AAPA's 14th International Flexible Pavements Conference

Sydney
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Topic: The Stripping Potential of Aggregates in Warm Mix Asphalt

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Position: Chairman
Organisation: AAPA National Technical Committee

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Background

- All work has been undertaken by RTA.
- Overall concept and interpretation from an AAPA member perspective.
- RTA has some concern regarding the potential for moisture damage to occur to warm mix asphalt.
- Extension of work previously undertaken and presented at the 2007 AAPA Conference.

Background cont'd

- Specification requirement (R116 Ed7/Rev0) – minimum curing temperature to achieve ≤10% stripping.
- Applicability of a plate stripping test to asphalt?

Current Work

- Evaluation included:
  - 26 aggregates
  - 7 binders (2xC320, AR450, 2xMultigrade, A15E and A35P)
  - 124°C, 100°C and 76°C (no adhesion agent)
  - 100°C, 76°C and 52°C (adhesion agent incorporated)
  - 24 hour embedment at the curing temperature

Current Work cont'd

  - 4 day soak @ 40°C (23°C for the 52°C cured samples)
- AR450 (no adhesion agent) samples cured at 76°C were retested without the 4 day soak
  - Soaked: average 74% stripping
  - Unsoaked: average 2% stripping
- Over 900 plates were prepared and tested.

Data Analysis

- Significant amount of data
  - Stripping data for AR450 at 100°C curing
  - Stripping data for each aggregate-binder combination at all curing temperatures
  - Calculation/interpolation of $T_{10\%}$ (estimated curing temperature at which a maximum of 10% stripping occurs)

Data for AR450 at 100°C curing

Aggregate Source ID	% Stripped	Aggregate Source ID	% Stripped
A	99	N	43
B	99	O	55
C	77	P	13
D	84	Q	13
E	88	R	4
F	73	S	12
G	96	T	35
H	70	U	6
I	63	V	2
J	69	W	3
K	60	X	3
L	64	Y	5
M	94	Z	1

Sample of data for each aggregate-binder combination at all curing temperatures

Aggregate	Binder	52°	76°	100°	124°	$T_{10\%}$
O	AR450		76	55	12	117
F	AR450		97	73	26	130
R	AR450		64	4	2	96
A	AR450		100	99	15	130
A	AR450 + AA1	21	6	1		58
H	AR450		100	70	11	123
Y	AR450	26	19	3	4	81
U	AR450		38	6	0	87
H	A15E		70	82	38	132
H	A15E + AA2	99	30	5		86

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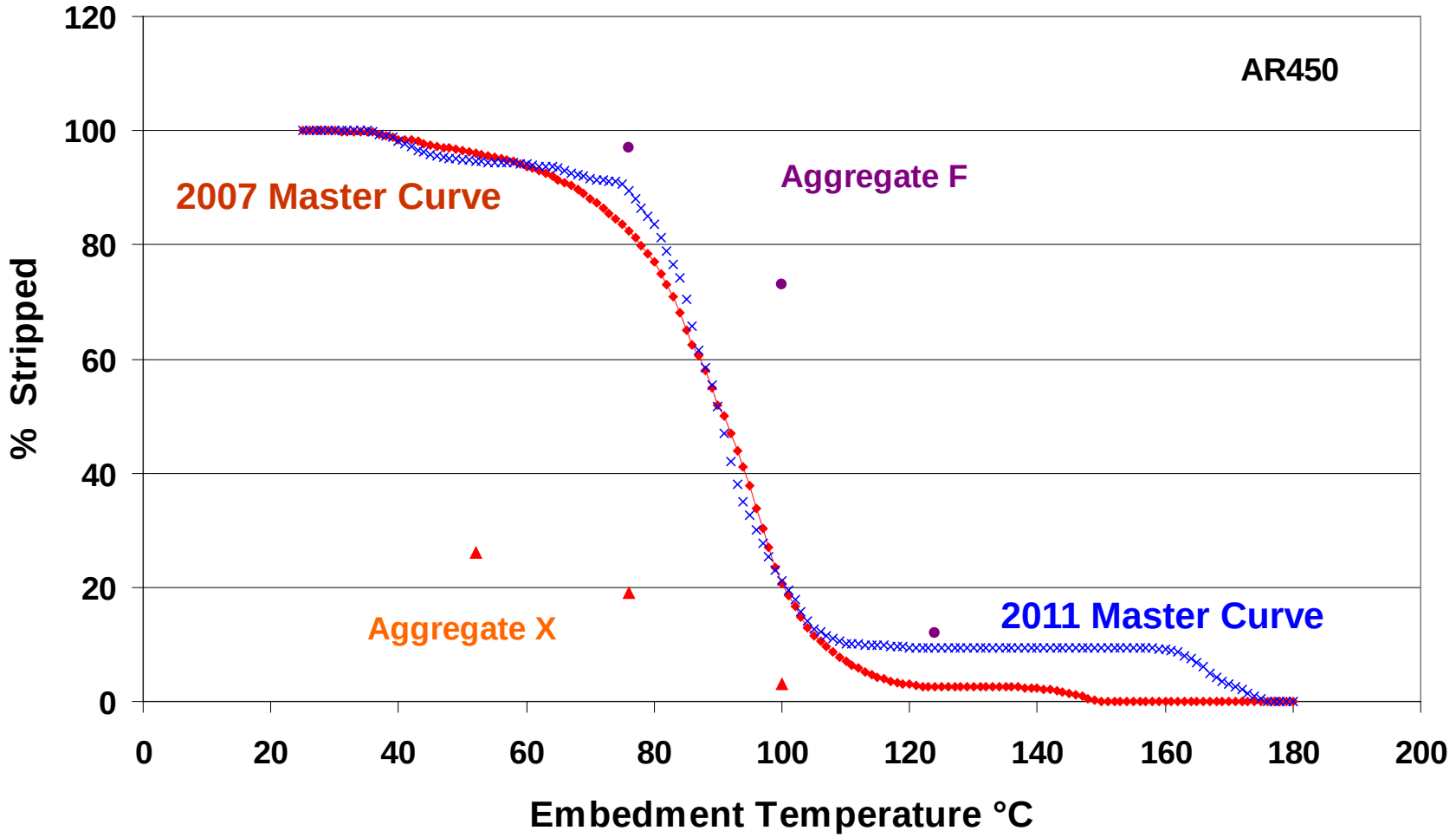
Master Curve



