

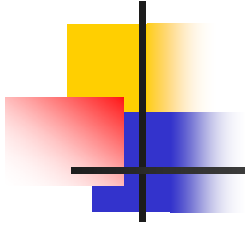
Appropriate Applications of Chemical Modification

**Association of Modified Asphalt
Producers**

AMAP 7th Annual Meeting

Orlando, FL

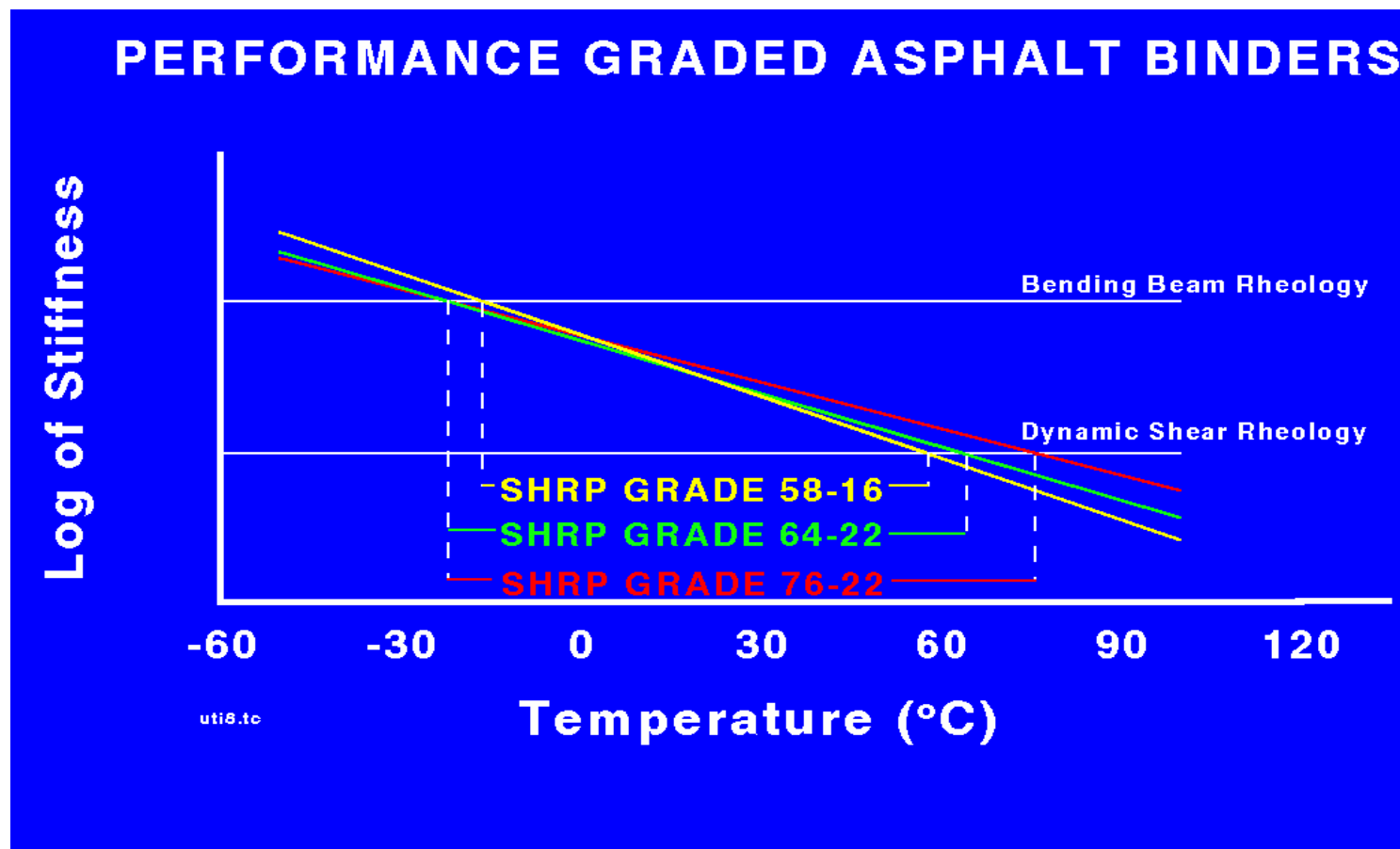
13- 15 February 2006

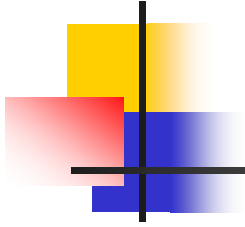


Appropriate Applications of Chemical Modification (Imposters)

The Acid Test







The thing that hath been is that which shall be; and that which is done is that which shall be done: And there is nothing new under the sun.

