

ASECAP DAYS



ISTANBUL 2023

Celebrating
50 YEARS
OF Successful
TOLL ROAD PROJECTS

BRISA'S SUSTAINABLE PAVEMENTS INTERVENTIONS

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Hosted by

ICA

YAVUZ SULTAN SELİM BRIDGE
AND
NORTHERN RING MOTORWAY



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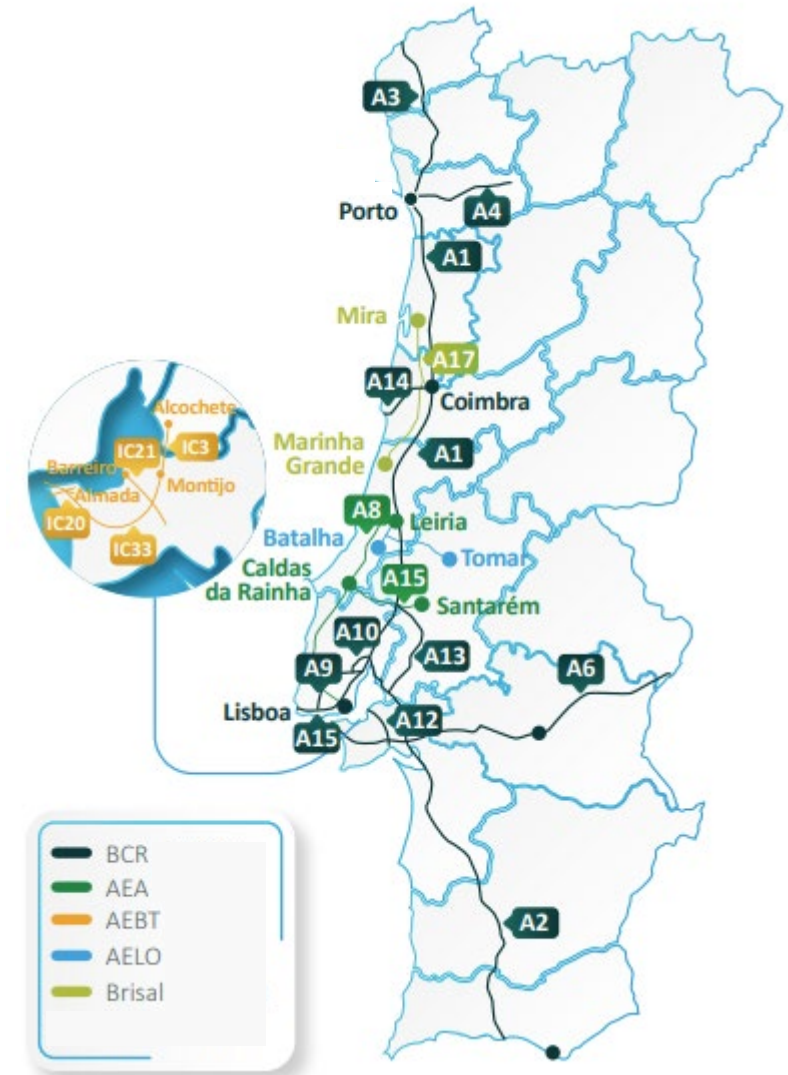
1. BRISA's Motorways in Operation

Brisa Autoestradas is a mobility operator with strong national and international experience in operating / managing road infrastructures, since 1972

Management of motorway concessions and cross-cutting support services, including operation and maintenance, asset management and other engineering services

5 Concessions in Portugal

1 549 km Network Extension



2. Strategic Agenda ESG VISION28 | ODS

Brisa Group is developing studies and solutions aimed at contributing to the circular economy of its processes, including a study on sustainable pavements incorporating recycled plastics, **and a study on maximizing the incorporation of reclaimed asphalt in wearing courses**

