

A Refiners View of Superpave Specifications



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Husky Oil



Introduction

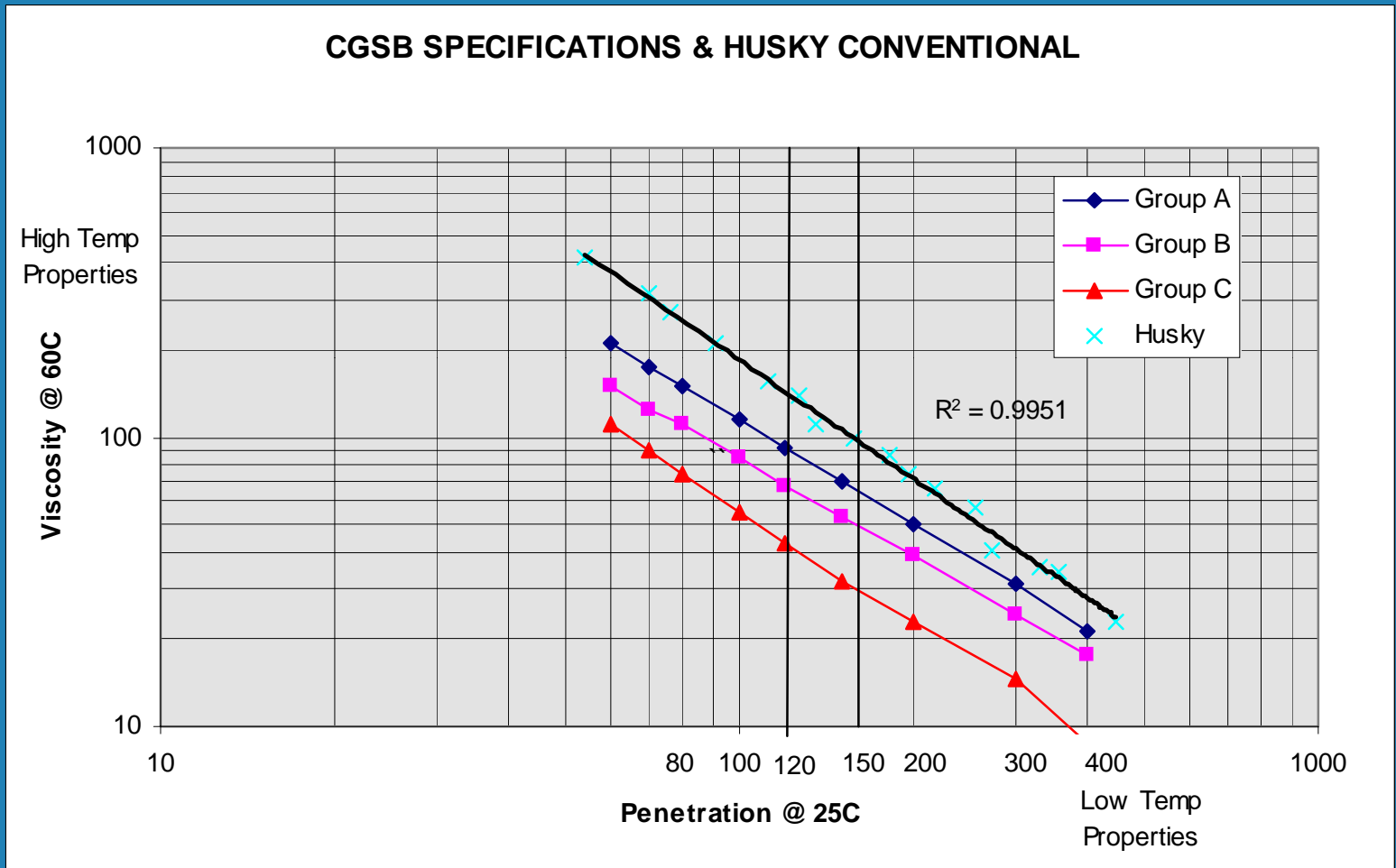
- ✧ Husky Oil - Asphalt Refining
 - 1938 - Cody, 1947 - Lloydminster
 - Expansions 1963 & 1983
 - Blow Stills - 1950
 - Emulsions - 1982
 - Polymer Plant - 1986
- ✧ Making "Modifieds" in the 70's
 - Sulphur, asbestos, 'CAC'



