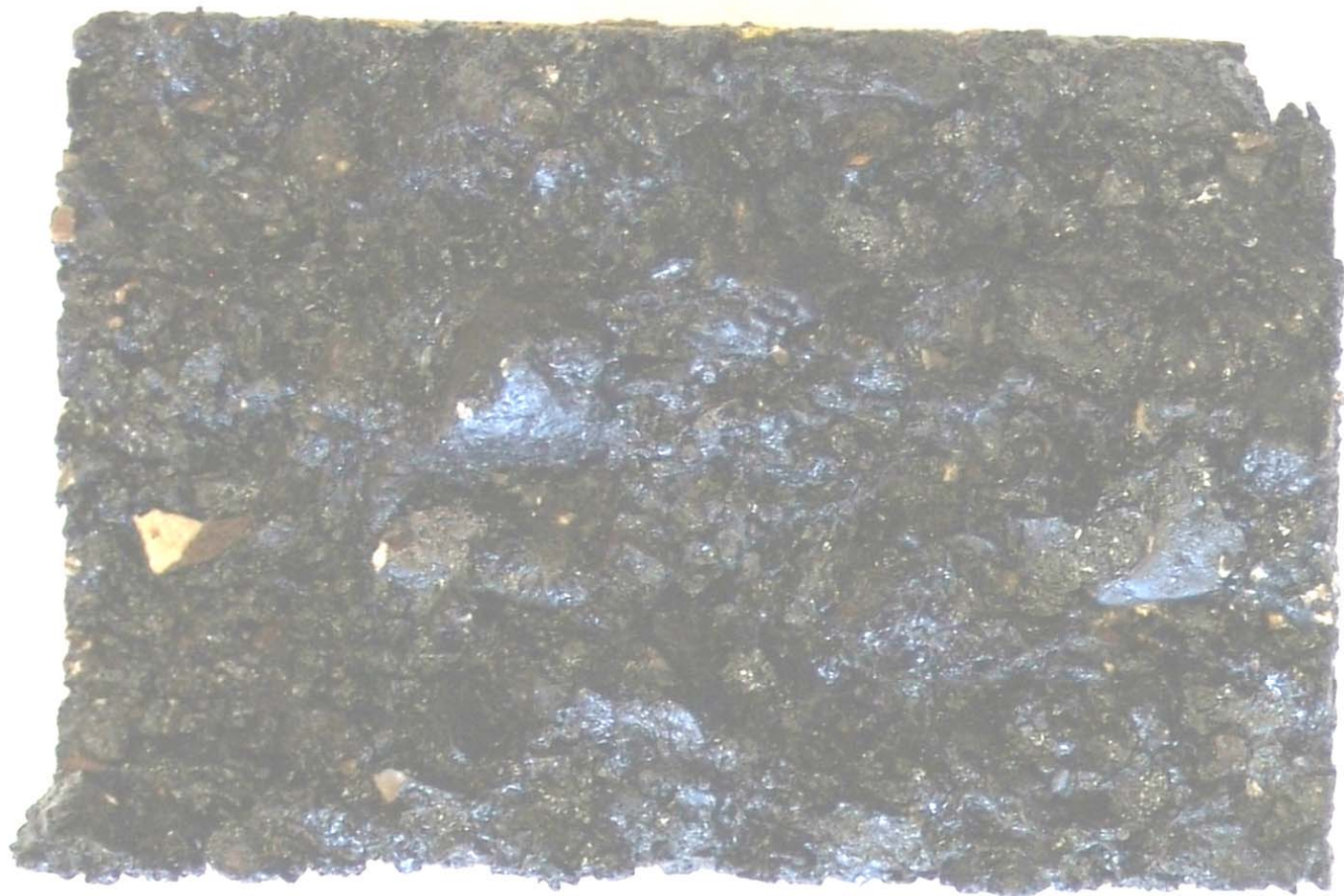
AASHTO T 283 Testing

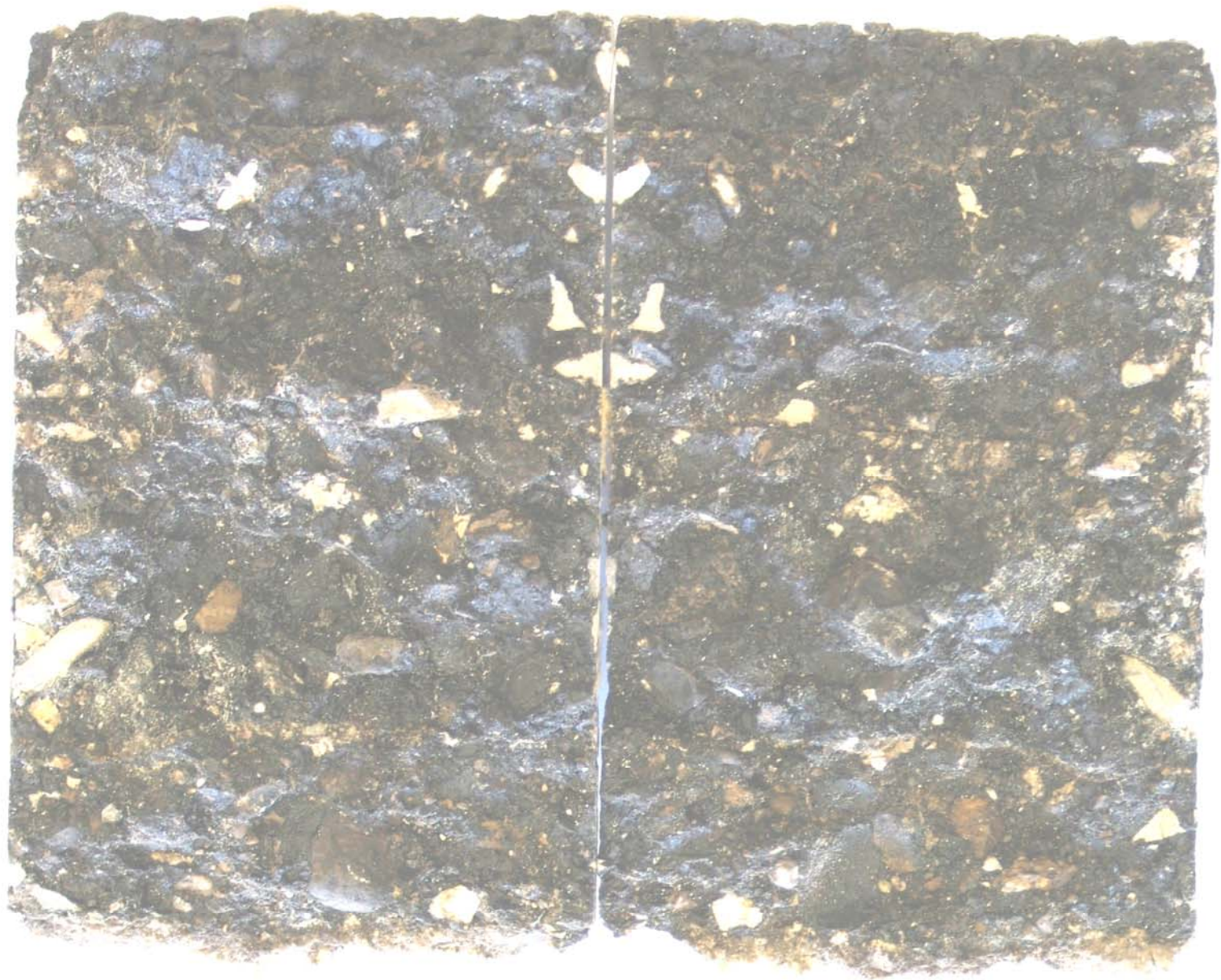
	<u>Asphalt</u>	<u>Additive</u>	<u>PSI</u>	<u>PSI</u>	<u>TSR</u>
	<u>%</u>	<u>%</u>	<u>Dry</u>	<u>Wet</u>	<u>%</u>
Min.	4.3	0.0	54.4	49.7	35.6
Max.	6.7	1.5	235.6	208.4	138.5
Avg.	5.5	1.0	135.0	115.2	86.2
S.D.	0.49	0.33	35.4	30.7	11.6





