AV '19 KONFERENCE ASFALTOVÉ VOZOVKY 2019

VYHODNOCENÍ CHOVÁNÍ RC POJIVA NA POKUSNÝCH ÚSECÍCH V ČESKÉ REPUBLICE A V RAKOUSKU

EVALUATION OF THE BEHAVIOUR OF RC BINDER ON THE TRIAL SECTIONS IN CZECH REPUBLIC AND AUSTRIA

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26. – 27. listopadu 2019, České Budějovice

SDRUŽENÍ PRO VÝSTAVBU SILNIC

ČESKÁ SILNIČNÍ SPOLEČNOST CZECH ROAD SOCIETY

EAPA

PRAGOPROJEKT

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OMV Refining & Marketing GmbH

- Dr. Ing. Markus Spiegl
- Ing. Siegfried Kammerer

The energy for a better life. OMV

CZ research partner who sponsored the test track

- Státní fond dopravní infrastruktury

Agenda

- **Introduction – Reuse/Recycling, a question of mindset?**
- **Change of properties during the aging process**
- **Product development**
- **First trial sections Austria**
    - Test results and interpretation
- **First trial sections Czech Republic**
    - Test results and interpretation
- **Conclusion and outlook**

Reuse/Recycling, a question of mindset?

Careful treatment of resources

- use existing raw material (current asphalt mixes are 100% reusable)
- reduce import of crude oil / bitumen
- reducing production costs

Environment protection

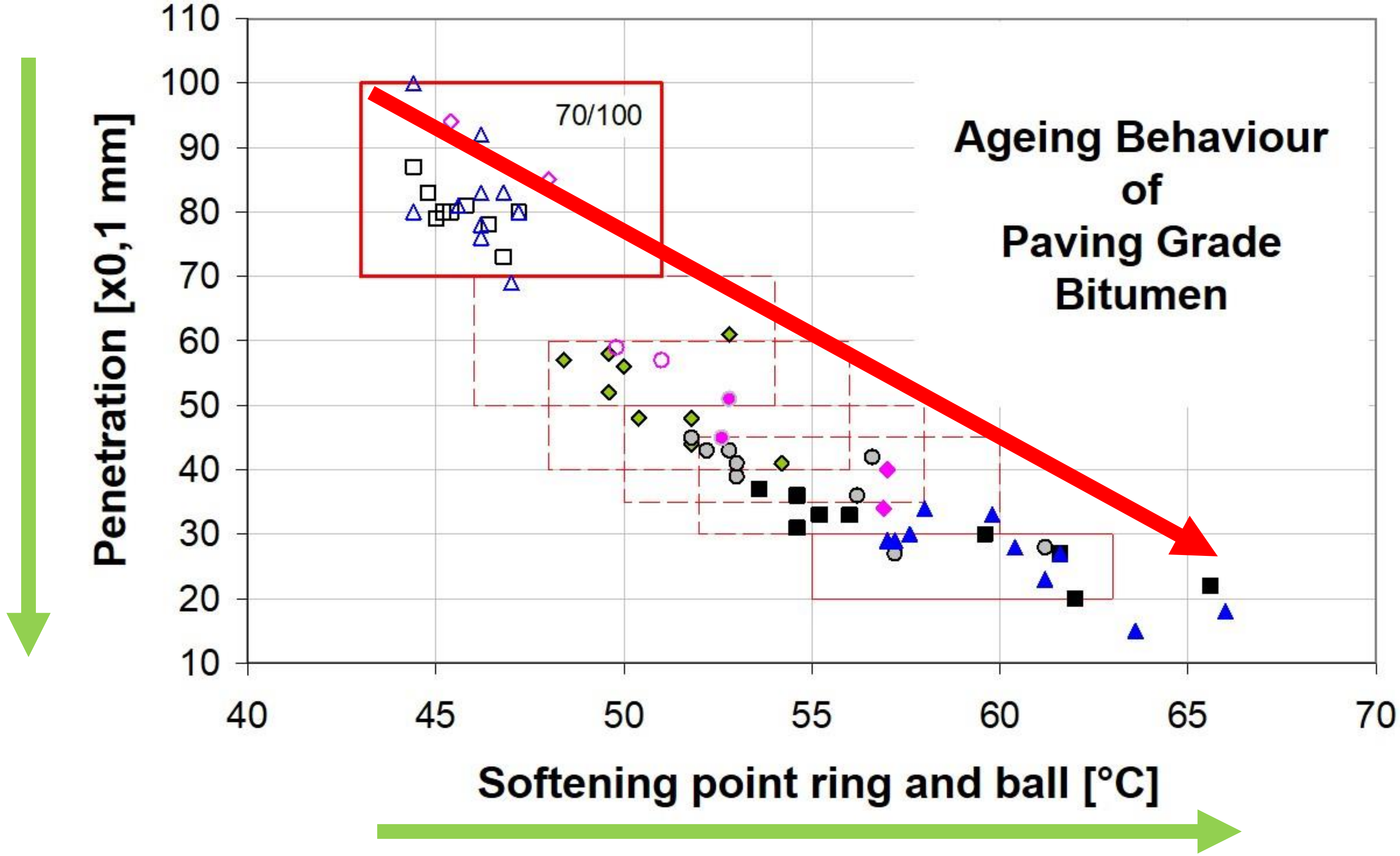
- reduce transport volume
- reduce of emissions (noise, dust, ...)
- careful treatment of disposal sites

CPR – since July 2013

- reuse / recyclable construction material
- sustainable use of natural resources

