

50 Years of PMB

Experience of a manufacturer

Olivier Moglia, NABin-konferansen 2026, Oslo

Agenda



- 1976: A pivotal year for innovation
- The birth and science of cross-linked PMB
- Performance benefits and field evidence
- The LAVOC study and landmark references
- Durability, lifecycle value and decarbonization
- High-RAP solutions and low-carbon PMB



1976: innovation and new horizons



JANUARY 21 Concorde enters commercial service

Air France and British Airways inaugurate the aircraft's first commercial supersonic flights.

APRIL 1 Apple is founded

Steve Jobs, Steve Wozniak and Ronald Wayne establish Apple Computer in California.

JUNE 16 Soweto uprising

The repression of student protesters becomes a major turning point in the struggle against apartheid.

LATE JUNE European heatwave

Prolonged heat and drought grip western Europe, creating a benchmark summer.

JULY 18 A historic “perfect 10”

In Montreal, Nadia Comăneci earns the first perfect 10 in Olympic history.

JULY 20 Viking 1 lands on Mars

NASA achieves the first fully successful U.S. landing on the Red Planet.

SEPTEMBER 9 Mao Zedong dies

His death ends twenty-seven years of rule and opens a succession struggle in China.

Sources: Smithsonian · Apple Newsroom · South African History Online · IOC · NASA · BBC · Met Office · Met Éireann

Invention of Polymer Modified Bitumen



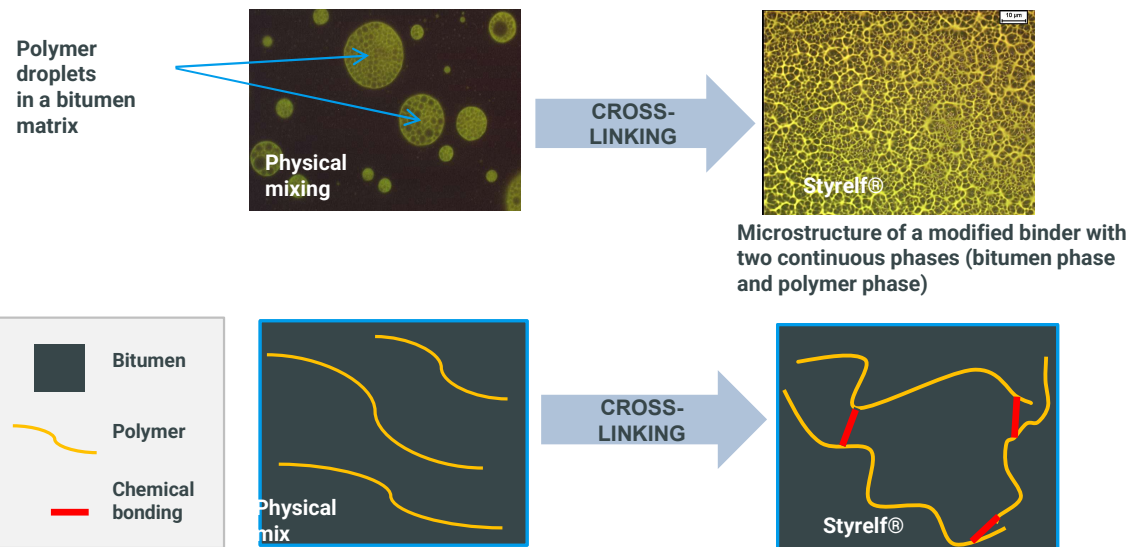
- First experimental trials 1930-1950 using rubber (natural then synthetic)
- 1963 : First experimental job sites in France (SBS and APP start to be used in membranes)
- 1976 : Elf patents a chemical reaction process based on cross-linking using sulfur.

STYRELF was born : main use at the beginning :
Surface dressing!

