

BITUMEN EMULSIONS : MARKET REVIEW AND TRENDS

Étienne le Bouteiller – IBEF Executive Director



OUTLINE

The International Bitumen Emulsion Federation

Market review

New needs and trends

Polymer modified emulsions

Conclusion

THE IBEF

An association founded in 1996 by 6 initial members: AEMA (USA), ATEB (Spain), FBS (Germany), SFERB (France), SITEB (Ital), REA UK)

A federation of national associations

20 countries represented

A forum of exchanges and promotion of best practices: techniques, safety, promotion, standardization



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BITUMEN EMULSION

- A transnational approach
- A commitment to collaboration
- Emulsion as a source of innovation
- Promotion of high-performance techniques

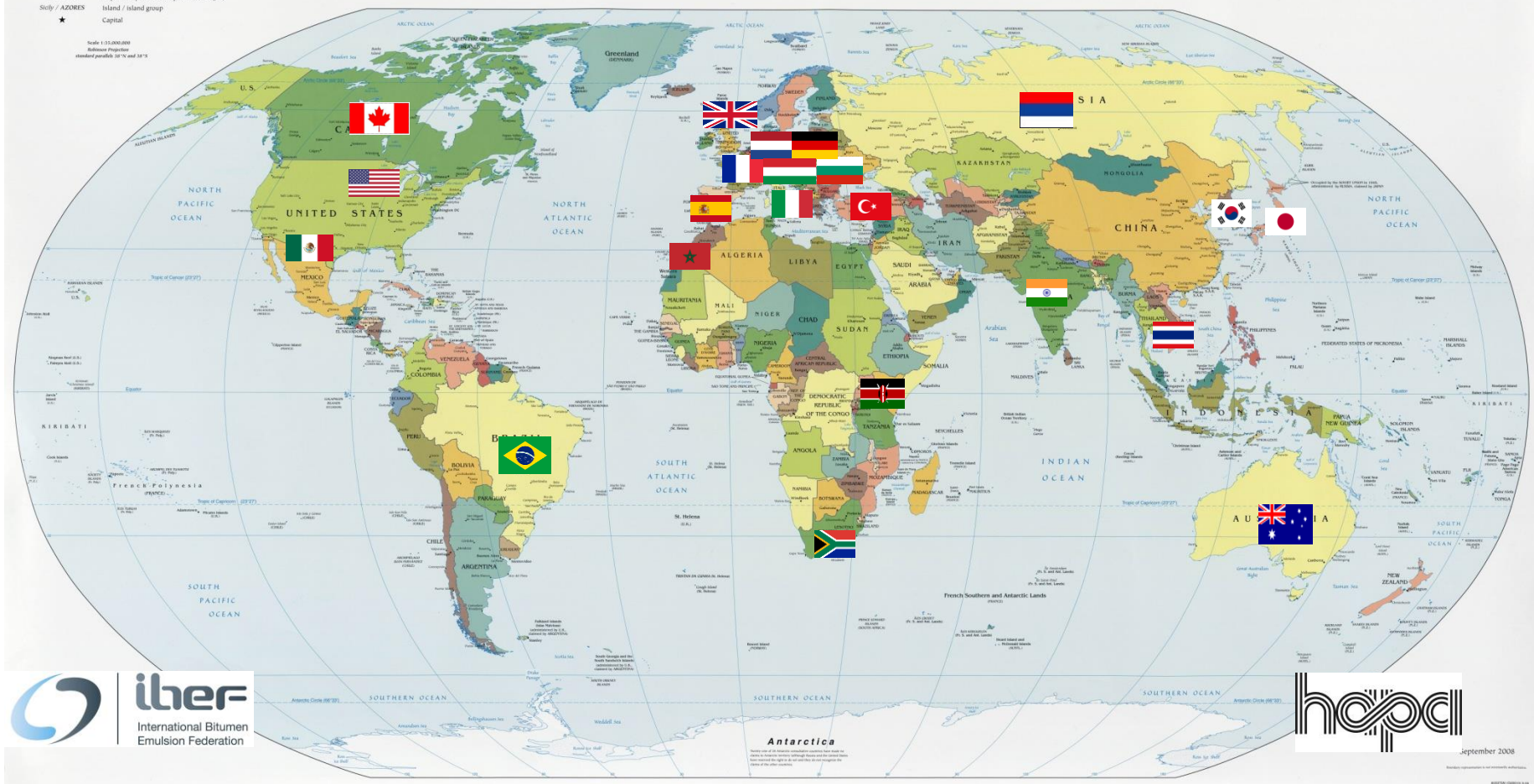


THE IBEF

Political Map of the World, September 2008

AUSTRALIA
Bermuda
Sicily / AZORES
★
Independent state
Dependency or area of special sovereignty
Island / island group
Capital