Change of properties during the aging process 1/2

Aging behavior of paving grade bitumen – empirical test



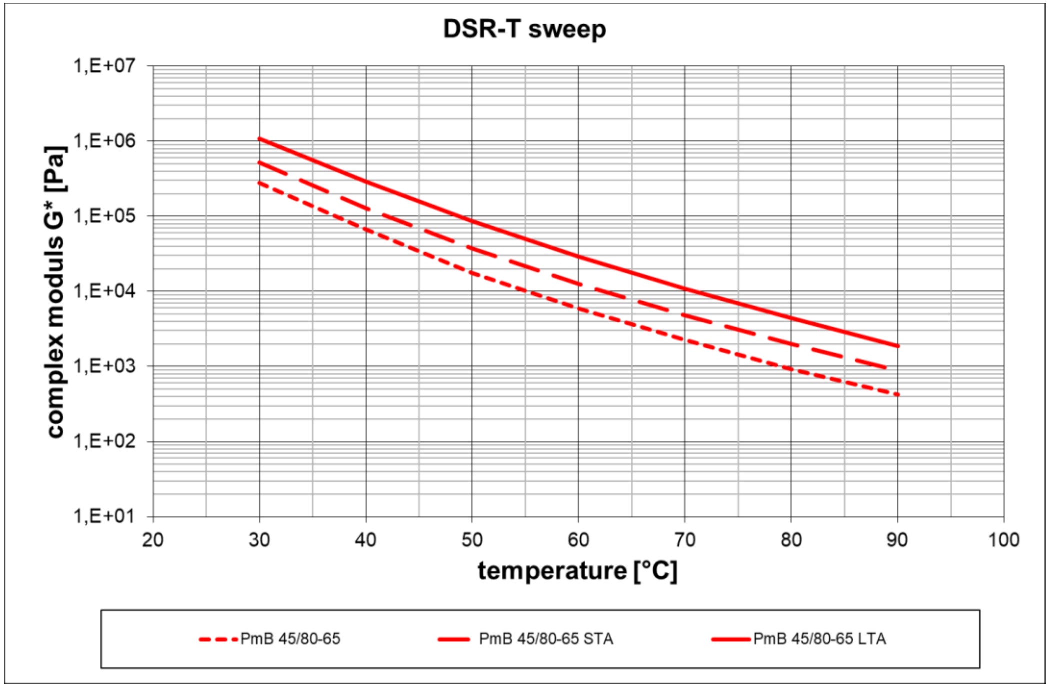
Decrease of Penetration

Increase of Softening Ring and Ball

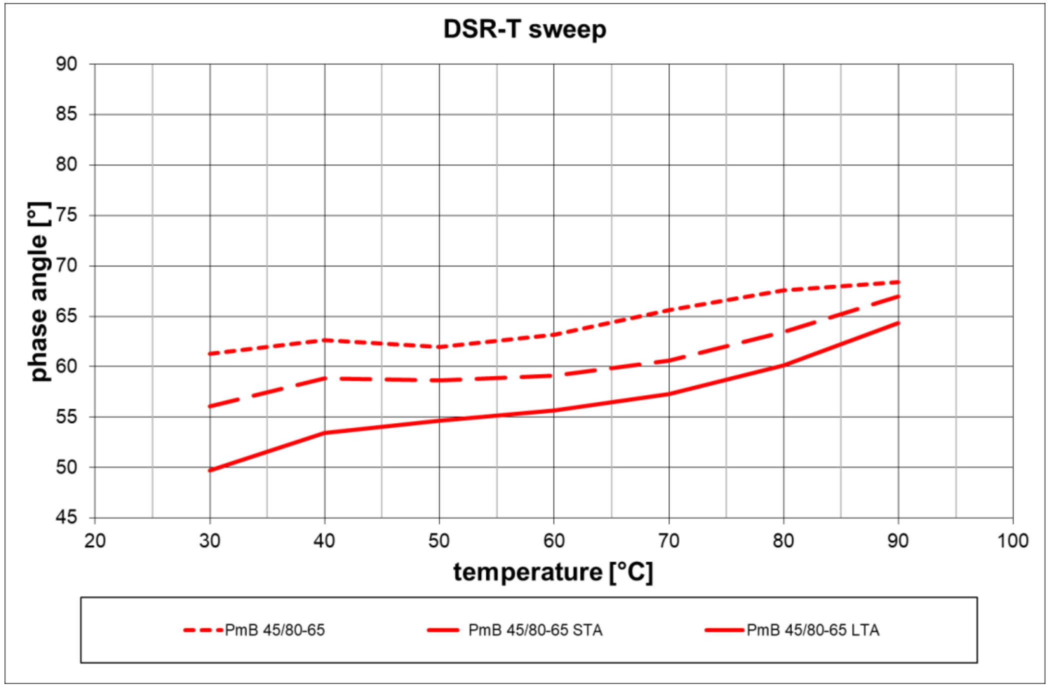
Change of properties during the aging process 2/2

Aging behavior of paving grade bitumen – Rheological properties (DSR test method)

Complex Shear Modulus (G*)



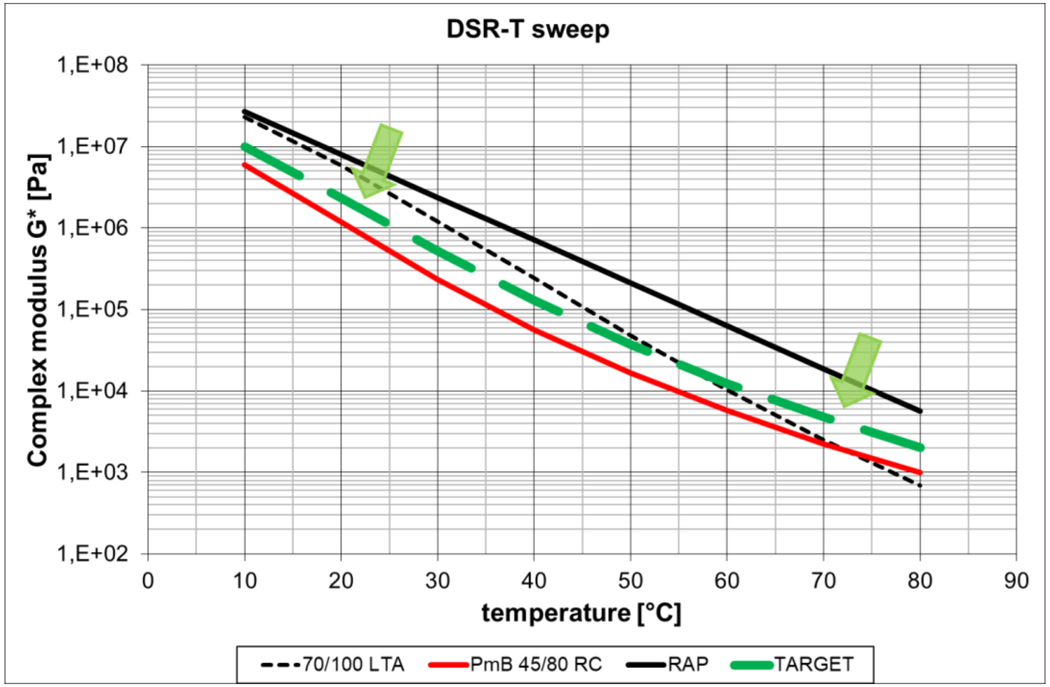
Phase Angle (δ)