OBJETIVOS DE DESENVOLVIMENTO SUSTENTÁVEL



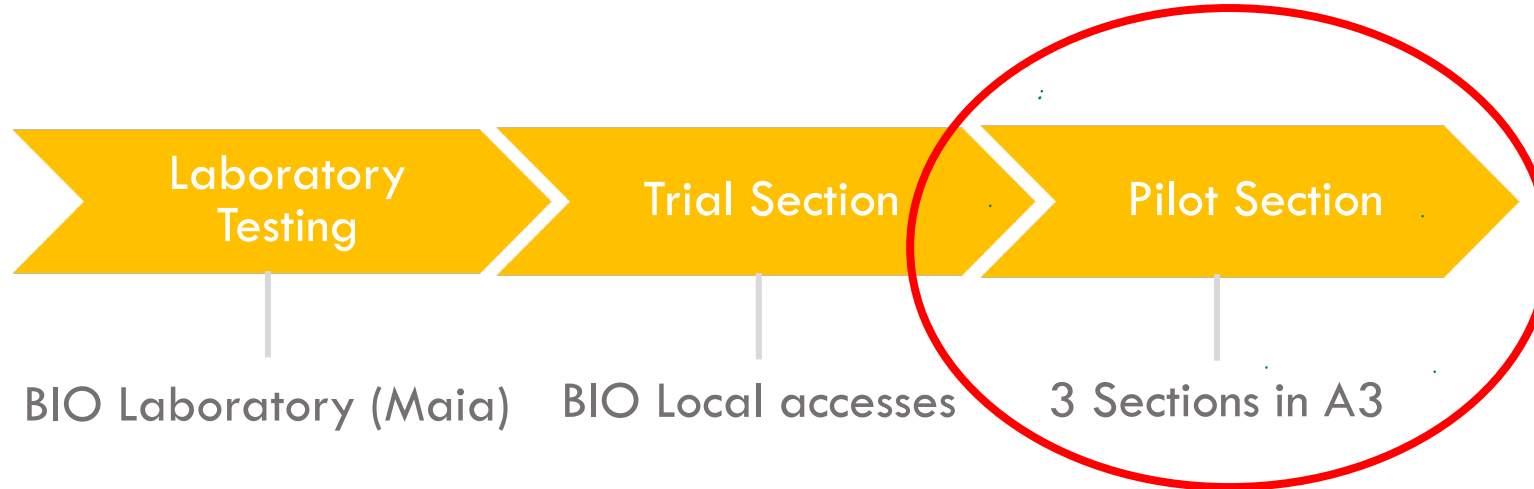
3. Sustainable Pavement Interventions

- Extend the pavement life by using solutions that preserve the integrity of the surface course as long as possible, making the lower structural layers ideally perpetual
- When the surface course has completed its useful life, its material must be recovered (RAP), becoming a product suitable for use again as a material for a new bitumen mixture (RA)

4. Reclaimed Asphalt Pavements Project | Objectives

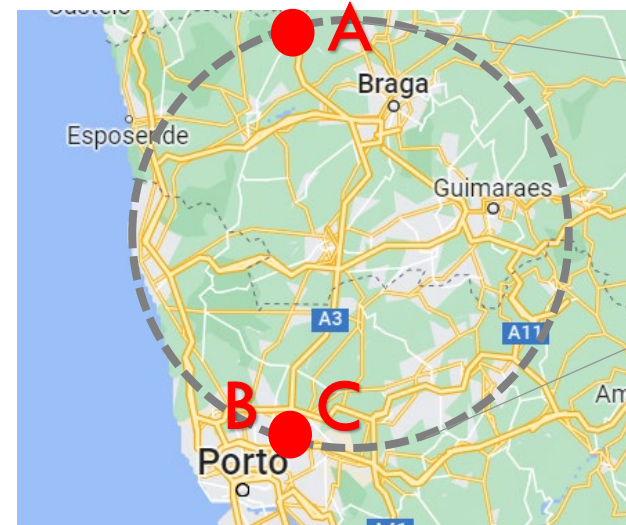
- Maximizing the incorporation of reclaimed asphalt in surface courses (Brisa pavement interventions have a significant expression in terms of surface course replacement)
- Minimizing waste production during construction
- Promote circular economy principles
- Not compromising mechanical and functional properties of the new mixture
- Not compromising operation
- Technical and environmental improvement in Brisa's activity, with additional possible economical gains