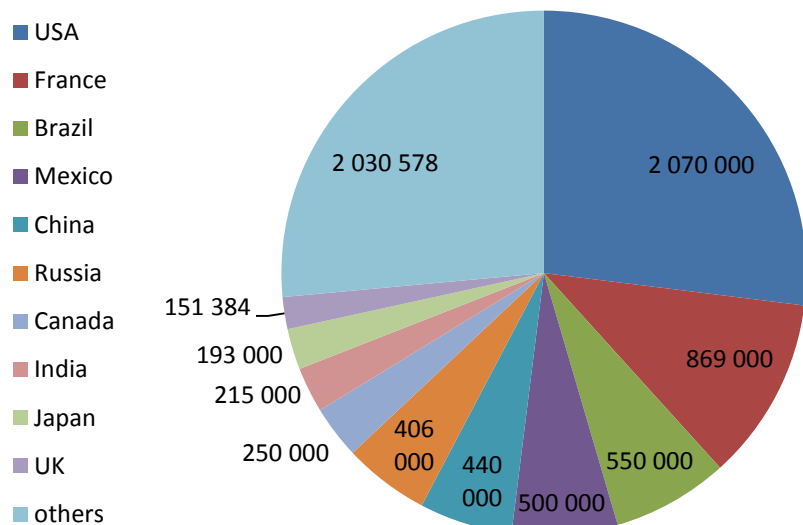
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Reference: Projection
standard parallel 30°N and 30°S



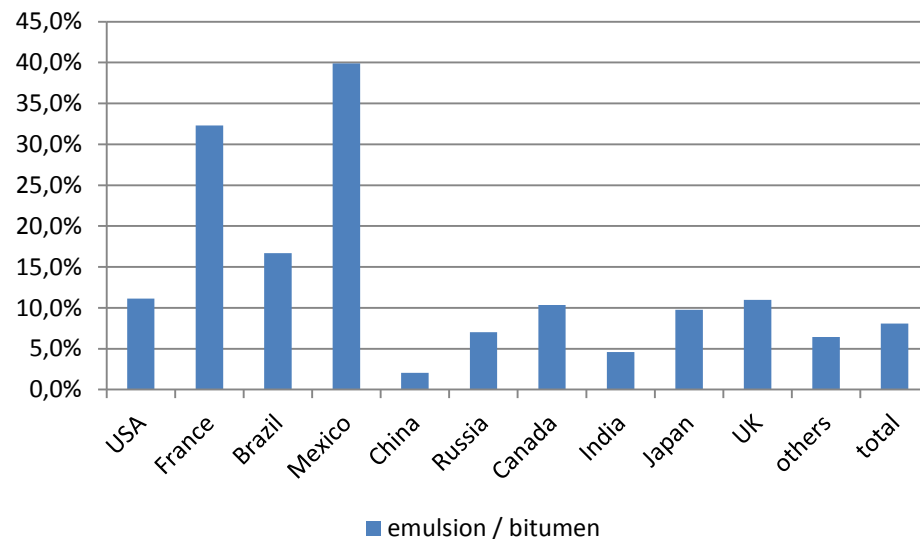
MARKET REVIEW

Hungary (2015)