Product development

Rheological properties - DSR

Complex Shear Modulus (G*)



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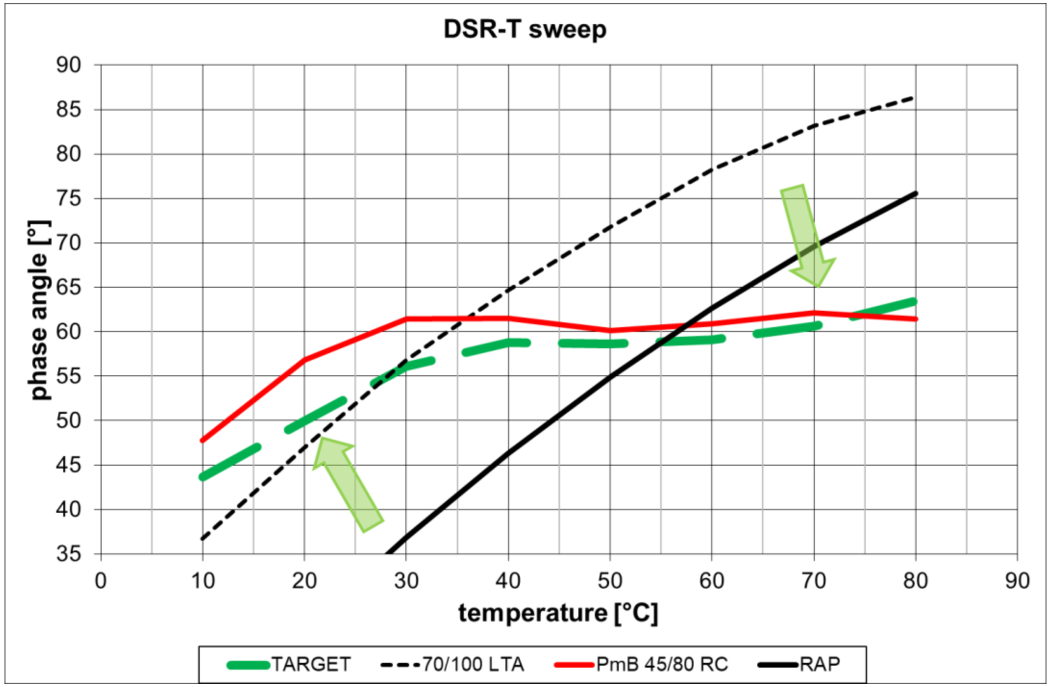


First trial sections – Austria – L384

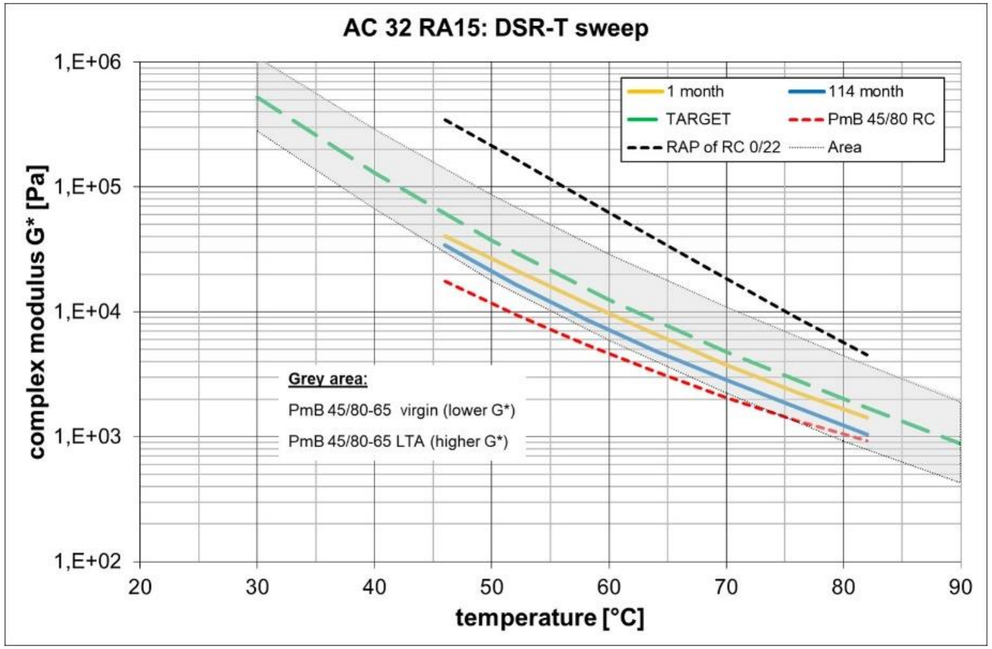
Asphalt mixture	planned RAP content [%]	actual RAP content [%]	Binder Fresh OMV Starfalt PmB 45/80 RC	Binder - RAP	Binder - total	Void content [%]
AC 16 surf RA15	15	15	4,5	0,8	5,3	2,4
AC 16 surf RA20	20	19	4,3	1,0	5,3	3,0
AC 32 bin RA15	15	14	3,8	0,6	4,4	3,4
AC 32 bin RA20	20	21	3,5	0,9	4,4	2,3

Road Condition in Laßnitzthal after 9 years in use

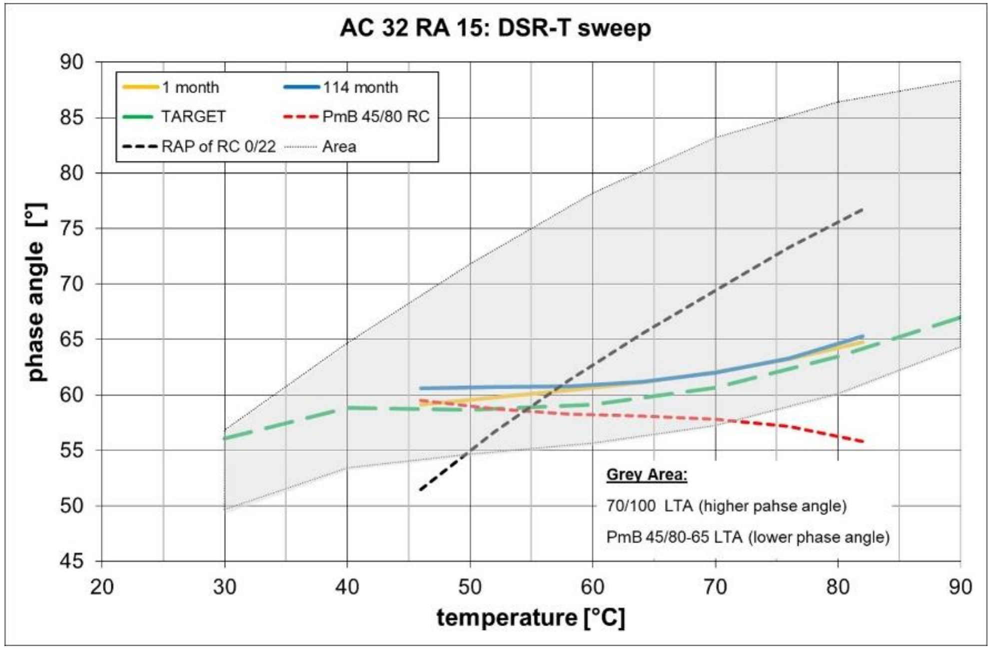
Test results and interpretation - Austria