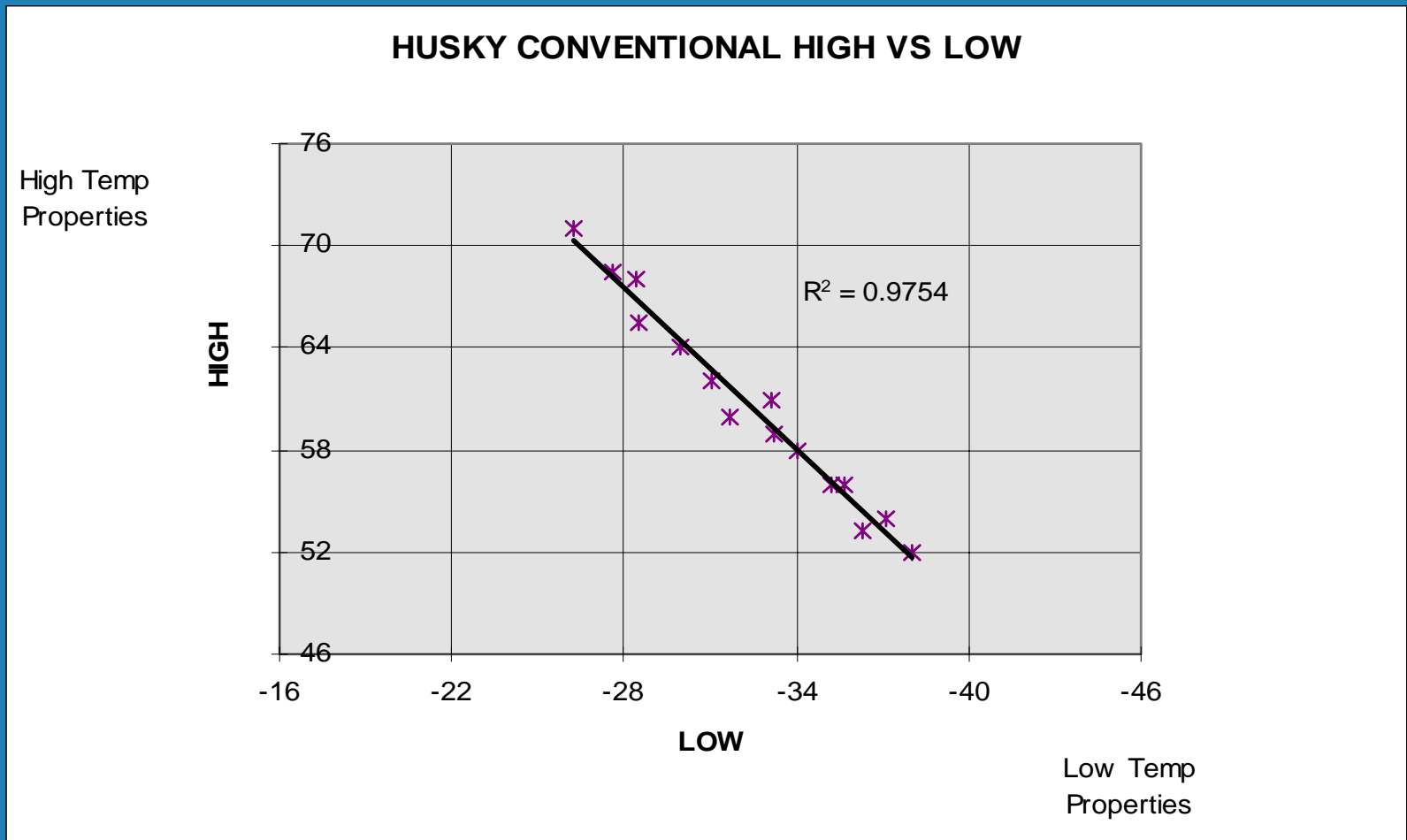
Producing Superpave Binders

- * Integrated vs Asphalt Refineries
- * Crude Oil Slate
- * Refinery Processes
 - Atmospheric Distillation
 - Vacuum Distillation
 - Solvent Refining (Blending)
 - Air Blowing