Emulsions	12 kT
Bitumen	190 kT
Ratio	7,5%

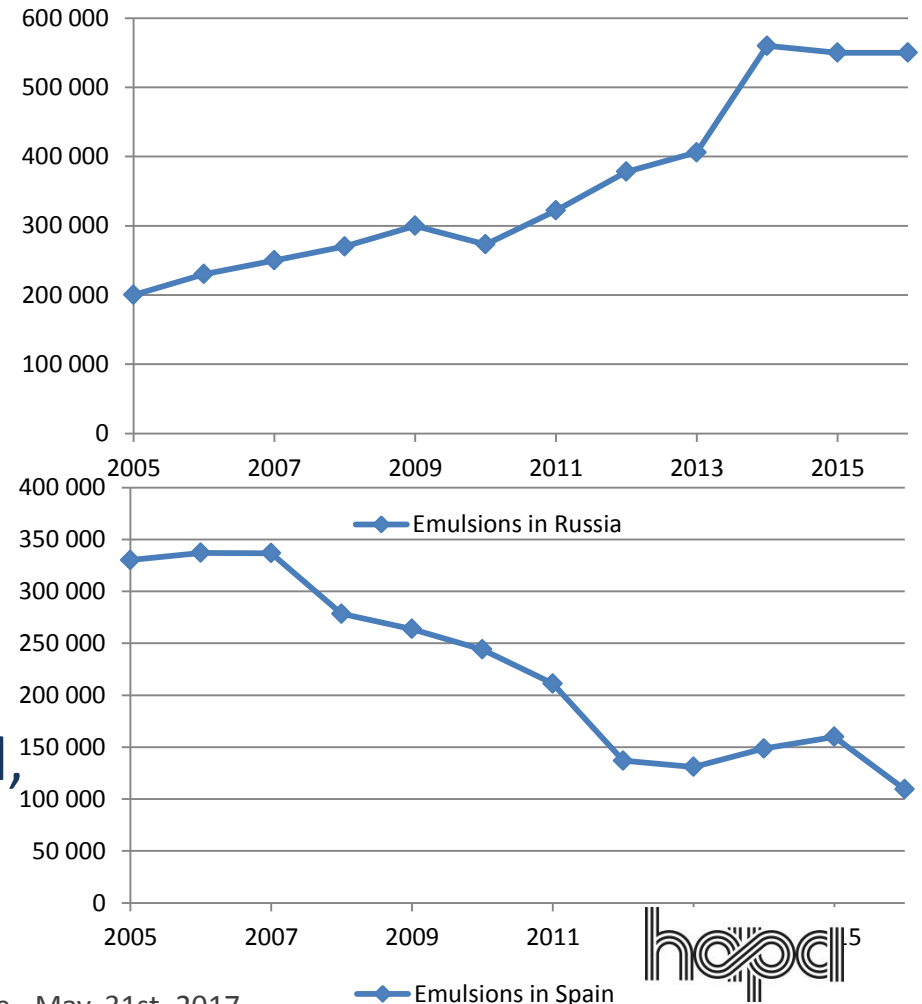


2013



MARKET REVIEW

- Stable over the last decade
- Disparities according to regions and markets
- Strong impact of the 2008 financial crisis in developed countries (USA, Europe, Japan)
- Compensation in emerging markets such as Russia, Brazil, India



MARKET REVIEW

- Data collection can be difficult in some countries; e.g. USA, China
- Some associations keep accurate figures; e.g. Japan, UK, France
- A new survey has been launched; results to be announced for the PPRS NICE 2018

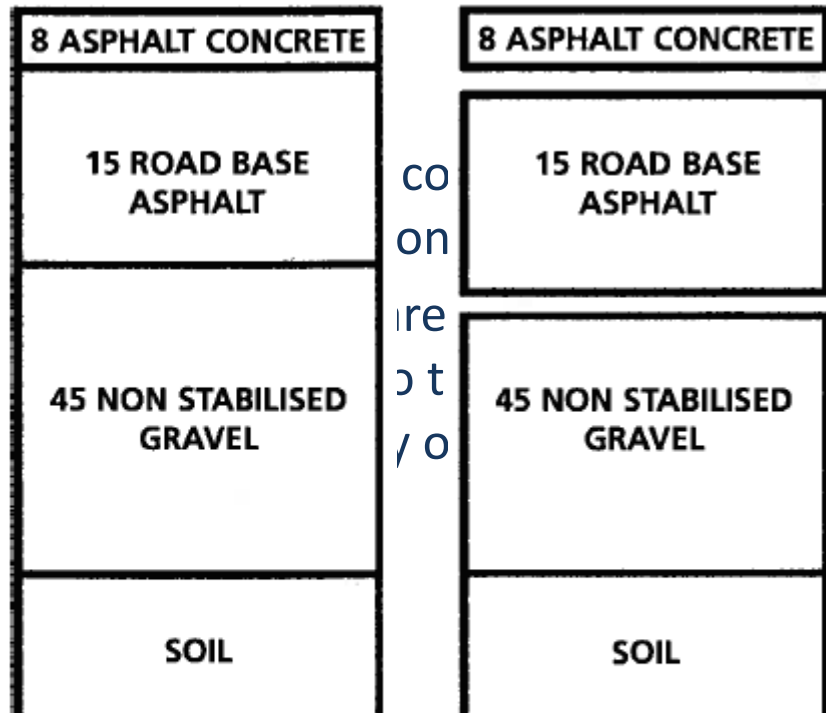


MARKET REVIEW

- Basic emulsions account for 50% of the volumes (estimation)
 - Tack coats
 - Prime coats
 - Seal coats
- Market increases with surface treatments
 - Surface dressing
 - Micro surfacing