Ecclesiastes 1, 9



Non-Polymer Modification

- Process
 - Air Blowing
 - Refining Fractions
- Bitumen
 - Gilsonite
 - Petroleum Pitch
- Fillers
 - Hydrated Lime
 - Carbon Black
- Chemical
 - Polyphosphoric Acid
 - Malaeic Anydride
- Wax
 - Sosobit
 - Bis-Amide
 - Montan
- Post Industrial Waste
 - Zuppaphalt



PG76-22 from Saudi Asphalt

PG Grade Achieved	76-22	76-22	76-22	76-22
PPA %	0	0.2	0.4	0.6
Polymer %	4.75%	4.10%	3.75%	3.40%
Brookfield Vis.@ 135	2950	3870	3290	2230
ODSR	1.606	1.532	1.561	1.534
Phase Angle	67.1	64.5	66.2	69.2
Wt. Loss	-0.105	0.21	-0.053	-0.034
RDSR	2.378	2.613	2.569	3.03
PDSR	1198	1126	1422	1276
BBR S Value	125	142	148	143
BBR M Value	0.325	0.335	0.332	0.327
Elastic Recovery	87.50%	86.70%	85.00%	85.00%

PG76-22 from Venezuelan Asp

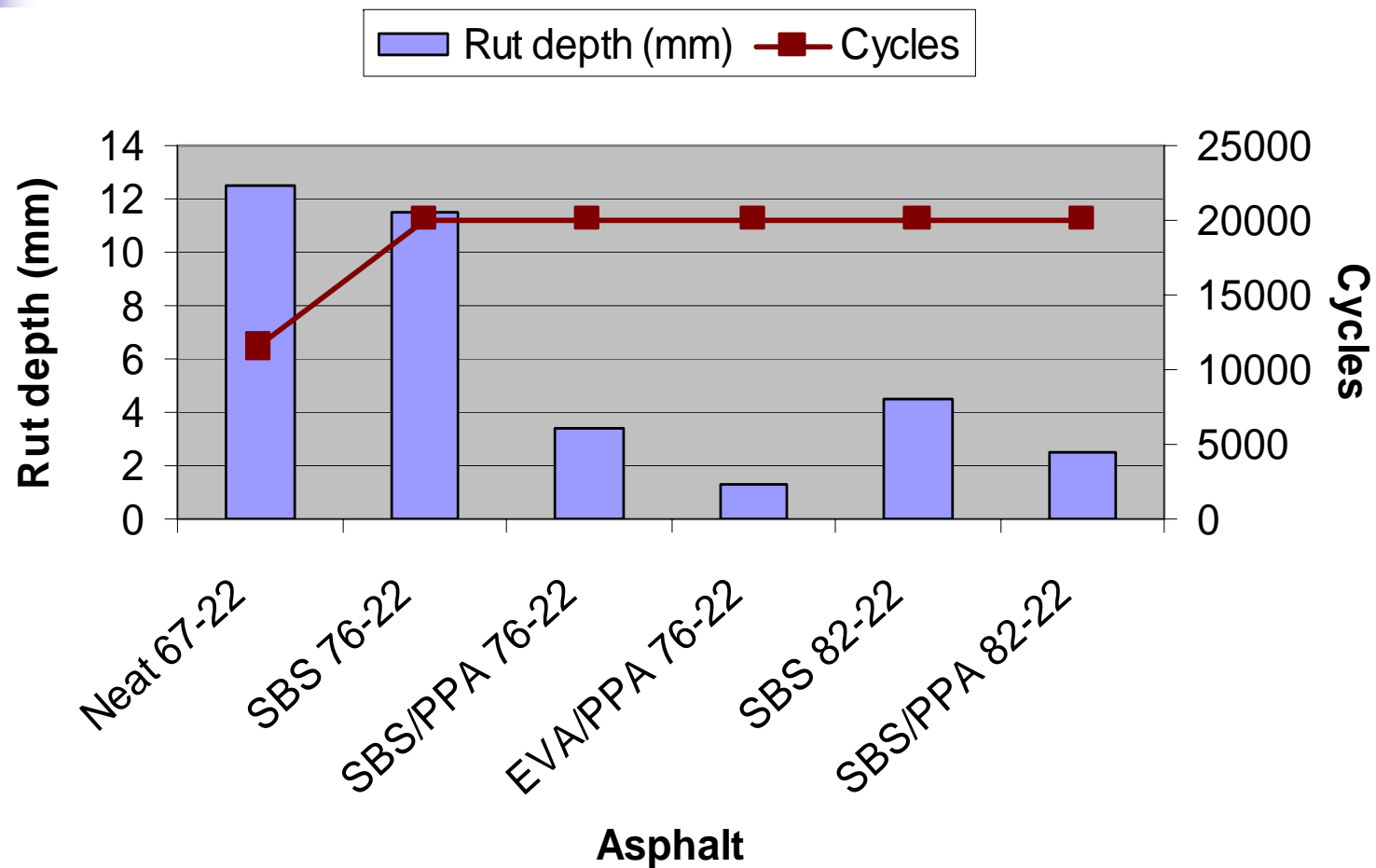
PG Grade Achieved	76-22	76-22	76-22	76-22
PPA %	0	0.2	0.4	0.6
Polymer %	4.25	3.75	2.9	2.6
Brookfield Vis.@ 135	2350	2030	1510	1360
ODSR	1.557	1.524	1.366	1.42
Phase Angle	68.7	68.6	78.3	79.4
Wt. Loss	0.012	-0.024	0.23	0.008
RDSR	2.472	2.802	2.281	2.58
PDSR	1424	2038	1804	1934
BBR S Value	138	150	163	172
BBR M Value	0.32	0.31	0.311	0.306
Elastic Recovery	80.00%	77.50%	69.00%	64.00%