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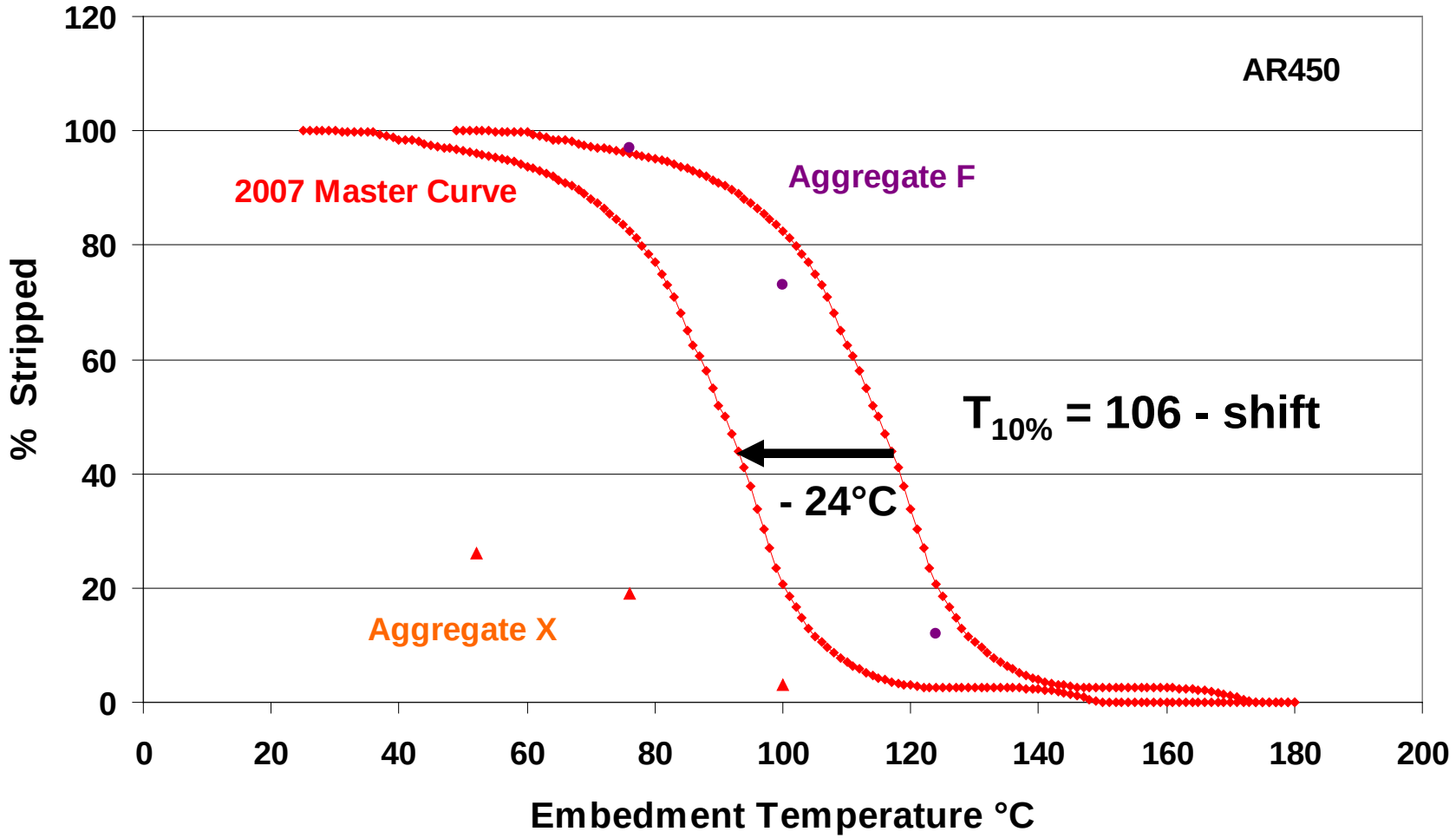
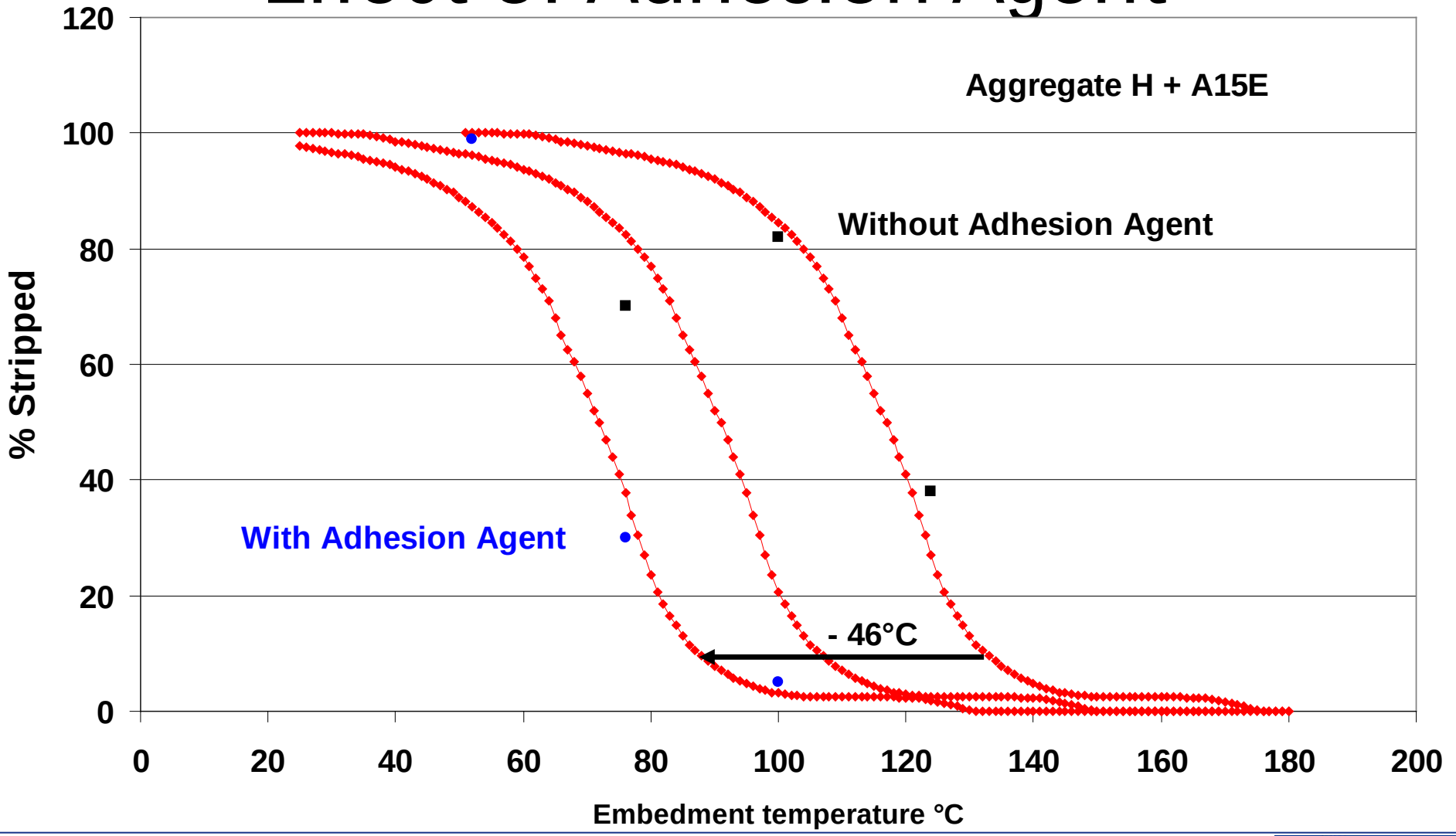
Master Curve with Shift



Effect of Adhesion Agent



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Additional Comment

- Ranking of aggregates in order of stripping potential.
- The risk of not exceeding the embedment temperature ($T_{10\%}$) for 24 hours?
- Is moisture damage an issue for WMA?
- Was the work undertaken a waste of time?

Thank You.

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