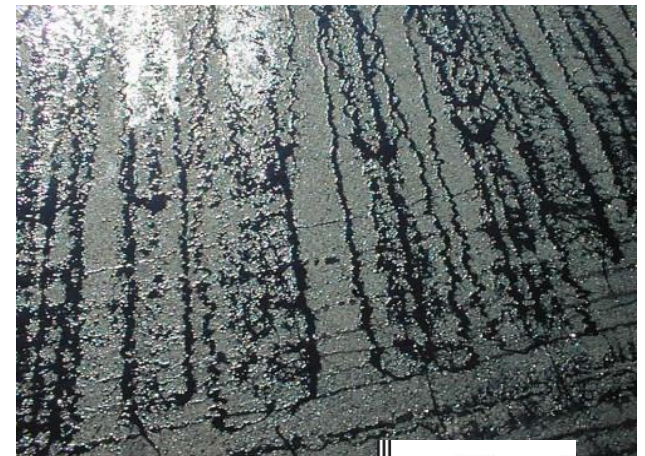
MARKET REVIEW



15 years



6 months



International Bitumen
Emulsion Federation

HAPA Conference - May. 31st, 2017



KEEP THE INTEGRITY OF THE PAVEMENT STRUCTURE

Tack coat

Tack coat

Tack coat

Prime coat

Road base asphalt 12 cm

Road base asphalt 13 cm

Crusher run 50 cm

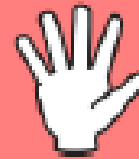
sub-base $E = 50 \text{ MPa}$

KEEP THE INTEGRITY OF THE PAVEMENT STRUCTURE



Tack Coats

Tack coats are a bituminous product that are applied either on top of a primed granular base or between layers of asphalt, its function is to promote adhesion. Tack coats are also used to enhance adhesion along transverse and longitudinal joints in asphalt layers.



Use of Tack Coats

Due to the risk of poor adhesion, the use of a tack coat is always recommended, in all cases.

GUIDELINES FOR USING PRIME AND TACK COATS

Publication No. FHWA-CFL/TD-05-002

July 2005

MARKET REVIEW

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 - Surface dressing
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- Market increases with new needs for cost effective solutions for maintenance



NEW NEEDS

- Market increases with new needs for cost effective solutions for maintenance: preventive maintenance is more economical over the long term

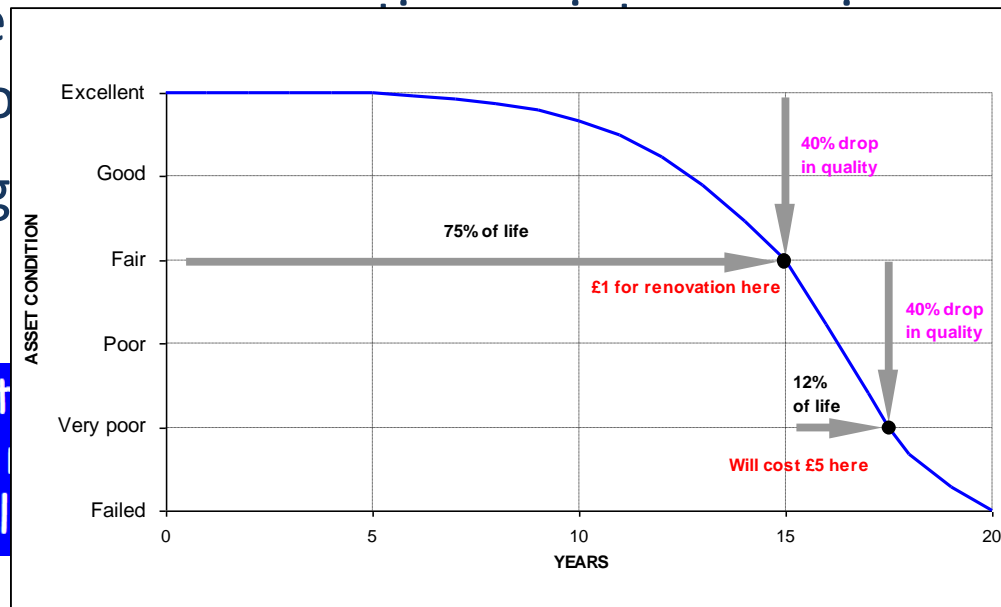


	strategy A		strategy B	
	cost	discounted cost	cost	discounted cost
year				
7	3,00 €	2,13 €		
14	3,00 €	1,52 €		
21	15,00 €	5,38 €	30,00 €	10,77 €
total	21,00 €	9,03 €	30,00 €	10,77 €
yearly equivalent cost (tx 5%)		0,43 €		0,51 €



NEW NEEDS

- Market increases with new needs for cost effective solutions for maintenance over the long term
- Keep the good



NEW NEEDS

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- Enlarge the approach to the whole community, i.e. road owners + road users