Rheological properties DSR of RAP, AC 32 bin (RA15), neat PmB 45/80 RC and target product

G* of RAP, AC 32 bin (RA15), PmB 45/80 RC and target product



Phase Angle of RAP, AC 32 bin (RA15), PmB 45/80 RC and target product



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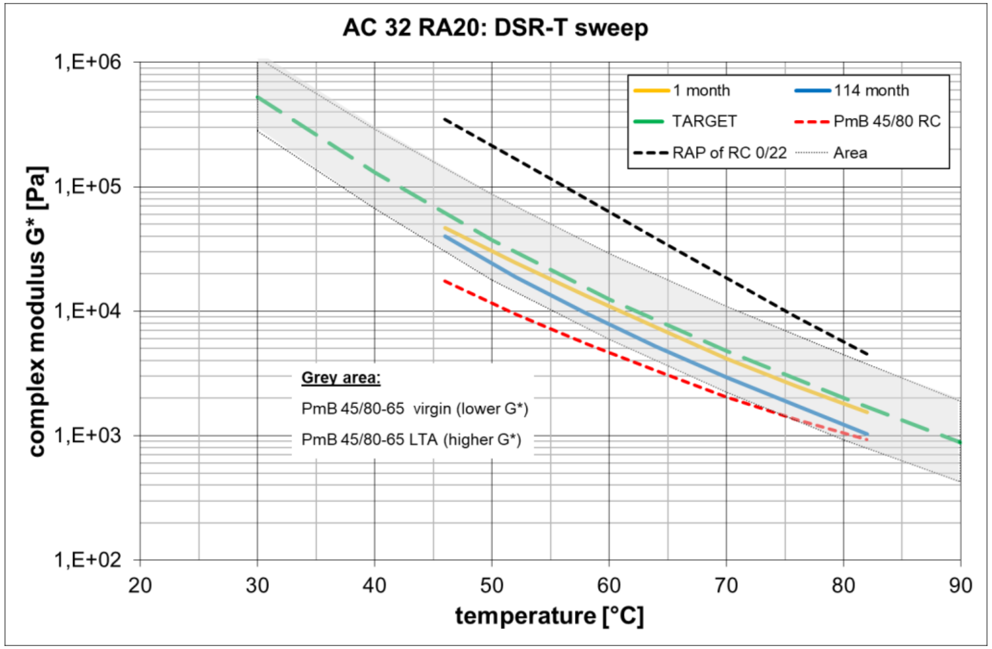
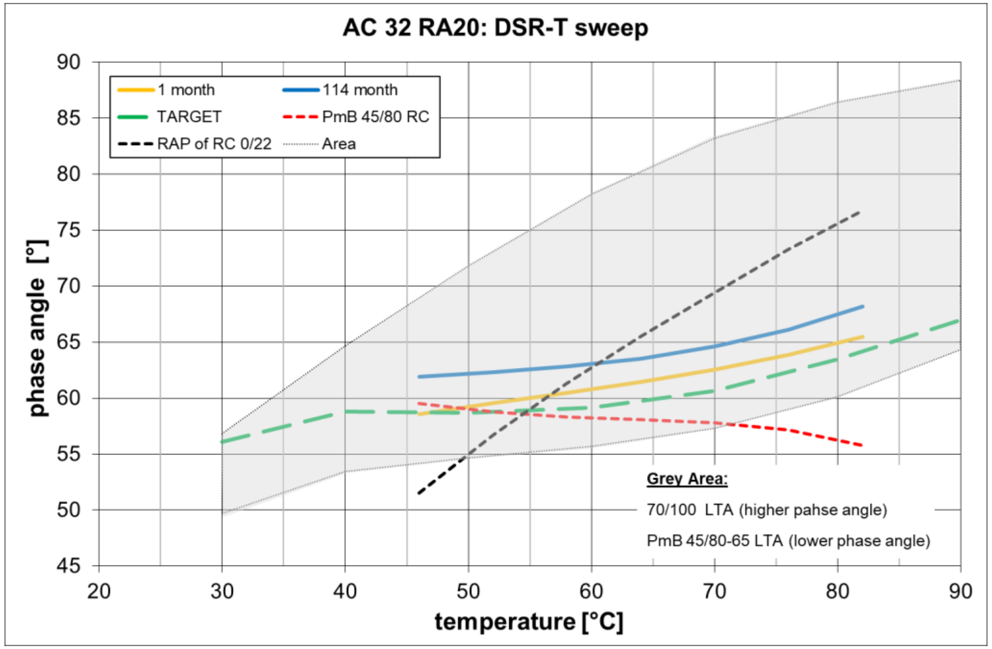
G* of RAP, AC 32 bin (RA20), PmB 45/80 RC and target product