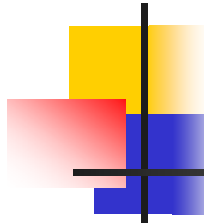


PG76-16 from CA Valley

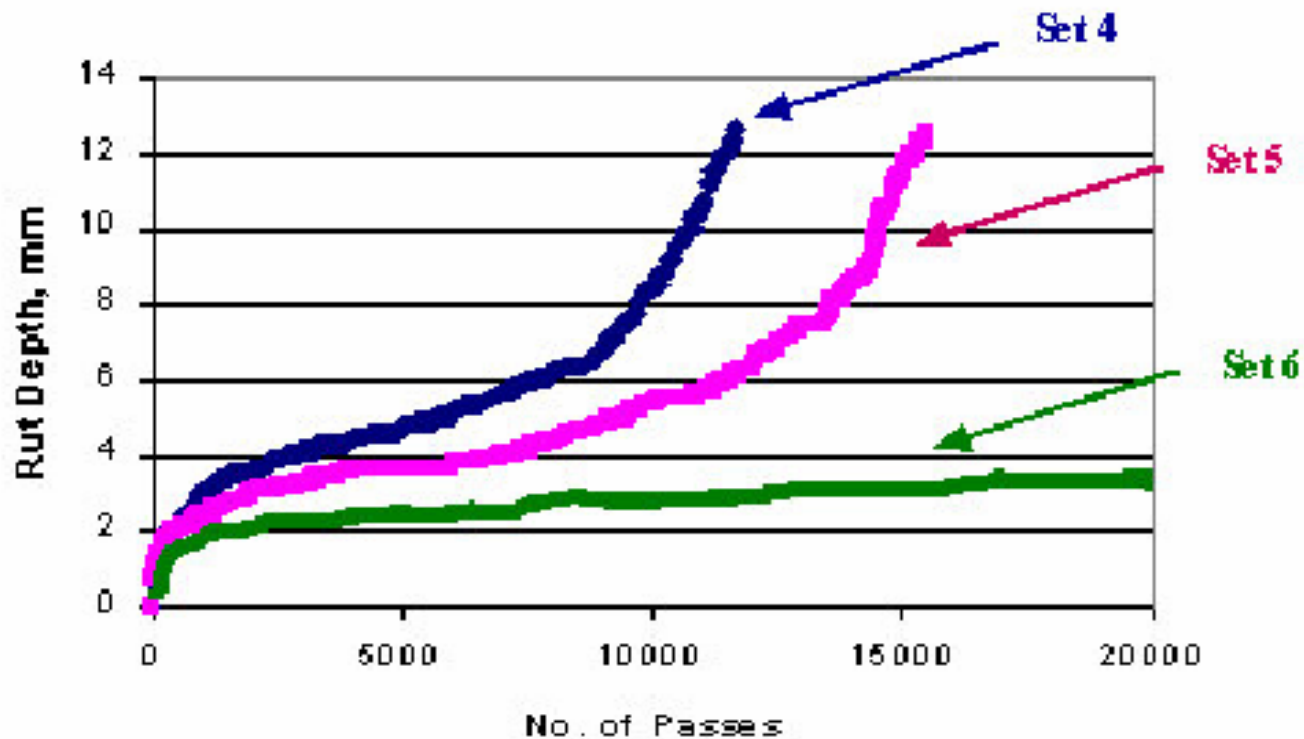
PG Grade Achieve	76-16	76-16	76-16	76-10
PPA %	0	0.2	0.4	0.6
Polymer %	5.5	4.4	3.8	3.25
Brookfield Vis.@ 135	2060	1450	1310	1140
ODSR	2.092	1.595	1.414	1.253
Phase Angle	55.8	61.5	67.3	72.2
Wt. Loss	0.11	0.24	0.127	0.049
RDSR	2.327	2.521	2.335	2.296
PDSR	1959	2203	2782	1719
BBR S Value	211	286	291	115
BBR M Value	0.337	0.317	0.312	0.425
Elastic Recovery	85.00%	87.50%	85.00%	82.50%

Hamburg Wheel Tracking Venezuelan Asphalt/Granite Agg.





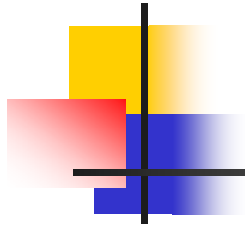
Hamburg Wheel Tracking Test



Set 4 : PG67-22

Set 5 : PG76-22 (PG67-22+4,25% SBS)

Set 6 : PG76-22 (PG67-22+2,6% SBS+0,6% PPA)



Conclusions

- Chemical Modifiers are a Valuable Tool
- Chemical Modifiers can be Use to Produce Quality High Performane Binders
- Custodians of the Publics Money