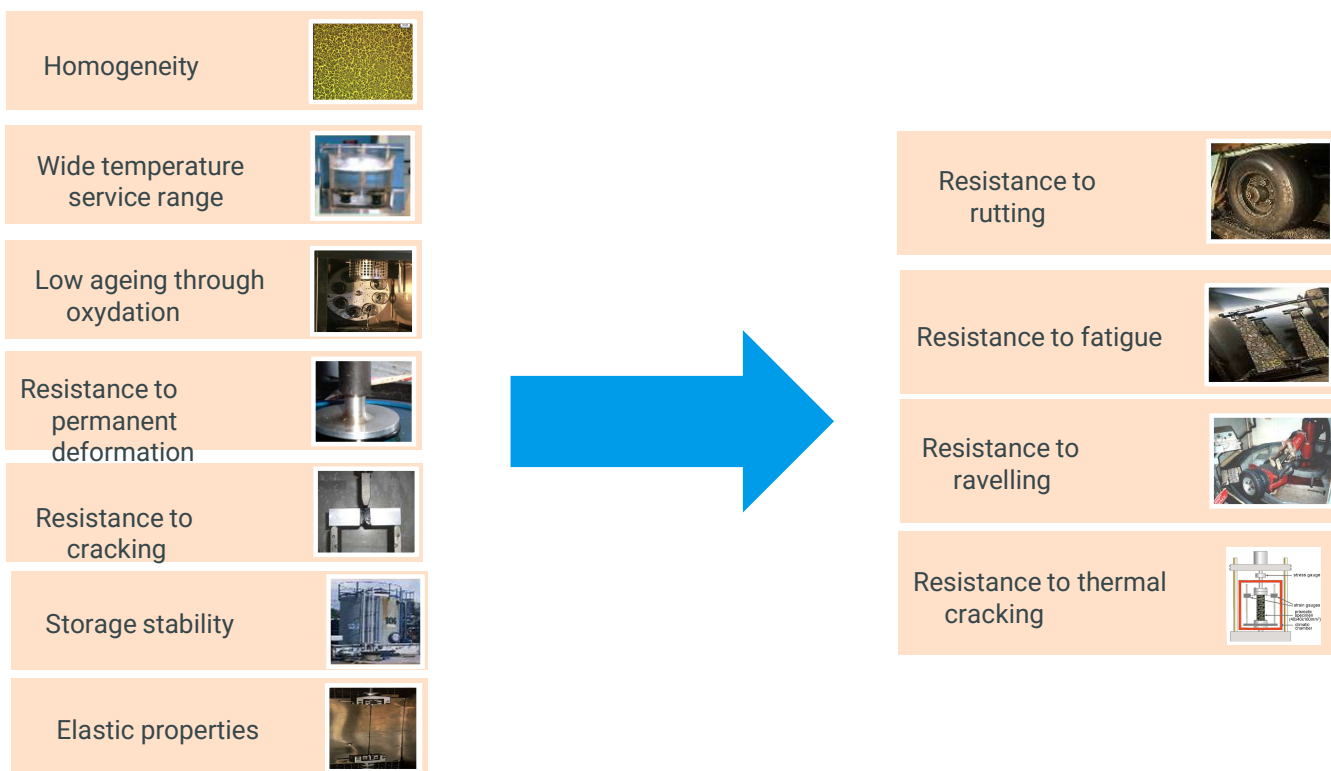


What is cross-linking about?