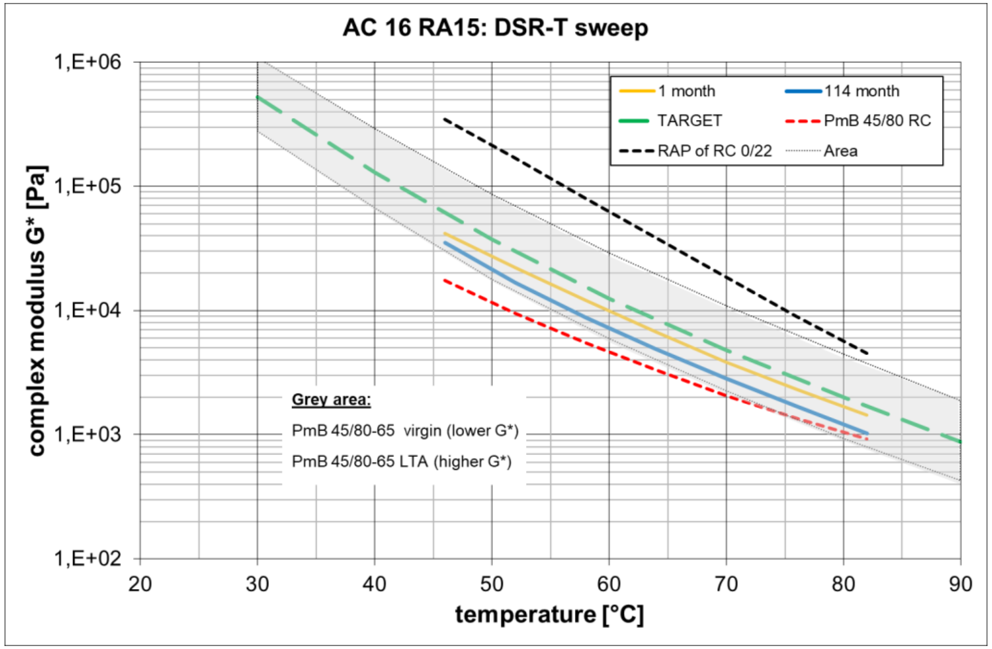
Phase Angle of RAP, AC 32 bin (RA20), PmB 45/80 RC and target product



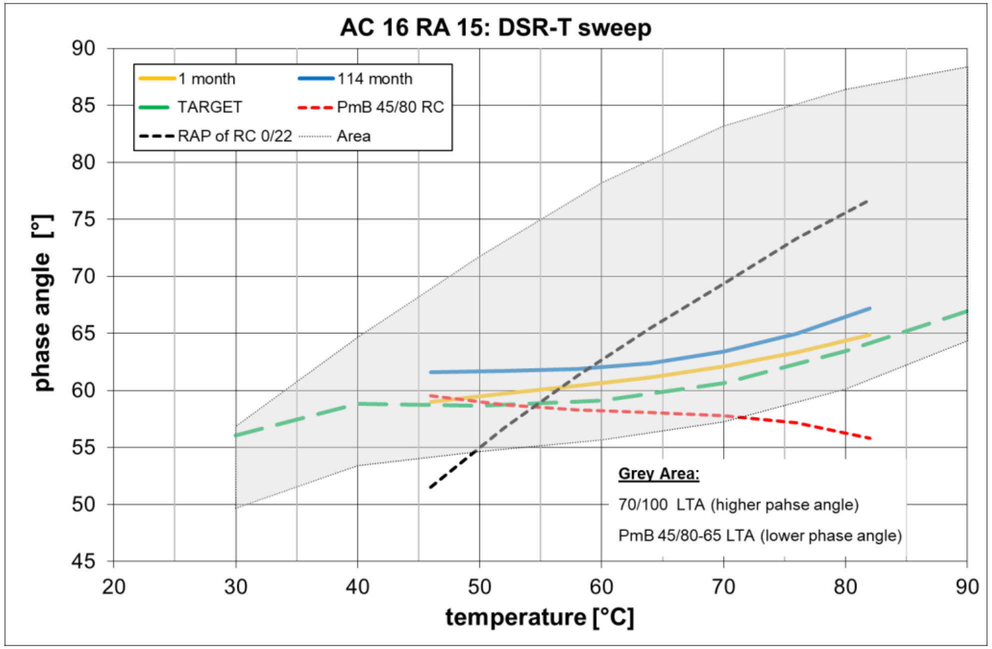
Test results and interpretation - Austria

Rheological properties DSR of RAP, AC 16 surf (RA15), neat PmB 45/80 RC and target product

G* of RAP, AC 16 surf (RA15), PmB 45/80 RC and target product



Phase Angle of RAP, AC 16 surf (RA15), PmB 45/80 RC and target product



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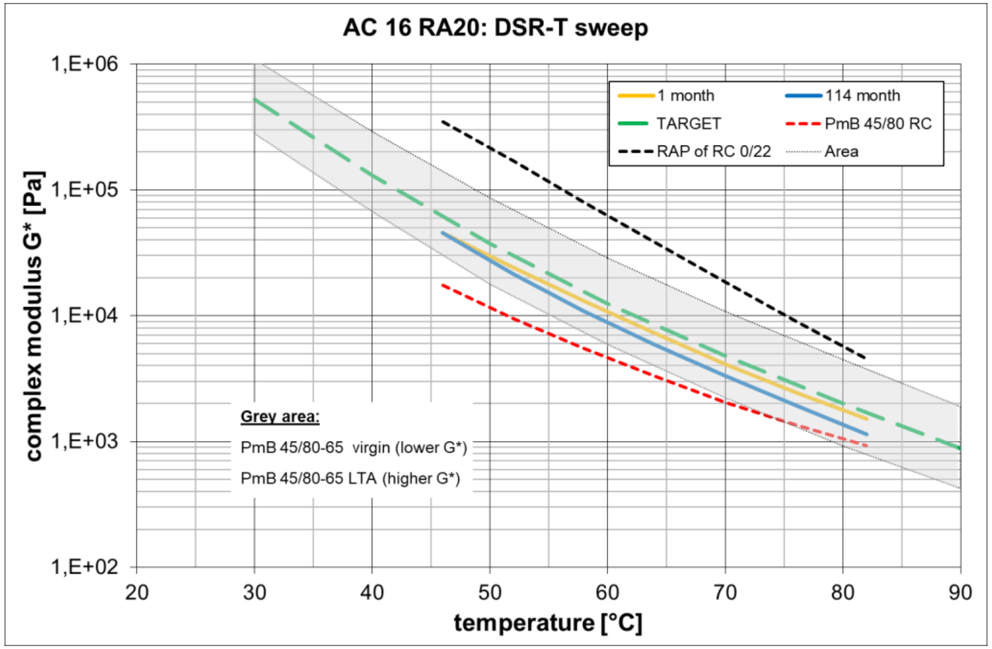
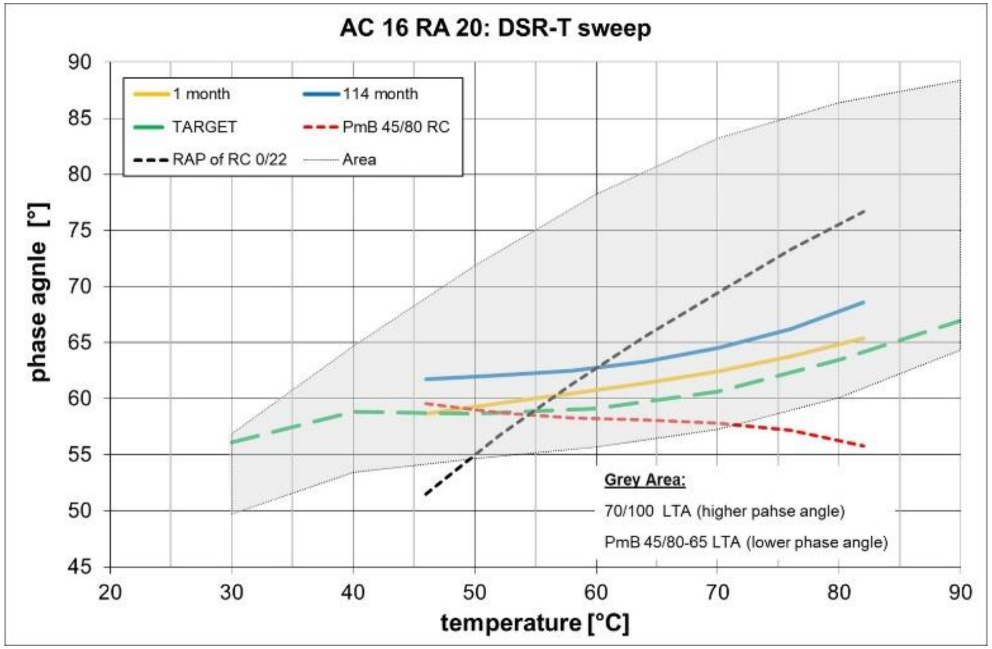