Producing Asphalt at Husky

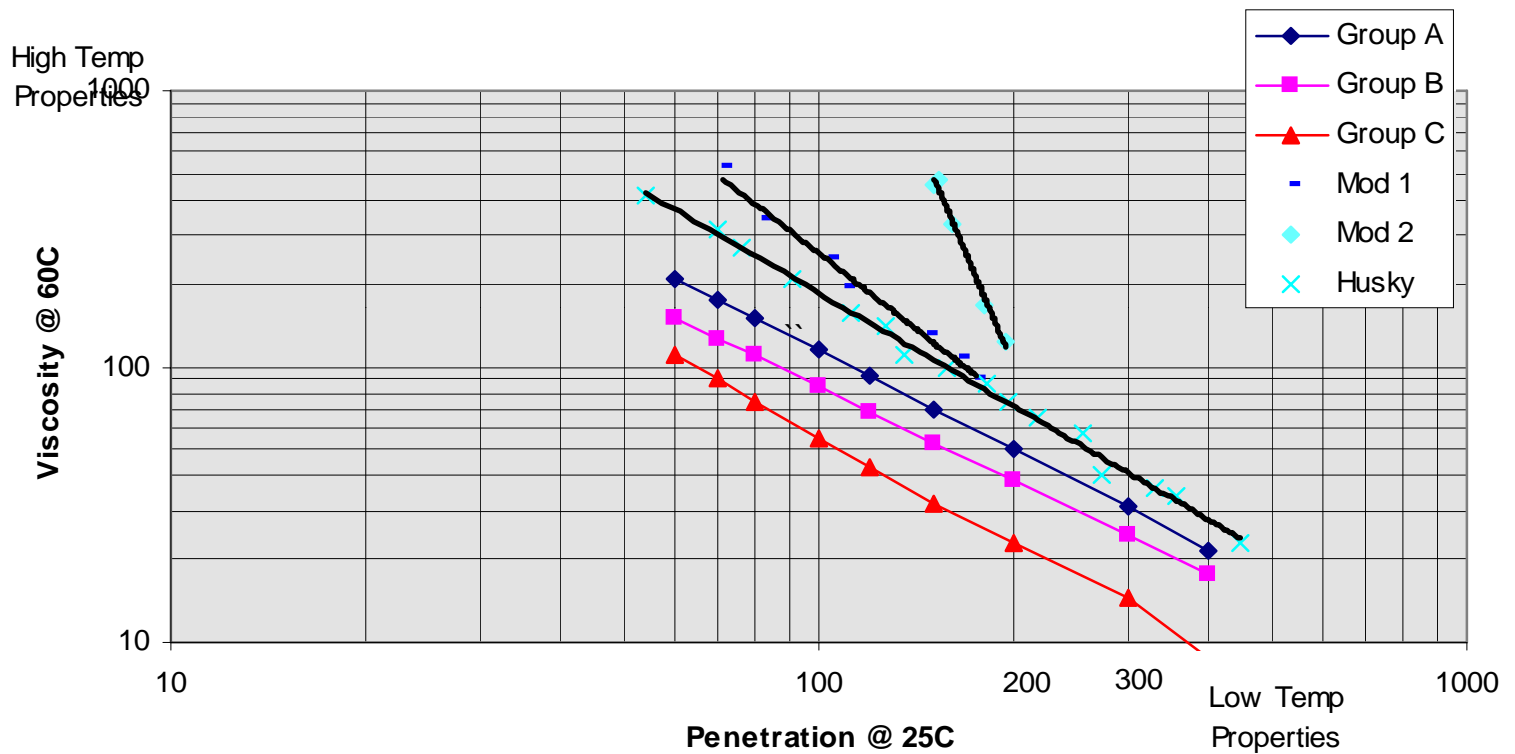


Producing Asphalt at Husky

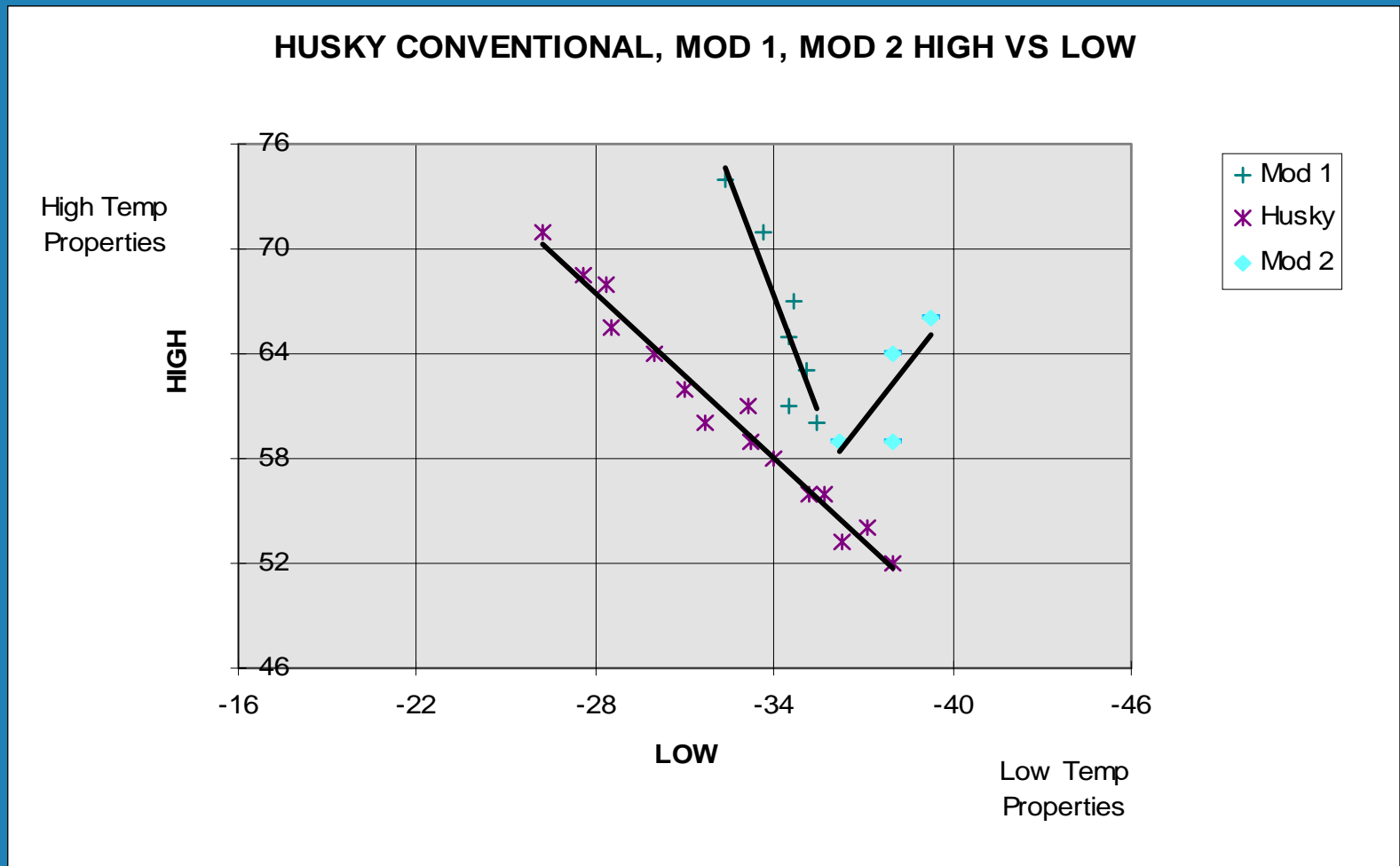


Producing Asphalt at Husky

CGSB SPECIFICATIONS, HUSKY CONVENTIONAL & HUSKY MODIFIED 1,2



Producing Asphalt at Husky



PG Asphalts @ Husky

* The Dream

- Early 90's MP1 - universal by 2000
- Two straight run asphalt grades
 - PG 64-28, PG 52-34
- Six modified asphalt grades
 - PG 70-28, 70 - 34, 64-34, 64-40, 58-34, 58-40
 - Performance based specs that were “blind’ to materials and production processes used

Development of Asphalt Specs

- * 1889 - Bowen develops penetration test
 - 1900's - local basis - 88 'grades'
- * 1926 - Penetration standardized
 - AI - national - 10 'grades'
- * 1960's - Penetration still standard
 - 30 different tests developed
 - typical spec had 6-15 tests
 - Pen @ 25C only common test among all specs

Development of Asphalt Specs

- * Characterizing Materials
- * Consistency - empirical to engineering properties, original to aged
 - Penetration (1889)
 - Softening point (1919)
 - Viscosity
 - Aging - TFOT (1941)
- * Temperature Susceptibility
 - PI, PVN, Pen / Viscosity Specs

Development of Asphalt Specs

- ✧ Eliminating types of materials
- ✧ Ductility test (1903)
 - air-blown asphalts, some waxy asphalts
 - some high ductility have high temp suscp.
 - some polymers improve engineering properties but lower ductility
 - Some additives improve ductility only
- ✧ Spot Test - Heterogeneity (1933)
 - 'cracked' asphalts or heavily blown

Implementing PG Specifications