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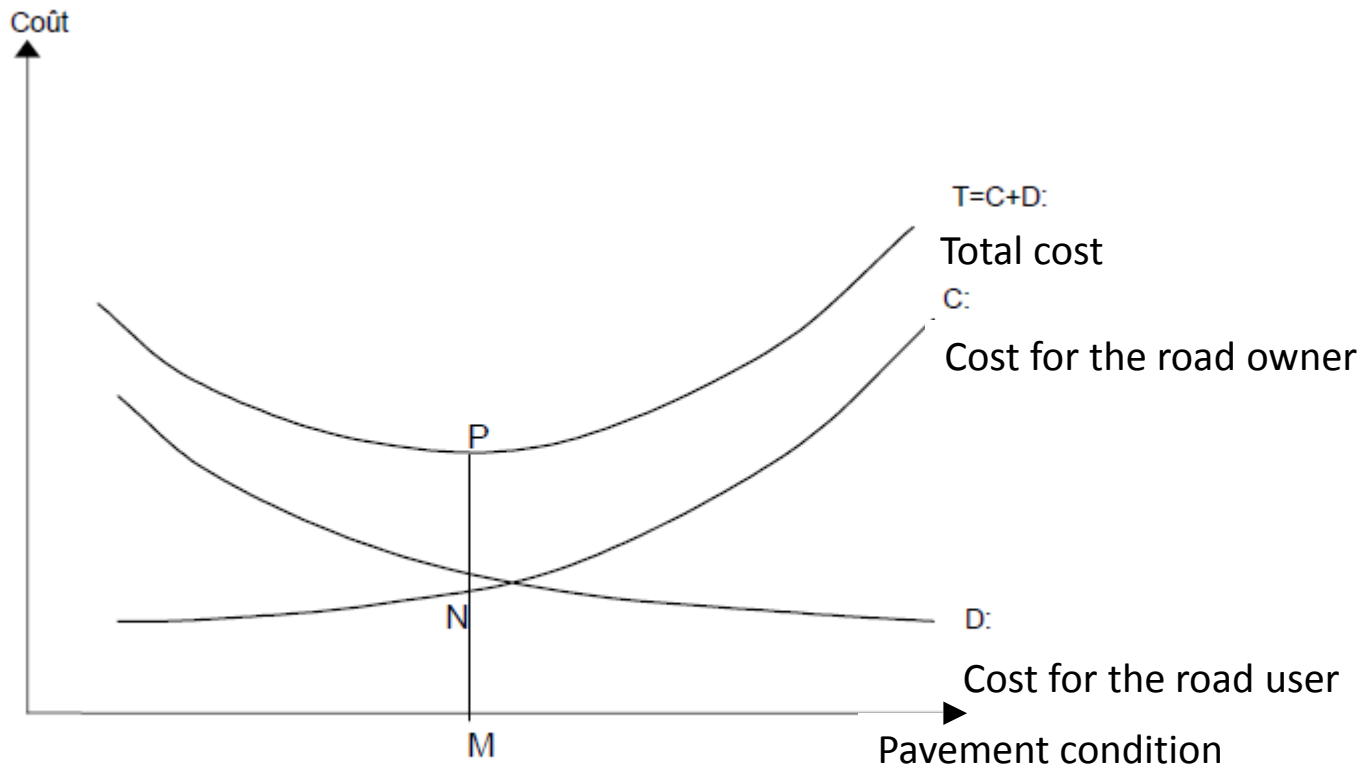


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NEW NEEDS

Figure 3.1. Approche économétrique pour optimiser la remise en état et l'entretien des routes



M = État optimal des routes..

MN = Budget nécessaire au maintien des routes à l'état optimal

MP = Coût total du maintien des routes à l'état optimal.

Source : OCDE, 1994.

NEW NEEDS

- Market increases with new needs for cost effective solutions for maintenance: preventive maintenance is more economical over the long term
- Enlarge the approach to the whole community, i.e. road owners + road users
- Needs for new materials and techniques: higher traffic roads



NEW NEEDS

- Needs for new materials and techniques: higher traffic roads
- New processes, new products



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POLYMER MODIFIED EMULSIONS

POLYMER MODIFIED EMULSIONS

- Higher traffic, higher stresses
- Higher stresses, improved characteristics

Table 4 — Specification framework for the technical requirements and performance classes for residual, recovered, stabilised and aged binders from cationic bituminous emulsions