Formation of a three-dimensional network



Benefits of high quality PMB



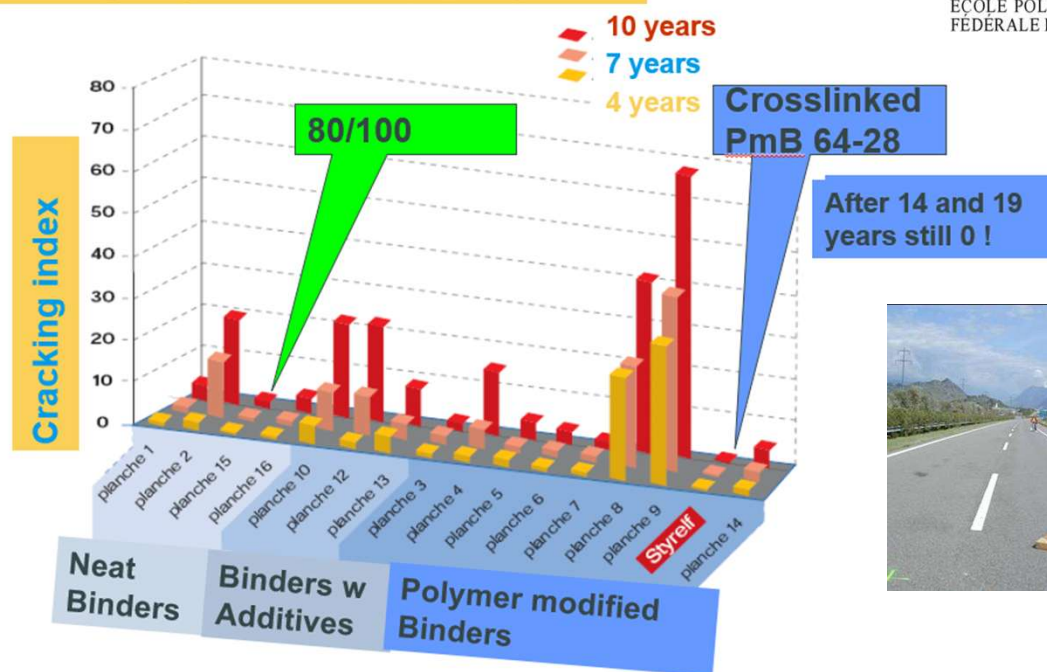
1988-2007 Iconic LAVOC-EPFL field experimentation: Durable performance legacy of crosslinked PmB



**Durability : Highway
field experiment
Valais test sections in
Switzerland**

**16 Sections including :
Neat bitumen, Bitumen
with additives, PmBs**

Cracking amplitude after 4, 7, 10 years



Some references



key projects



Orly airport (2019)



Var Circuit (2025)



Mersey gateway bridge (2018)



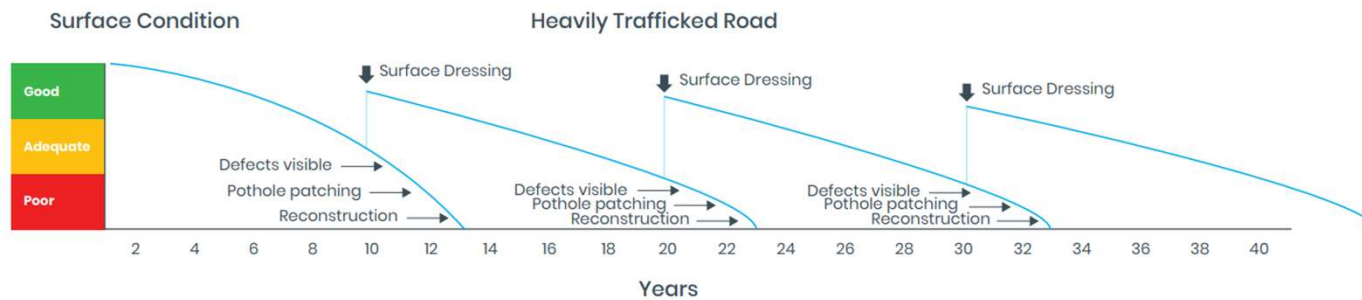
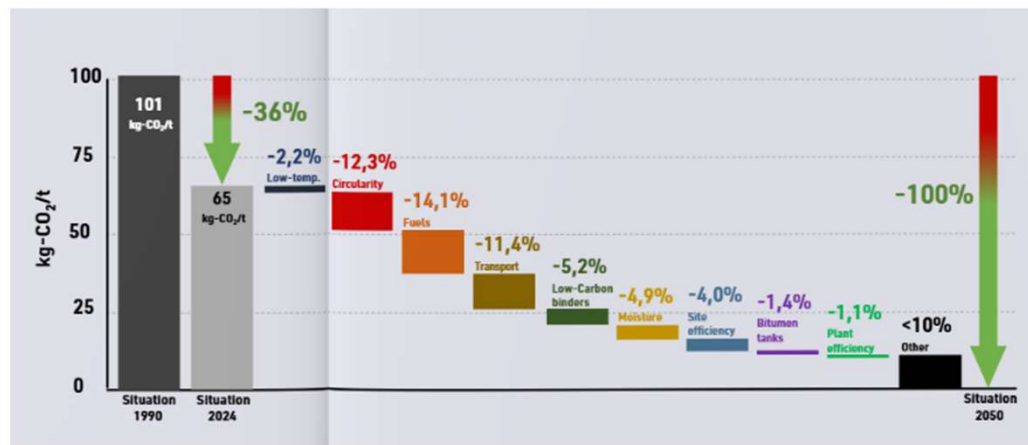
Mont Blanc tunnel (2017-2018)