5. Reclaimed Asphalt Pavements Project | Methodology



6. Reclaimed Asphalt Pavements Project | Geography

- **Section A**
A3 - Braga Oeste/ EN 201
Area | Extension: 8280 m² | 570 m
- **Section B**
A3 - Águas Santas (A3/A4) / Maia
Area | Extension: 3570 m² | 850 m
- **Section C**
A3 - Águas Santas (A3/A4) / Maia
Area | Extension: 2415 m² | 575 m



7. Reclaimed Asphalt Pavements Project | RA Information

- **RAP Origin:** Milled porous asphalt (PA 12,5)
- **RAP Age:** Section A – 25 years
Section B and Section C – 17years
- No contaminants
- **Objective:** 20 % of RA incorporation on a new mixture AC 14 surf PMB 45/80-65 (BBr) (discontinuous asphalt concrete with high macrotecture)

8. Reclaimed Asphalt Pavements Project | RA Characterisation

- **Fraction in use:** RA 8 -16 mm
- **Bitumen:** Very low penetration values! Aged Bitumen
Need of **rejuvenators** or **soft bitumen** for the new mixtures

Bitumen Tests	Unit	Section A	Section B + Section C
Bitumen content	%	2,7	3,3
Penetration	0,1 mm	4	6
Softening Point	°C	95,5	93



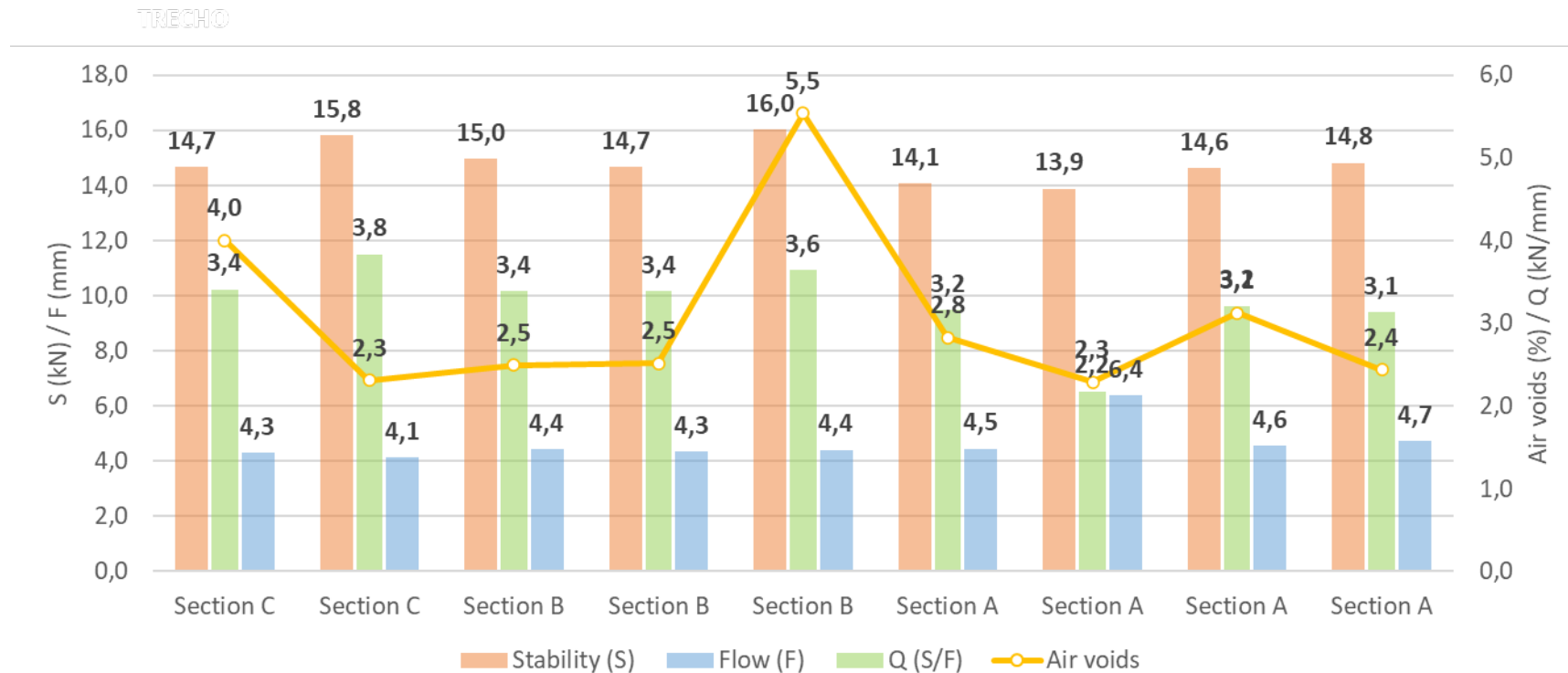
9. Reclaimed Asphalt Pavements Project | Bitumen Information