Technical requirements	Document	Unit	Performance Classes for the technical requirements of cationic bituminous emulsions										
			Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11
Consistency at intermediate service temperature													
Penetration at 25 °C ^a	EN 1426	0,1 mm	DV	≤ 50	≤ 100	≤ 150	≤ 220	≤ 270	≤ 330	-	-	-	-
or Penetration at 15 °C ^a	EN 1426	0,1 mm	DV	-	-	-	-	-	-	90 to 170	140 to 260	180 to 360	-
Consistency at elevated service temperature													
Softening Point ^b	EN 1427	°C	DV	≥ 60	≥ 55	≥ 50	≥ 46	≥ 43	≥ 39	≥ 35	< 35	-	-
or Dynamic viscosity at 60 °C ^b	EN 12596 or EN 13302	Pa.s	DV	≥ 18	≥ 12	≥ 7	≥ 4,5	< 4,5	-	-	-	-	-
or Kinematic viscosity at 60 °C ^b	EN 12595	mm²/s	DV	≥ 16 000	≥ 8 000	≥ 6 000	≥ 4 000	≥ 2 000	< 2 000	-	-	-	-
Cohesion (modified binders only)													
Cohesion energy by tensile test (100 mm/min traction) ^c	EN 13587 EN 13703	J/cm²	DV	≥ 3 at 5 °C	≥ 2 at 5 °C	≥ 1 at 5 °C	≥ 2 at 10 °C	≥ 1 at 10 °C	≥ 0,5 at 10 °C	≥ 1 at 15 °C	≥ 0,5 at 15 °C	≥ 0,5 at 20 °C	≥ 0,5 at 25 °C
or Cohesion energy by force ductility (50 mm/min traction) ^c	EN 13589 EN 13703	J/cm²	DV	≥ 3 at 5 °C	≥ 2 at 5 °C	≥ 1 at 5 °C	≥ 0,5 at 5 °C	≥ 2 at 10 °C	≥ 1 at 10 °C	≥ 0,5 at 10 °C	≥ 0,5 at 15 °C	≥ 0,5 at 20 °C	-
or Cohesion by pendulum test ^c	EN 13588	J/cm²	DV	≥ 1,4	≥ 1,2	≥ 1,0	≥ 0,7	≥ 0,5	-	-	-	-	-
Brittleness at low service temperature (Fraass breaking point)	EN 12593	°C	DV	≤ -25	≤ -20	≤ -15	≤ -10	≤ -5	≤ 0	≤ 5	-	-	-
Elastic recovery at 10 °C (for elastomeric polymer binders)	EN 13398	%	DV	≥ 75	≥ 50	-	-	-	-	-	-	-	-
Elastic recovery at 25 °C (for elastomeric polymer binders)	EN 13398	%	DV	-	-	≥ 75	≥ 50	-	-	-	-	-	-

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FIELD GUIDE FOR POLYMER MODIFIED ASPHALT EMULSIONS

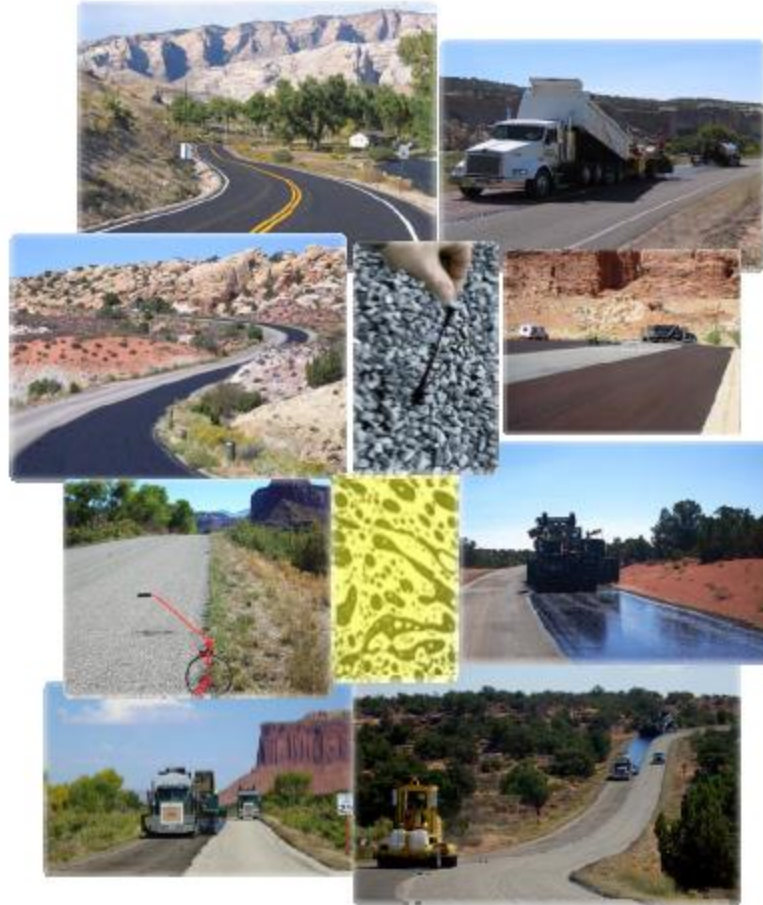
Composition, Uses and Specifications for Surface Treatments