Phase Angle of RAP, AC 16 surf (RA20), PmB 45/80 RC and target product



First trial sections – CZ– Domasov Road 602

Asphalt mixture	planned RAP content [%]	Binder Fresh OMV Starfalt PmB 45/80 RC	Binder - RAP	Binder - total	Void content [%]
ACO 11+	15	4,9	1,1	6,0	2,3

Domasov road 602 after four years in use

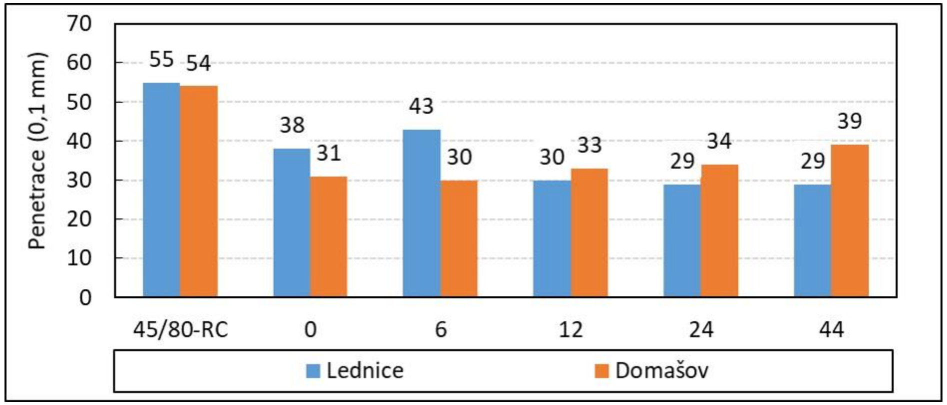
First trial sections – CZ - Lednice

Asphalt mixture	planned RAP content [%]	Binder Fresh OMV Starfalt PmB 45/80 RC	Binder - RAP	Binder - total	Void content [%]
ACP 22 S	20	3,3	1,0	4,3	5,7

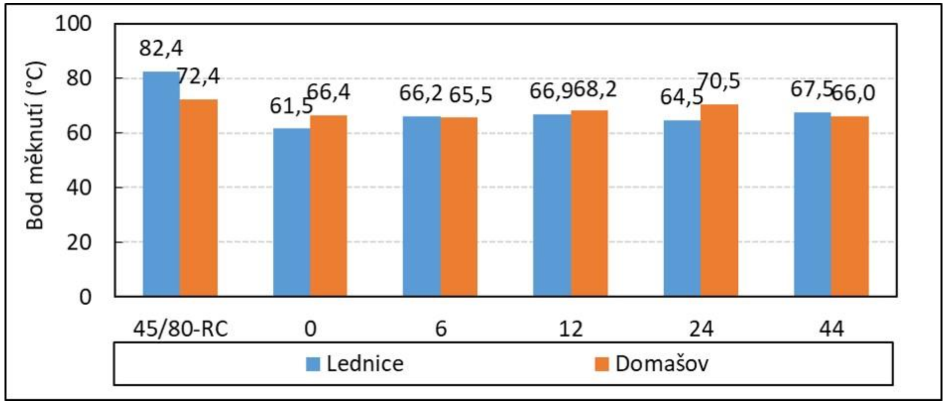
Road condition Lednice after four years in use

Bitumen test results for Domasov and Lednice

Penetration of the neat PmB 45/80-RC and the recovered binder (variation in time)



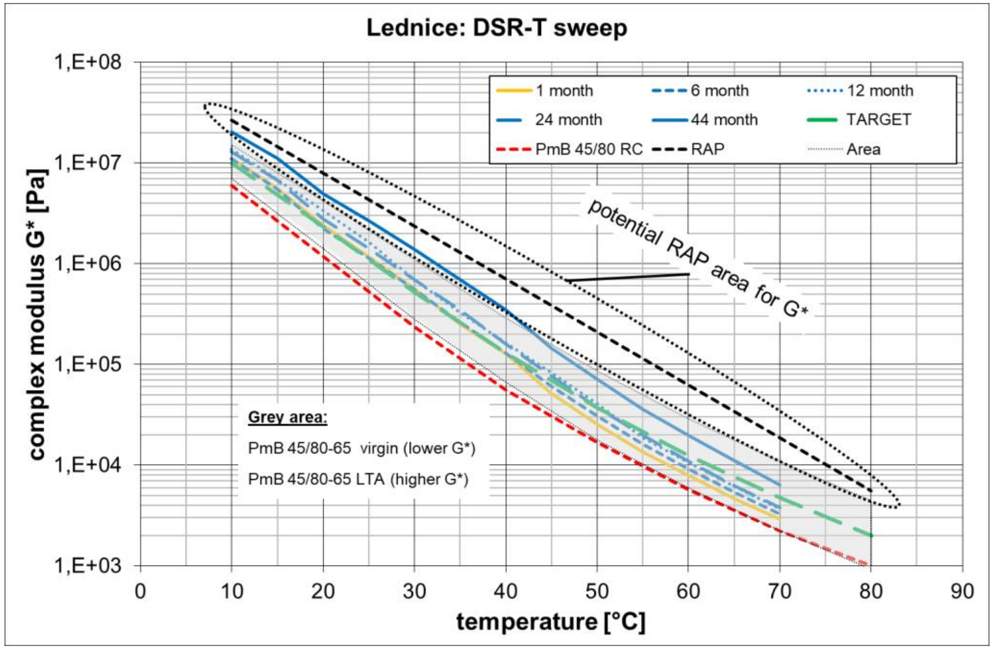
Softening point of the neat PmB 45/80-RC and the recovered binder (variation in time)