- **Section A and Section B**
 - Formulated bitumen: PMB 45/80-65 Elaster Regener (Cepsa)
- **Section C**
 - Virgin bitumen: PMB 45/80-65
 - Rejuvenator: Fibres Viatop plus RC (JRS)

10. Reclaimed Asphalt Pavements Project | Job Mistures Formula

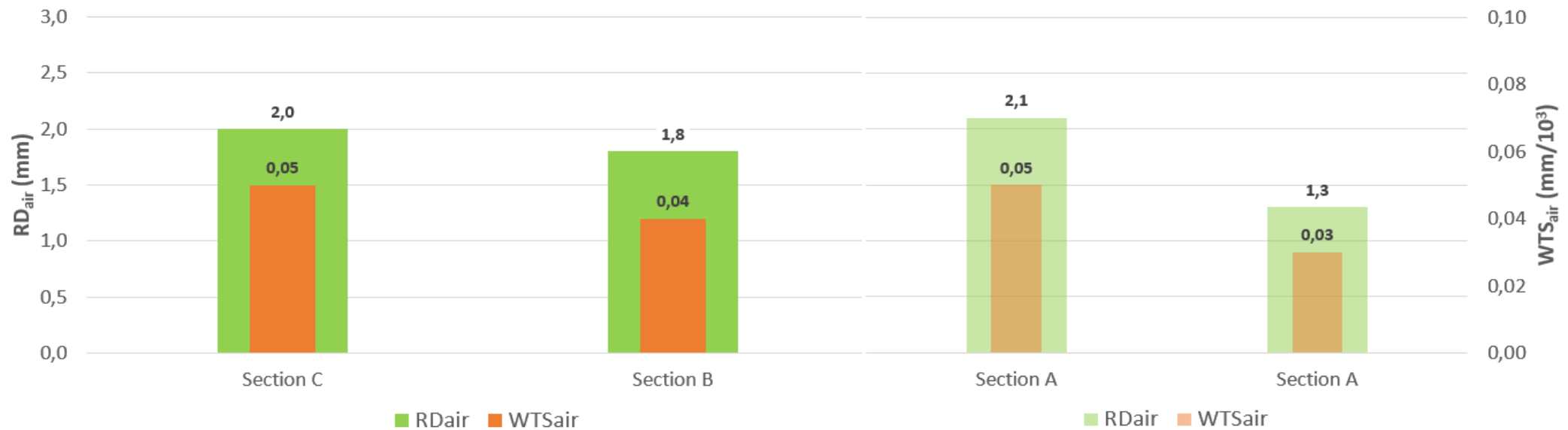
	Fractions in Plant		
	Section A	Section B	Section C
10/16 mm	27	29	29
4/12 mm	22	19	19
0/6mm	18	24	24
8/16mm (RA)	20	19	19
Filler	9	5	5
Viatop plus RC	-	-	0,15
Optimum Bitumen	5	5	5
Recovered Bitumen	0,5	0,3	0,3
PMB 45/80-65	4,5	4,7	4,7