- * SHRP - 1987 (5 year, \$50 million)
- * AASHTO MP1 - Provisional (~1993)
 - Performance based specification
 - Measure physical properties
 - Correlates to field performance
 - Low temp. properties and long term aging
 - Binder selection method
 - Modified and non-modified asphalts



Using PG Specifications

- * 2000 - Still under development
 - low temp Direct tension/BBR method
 - Fatigue measurement
 - Modified asphalts
 - Binder selection - low temp.



Using PG Specifications

- * Today mix of PG based and old standards
- * Need to supply flux and base materials
- * PG Plus Specs
 - Additional tests
 - Ductility, Elastic recovery
 - Split Grades
 - Different specification limits



Producing PG Asphalts at Husky

- * PG 58-28
 - 3 different materials
- * PG 64-28
 - 4 different materials
- * PG 58-34
 - 3 different materials



Using PG Specifications

- * Back to 1900's ??
- * Characterizing materials
- * Eliminating poor performers
- * Choosing binders based on available grades or lowest up front cost



What have we achieved

- * Better ways of measuring temperature susceptibility
- * Better method of simulating in service properties
- * Better methods for choosing binder grade
- * A start towards universally defining higher performing (modified) asphalts



Where do we go?

- * Continue to improve existing tools and methods
- * Continue to develop new tools and methods
- * Producers / users / academics continue working together
- * It will take time and there will be problems but the results will be worth it!