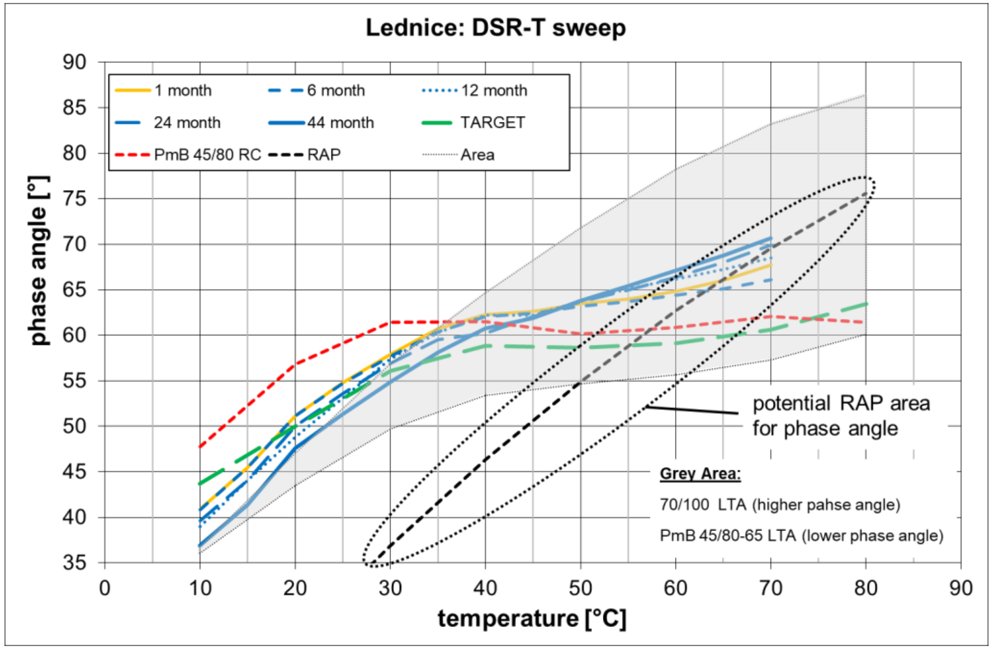
Test results and interpretation - CZ - Lednice

Rheological properties DSR of RAP, ACP 22 S (RA20), neat PmB 45/80 RC and target product

G* of RAP, ACP 22 S (RA20), PmB 45/80 RC and target product



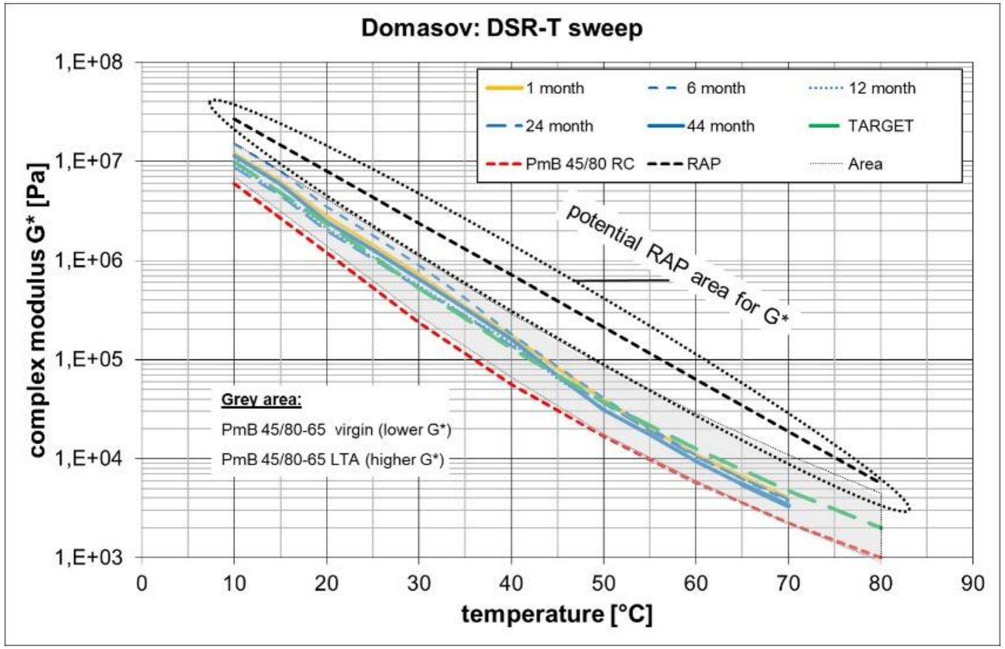
Phase Angle of RAP, ACP 22 S (RA20), PmB 45/80 RC and target product