POLYMER MO

FHWA

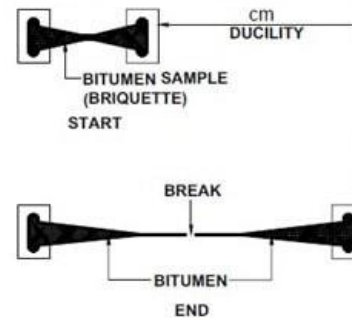
March 2009

- Higher traf
- Higher stre



POLYMER MODIFIED EMULSIONS

- Improved cohesion & elasticity



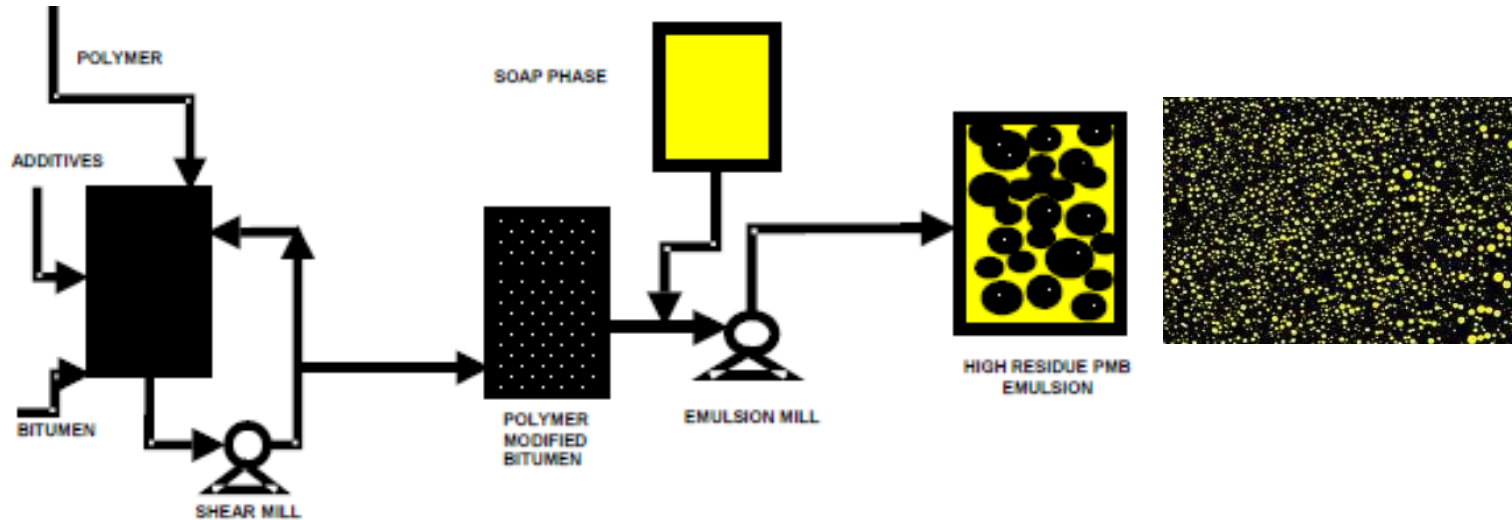
POLYMER MODIFIED EMULSIONS

- Cohesion & elastic recovery
- Use of a polymer
- Various types of polymers
 - Plastomers, thermoplastic elastomers
 - Natural or synthetic latex