11. Reclaimed Asphalt Pavements Project | Mixtures Characterisation



	Stability	Flow	Quotient	Air voids
Reference values	12,5 - 15 kN	2 - 4 mm	≥ 3	3 - 6 %

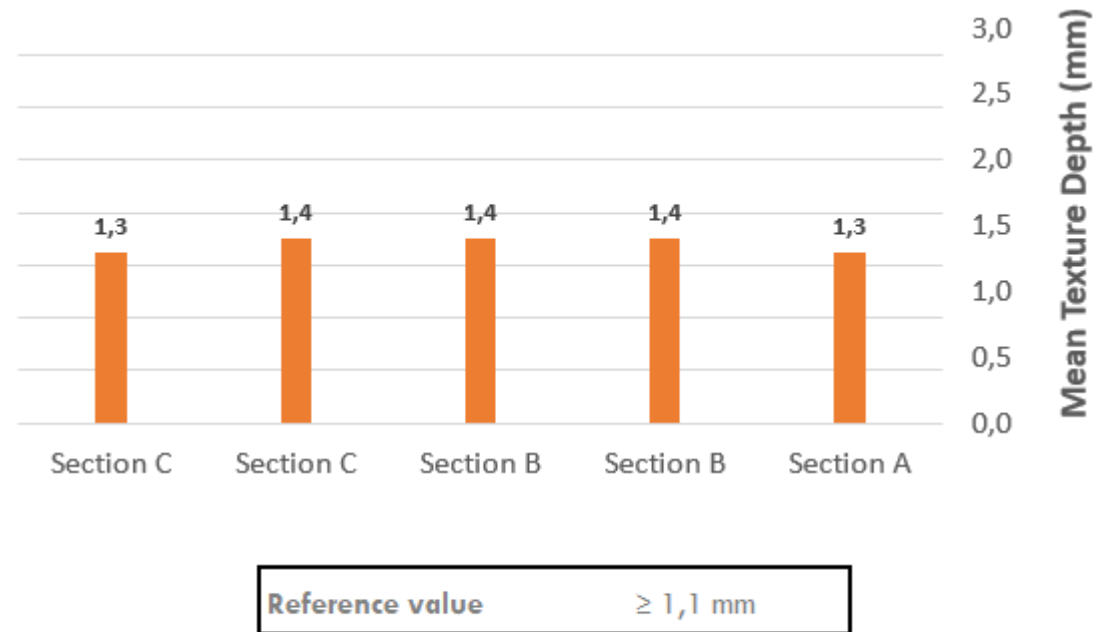
12. Reclaimed Asphalt Pavements Project | Mixtures Performance



Note: Laboratory information

	WTS _{air}	RD _{air}
Reference values	≤ 0,10 mm/10 ³	to be declare

13. Reclaimed Asphalt Pavements Project | Surface Characteristics



14. Reclaimed Asphalt Pavements Project | Conclusions

- The results obtained from the tests carried out confirm the suitability of the materials used
- It's necessary to evaluate the development of the functional performance of the bituminous mixture applied
- The use of RA promotes a reduction of virgin aggregates and virgin bitumen:
 - Promotion of circular economy with environmental advantages
 - Possible economical advantages
- Higher percentages of RA need a proper laboratory characterization to determine the use of rejuvenators

15. Reclaimed Asphalt Pavements Project | Next Steps

- Following Steps Towards Sustainability
 - Quantify Carbon Footprint reduction in Sustainable Pavements Solutions and compare solutions
 - Quantify Circular Economy gains and compare solutions
 - Warm Mix Asphalt Project
- Challenges
 - Industry limitations
 - Characterization and quality of the reclaimed asphalt
 - **Constructions Specifications**

THANK YOU

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