- **ORLY AIRPORT (2019)** — Resistance to traffic and hydrocarbon exposure.
- **MERSEY GATEWAY (2018)** — Fatigue strength under intense bridge traffic.

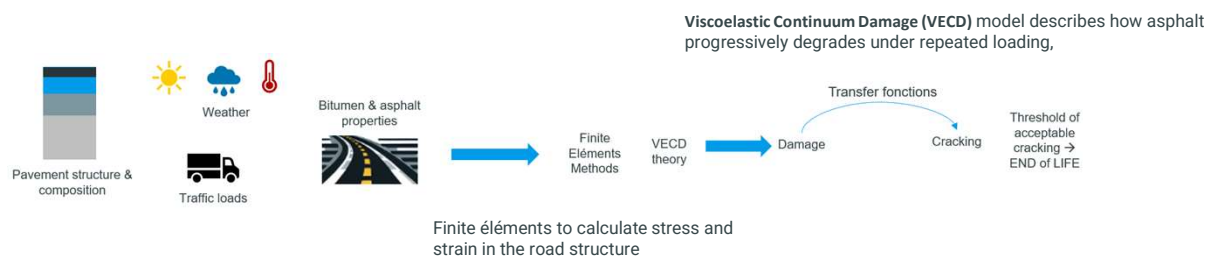
- **VAR Circuit (2025)** — Performance under extreme mechanical and thermal loads.
- **MONT BLANC TUNNEL (2017-18)** — Durability under heavy traffic and strict safety constraints.

The story carries on!