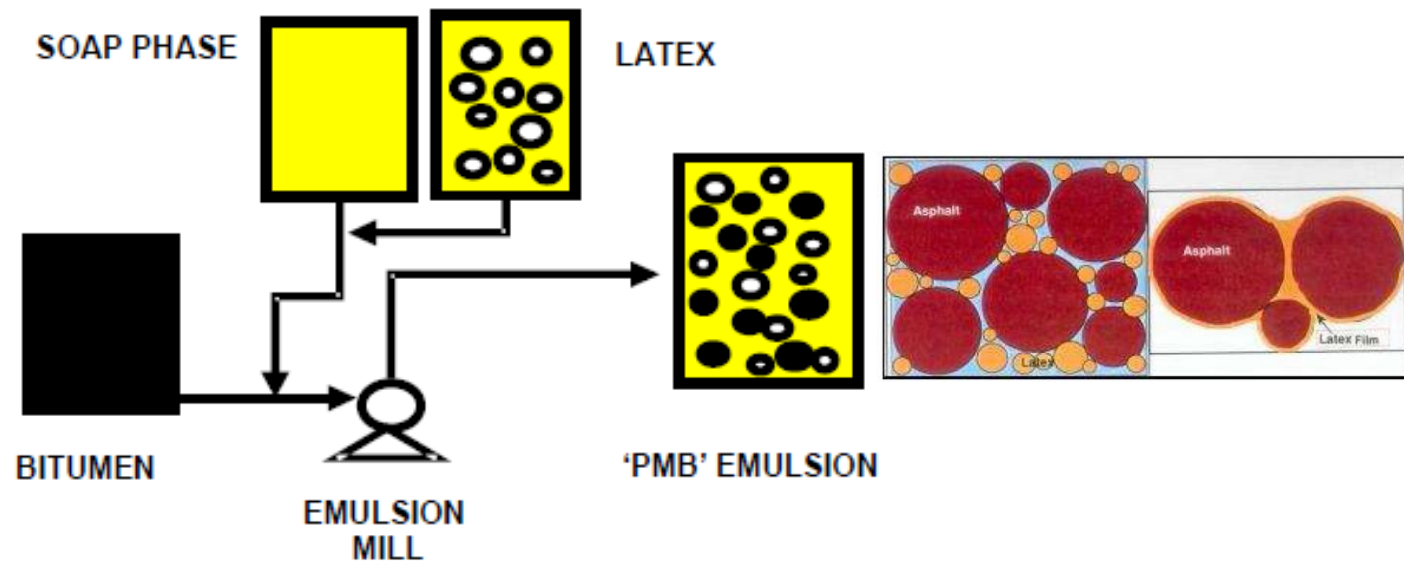
POLYMER MODIFIED EMULSIONS

- Cohesion & elastic recovery
- Use an appropriate process depending on the polymer type



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POLYMER MODIFIED EMULSIONS

- Cohesion & elasticity

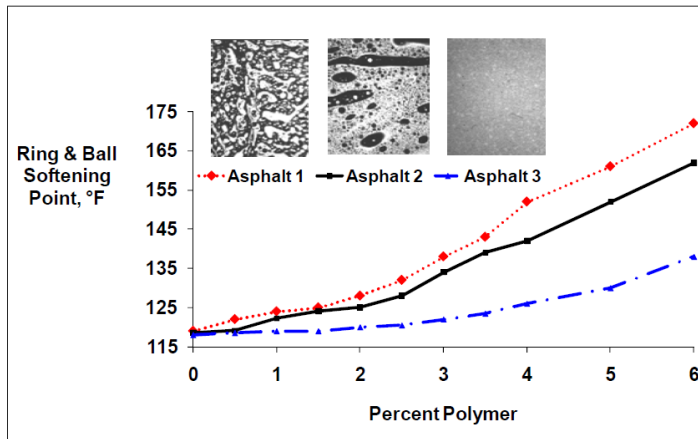
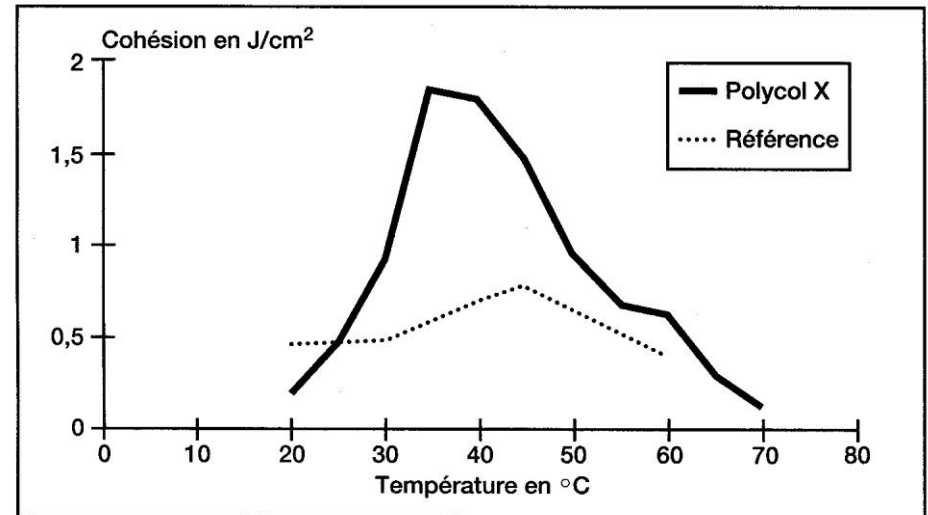


Figure 2: Effect of Percent SBS Polymer on Softening Point in 3 Asph
Photomicrographs of 6% Polymer in Those Asphalts



CONDITIONS OF SUCCESS

- Bitumen emulsion techniques are of high level and should be properly monitored and controlled in the laboratory and in the manufacturing plant
- Specific skills for design
- Appropriate equipment



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- Bitumen emulsion techniques are of high level and should be properly monitored and controlled in the laboratory and in the manufacturing plant
- Specific skills for design
- Appropriate equipment
- Need to exchange and to interact: one the goals of the IBEF



PAVEMENT PRESERVATION & RECYCLING SUMMIT
PPRS NICE 2018
MARCH 26-28
Nice Acropolis - FRANCE

Initiated by:
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MARCH 26-28, 2018
Nice Acropolis Convention Center - FRANCE

**Maintenance Modernisation Adaptation
of Roads & Streets
for Tomorrow's Mobility**

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General information
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Exhibition & partners

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CONDITIONS OF SUCCESS

- PPRS: a global challenge.
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- An opening to **exhibit new technologies** for new uses and road services.
- A unique opportunity **to exchange on themes of your core business with the main actors of the road.**
- A summit built **by actors of the road for actors of the road.**
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