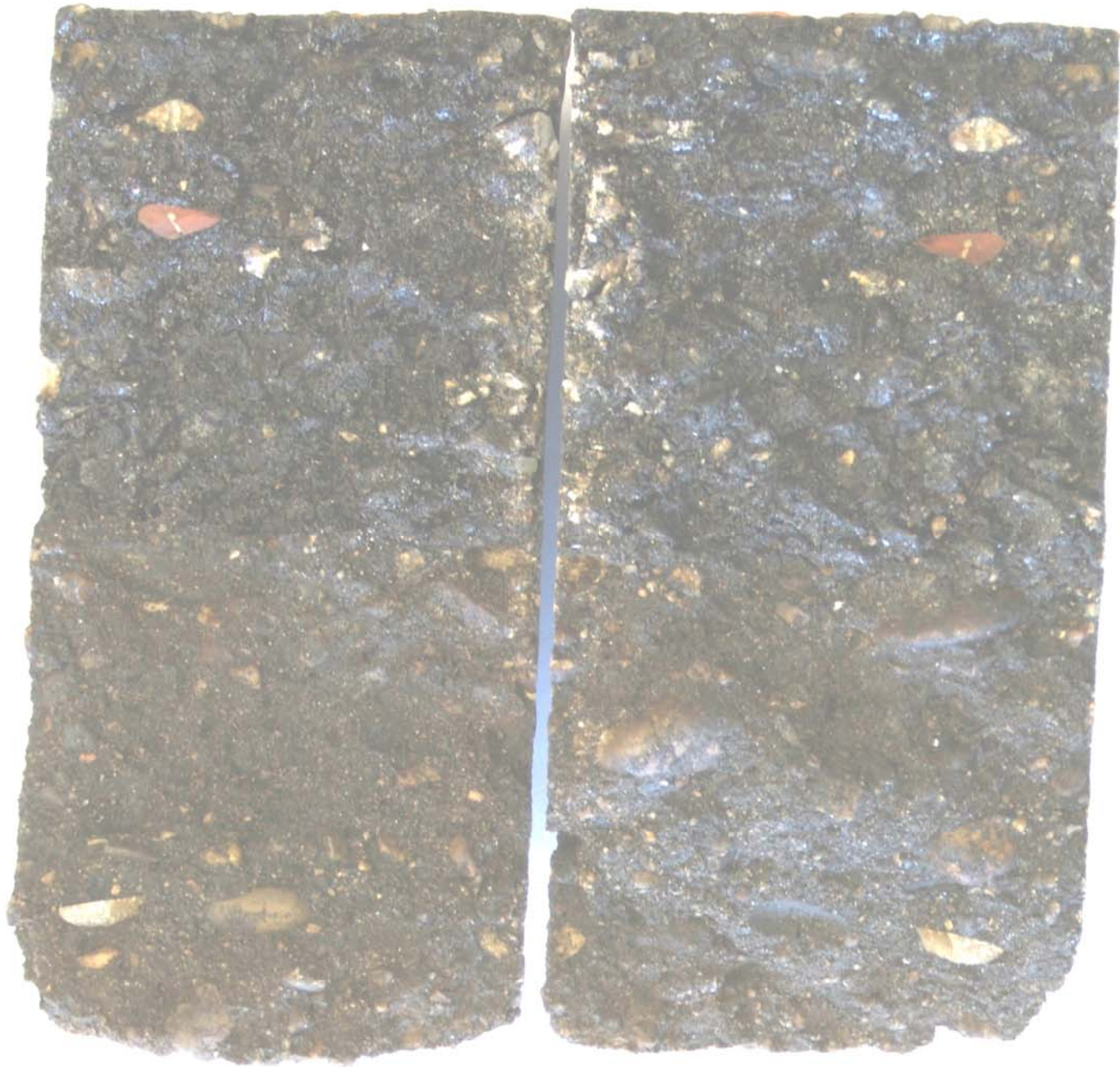


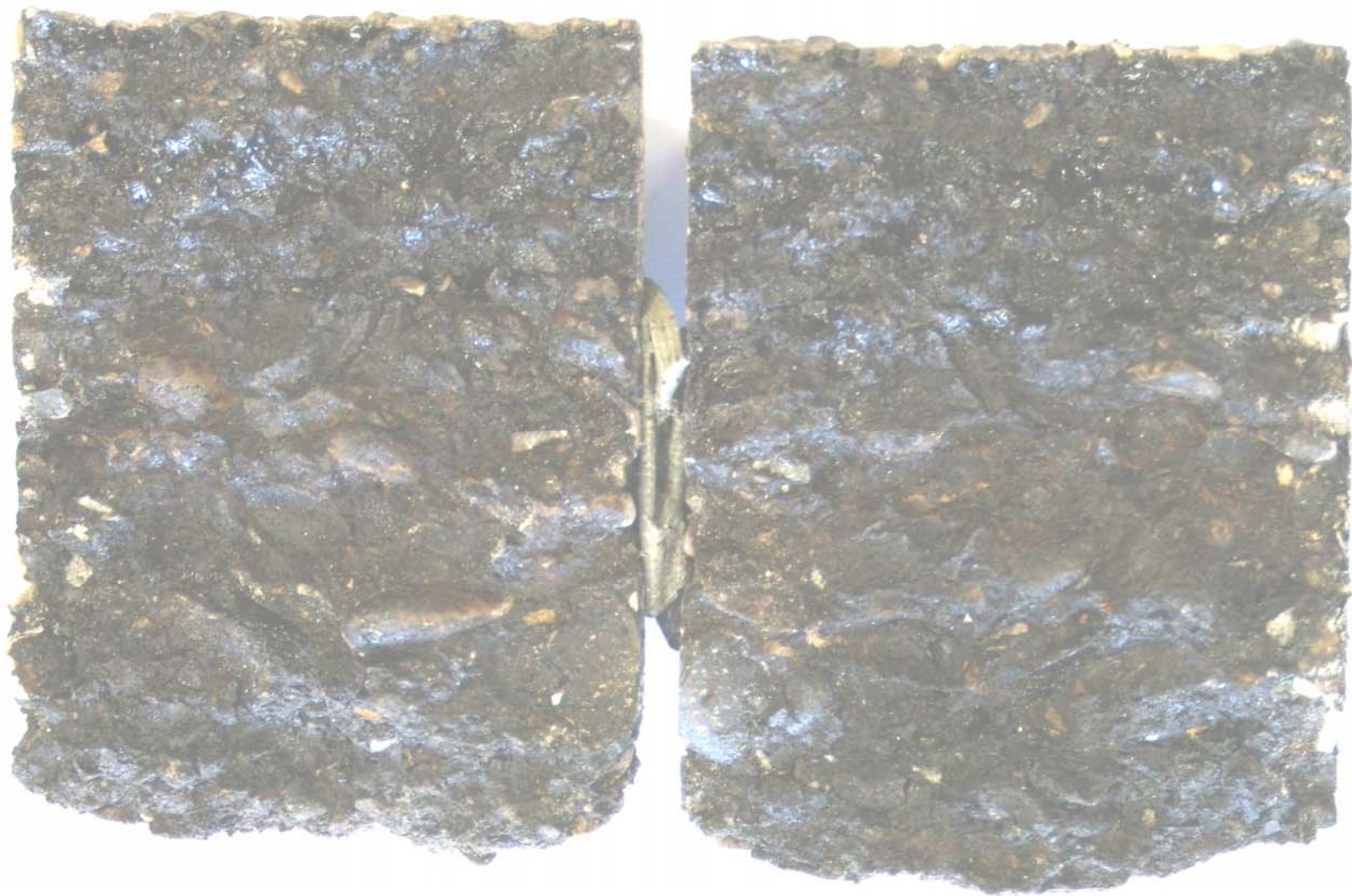














WYDOT Concerns

- How is stripping related to adhesion and cohesion?
- How is adhesion and cohesion related to mixture properties such as % binder, film thickness, flow, stability, voids, etc.?
- How can adhesion and cohesion be measured?
- What are the critical or acceptable limits for adhesion and cohesion?
- Will test results correlate to field performance?

WYDOT Concerns (continued)

- What properties or characteristics of aggregates and binders are critical for adhesion ?
- How does gradation affect adhesion?
- How should aggregate be produced to maximize adhesion (fractured faces, pre-coat, etc.)?
- Is ‘compatibility’ important? How is it measured?
- How can ‘compatibility’ tests be standardized?
- What are the critical values for ‘compatibility’?

Testing Constraints

- Procedure and apparatus need to be
 - simple, user-friendly (field technicians, etc.)
 - field portable
 - real-time data capability
 - frequent, repeated use during project construction (e.g., aggregate source changing every 10 miles for projects in Western Wyoming)
 - rugged
 - accurate/reliable
 - economical

Acknowledgements

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Questions ???