High quality PMB and decarbonation levers

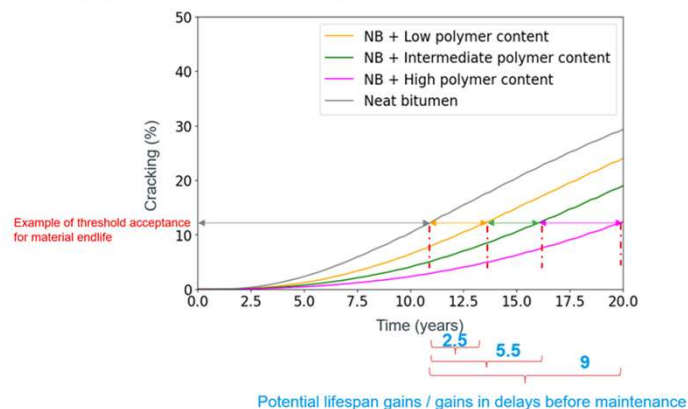


Durability Prediction



PREDICTED CRACKING HORIZON

Impact of polymer addition level on lifespan



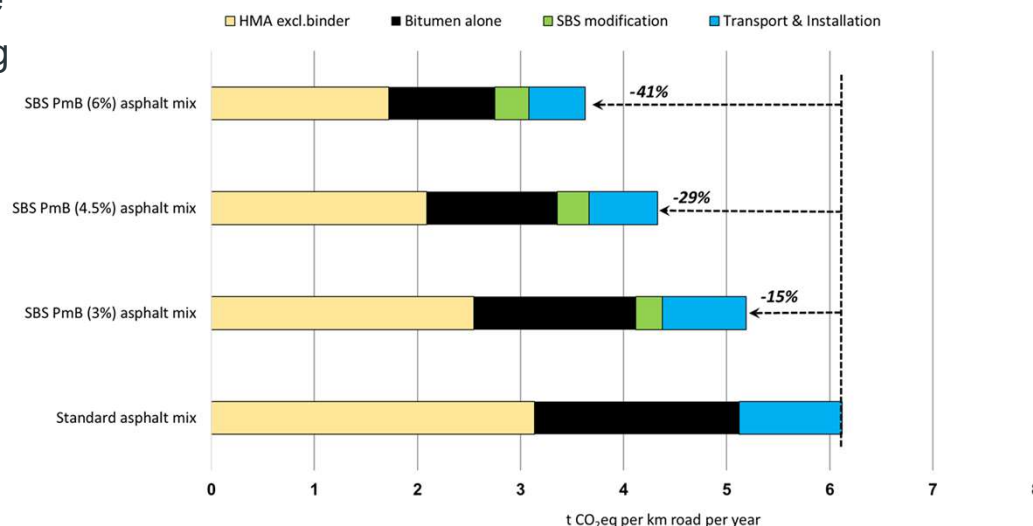
Service-life gains can offset a higher product footprint.

This connects material durability directly to total carbon and ownership cost.

GWP calculations showing high potential for PMBs



- Generic carbon footprint calculation example
- Cradle to End of Life (excluding usage) using Eurobitume 2025 data
- Standard asphalt mix: virgin aggregates, unmodified bitumen, assumed service life of 10 years
- Lifetime extensions taken from above
- Higher polymer content has the potential to substantially reduce the carbon footprint over service life
- (Additional effect of RAP reuse)



Rheometrics guides binder selection for high-RAP mixes

Turn a broad RAP profile into a worksite-specific binder choice.

01 Characterize RAP and target

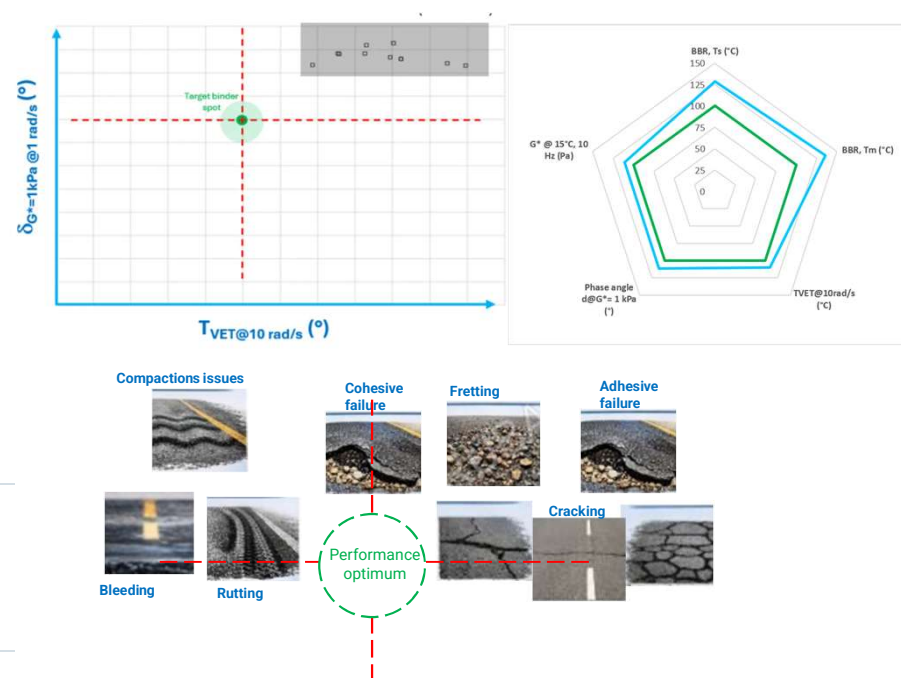
Using Rheological Indicators rather than empirical ones.