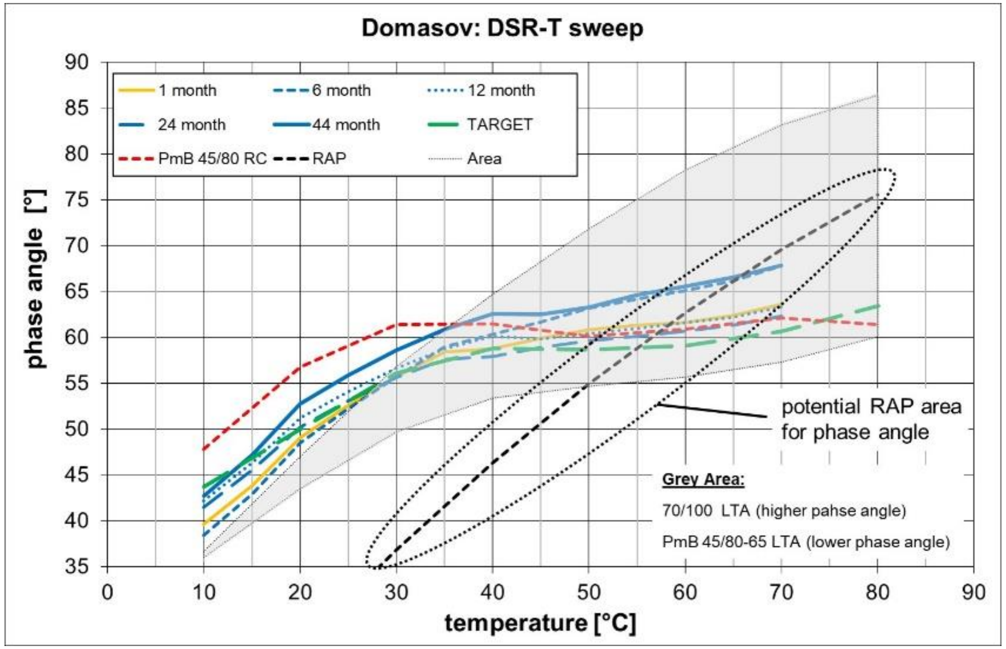
Test results and interpretation - CZ - Domasov

Rheological properties DSR of RAP, ACO 11+ (RA15), neat PmB 45/80 RC and target product

G* of RAP, ACO 11+ (RA15), PmB 45/80 RC and target product

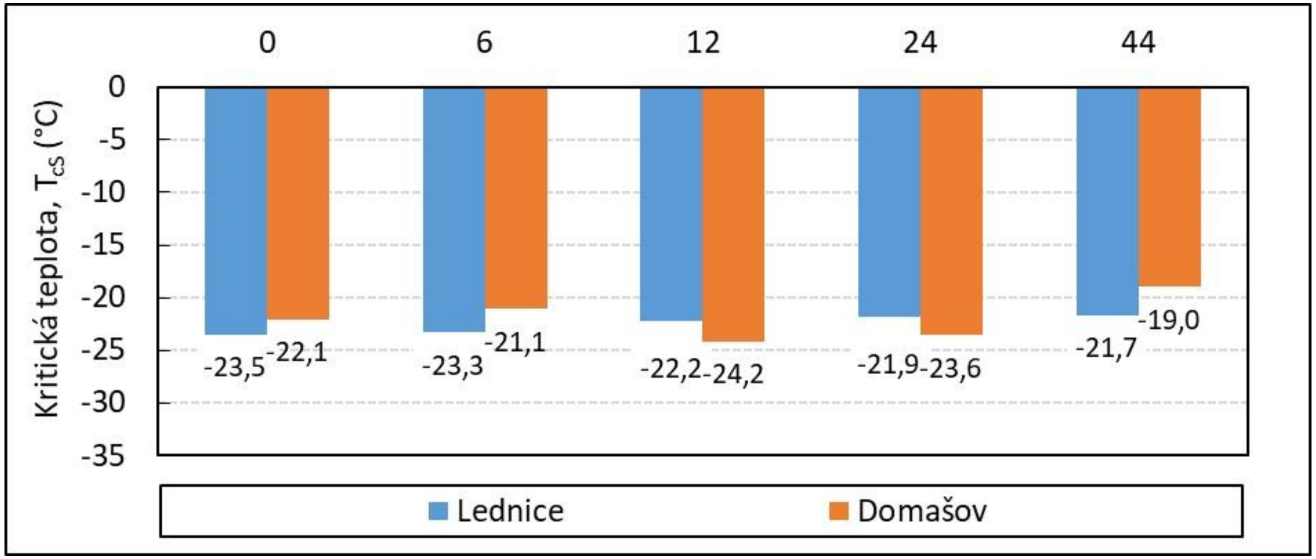


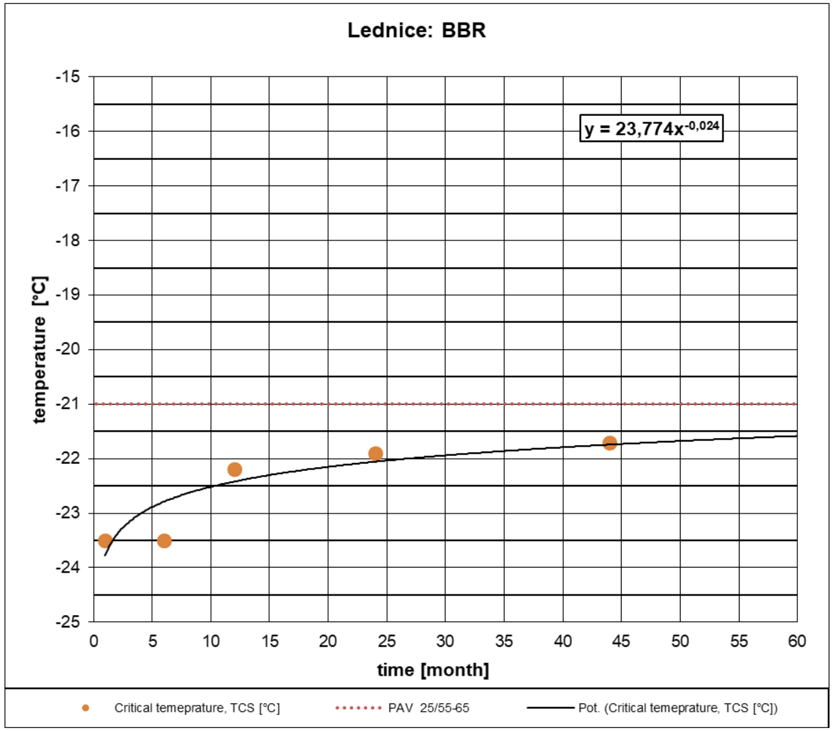
Phase Angle of RAP, ACO 11+ (RA15), PmB 45/80 RC and target product



Bitumen test results for Domasov and Lednice

Critical temperature with a BBR; stiffness S= 300 MPa





Conclusions and Outlook

- No road maintenance was required on test tracks so far
- Slow aging behavior
- When using a high quality binder cold adding of 20 % RAP is possible – without a decrease in quality
- Test Results prove excellent properties of OMV Starfalt®PmB45/80 RC
- Commodity product in Austria for highway projects with 20% RAP

Outlook:

- Future projects will have a higher RAP content (up to 40 %)
- Introduction of new test parameters are highly recommended
- Multiple Recycling


Questions?
Michal Varaus, VUT v Brně
Markus Spiegl, OMV
The energy for a better life.
OMV
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