02 Quantify the technical gap

Map grade and polymer-modification levels, then account for climate, mix type and the target performance.

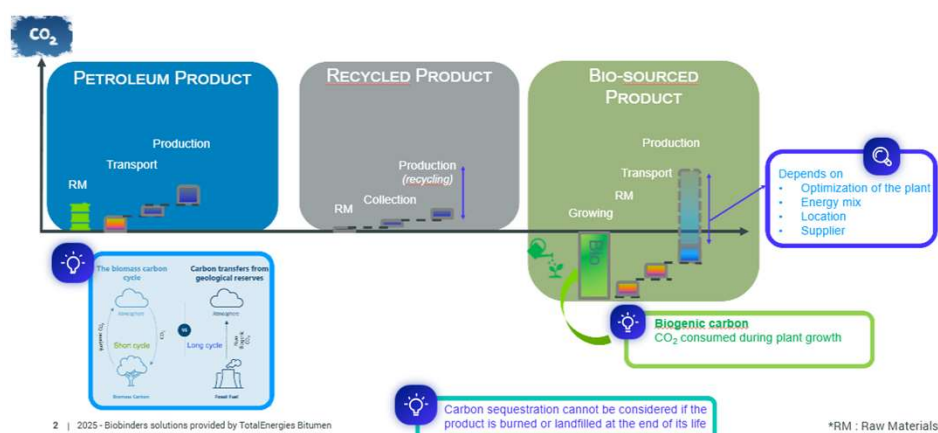
03 Select the fresh PmB

Choose the binder that closes the gap for each worksite

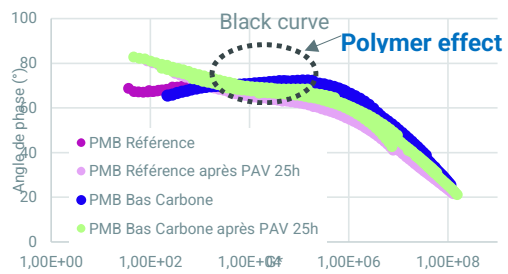


The right rheological fit enables higher RAP use while reducing early-failure risk.

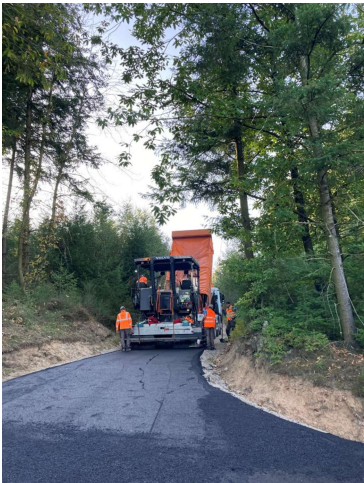
Low Carbon Polymer Modified Binders



2 | 2025 - Biobinders solutions provided by TotalEnergies Bitumen



	Styrelf Bio10
Penetrability	=
Softening point	=
Elastic properties	= / +
Stability	=
Cold properties	=
Ageing PAV (25h)	=



- Jobsite : october 2023
 - Forest road : 300t / 200m²
 - Good weather conditions
 - Good quality of the base course GNT (100% >70MPa)
 - Production meets requirements, compacity 5-8%
 - description : 90% mechanical, 6 cm, 130-155°C at finisher table
 - BBSG 0/10 classe 3 with 10% RAP



Merci.