ASECAP DAYS
MADRID 2025

52nd ASECAP DAYS

Challenges of Future Mobility | The Role of Road Infrastructure



Organized by ASECAP

Hosted by seopan
Asociación de Empresas Constructoras y Concesionarias de Infraestructuras

26 - 28 May 2025 | Madrid
www.asecapdays.com

A35 TOWARDS THE GREEN HIGHWAY: RECYCLING MATERIALS, REDUCING EMISSIONS AND SAFEGUARDING NATURAL MATERIAL RESOURCES

GIUSEPPE MASTROVITI - LORENZO CICCIU'

A35 Brebemi

ALEATICA

Pubblico

OVERVIEW

1. THE ROLE OF TRANSPORT SYSTEMS

- A35 BREBEMI AND ALEATICA GROUP – WHO WE ARE
- ECO-SUSTAINABLE CHOICES FOR RESILIENT INFRASTRUCTURES

2. THE A35 BREBEMI STRATEGY IN PAVEMENT MANAGEMENT

- THE PROJECT OF THE "PERFECT FORMULA" FOR THE OPEN GRADED BITUMINOUS MIXES
- LABORATORY STUDIES & TRIAL PROTOCOL
- INNOVATIVE ADDITIVES TO IMPROVE THE MECHANICAL PERFORMANCE OF THE BITUMEN
- THE INSTALLATION OF THE INNOVATIVE PAVEMENT
- LCA (LIFE CYCLE ASSESSMENT) ANALYSIS

3. NEXT STEPS TOWARD GREEN HIGHWAY

- CONTINUOUS PAVEMENT MONITORING CYCLES
- OPTIMISATION OF PRODUCTION AND LAYING CYCLES

Pubblico

1. THE ROLE OF TRANSPORT SYSTEMS

WHO WE ARE

ALEATICA
Smart & Sustainable Infrastructure

ASECAP DAYS
MADRID 2025

A35 BREBEMI is part of ALEATICA GROUP an exclusive transport infrastructure operator, which means we can focus purely on the design and operation of highways and other mobility assets in Europe and Latin America.

Aleatica is fully owned by IFM Global Infrastructure Fund, which is managed by IFM Investors, a pioneer in infrastructure investment.

Our operation has a unique geographic footprint.

Mexico | Peru | Colombia | Chile | Spain | Italy | United Kingdom

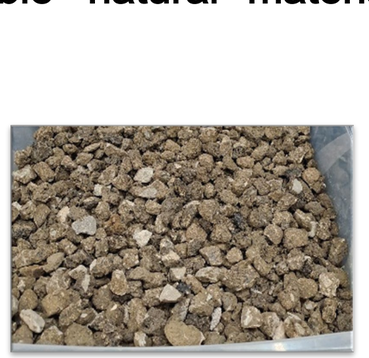


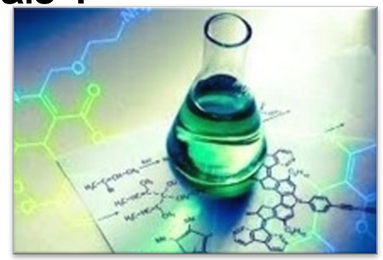
Pubblico

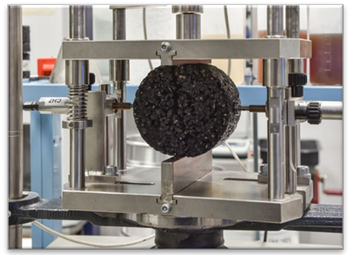
ECO-SUSTAINABLE CHOICES FOR RESILIENT INFRASTRUCTURES

In recent years, the violent effects of climate change are increasingly evident in the ecosystem and forcing us to make eco-sustainable choices in all production sectors of anthropic life. The role of transport systems is a fundamental aspect to guarantee strong social development, but with the foresight that climate resilience guides us towards the protection of natural materials and the recycling of those deriving from the end of the useful life of the materials resulting from installations and infrastructures . Highways involve the massive use of open graded bituminous mixes which require the application of non-regenerable natural materials .

In this context, A35 BREBEMI in its planned highway pavement maintenance activities has begun studies and implementations in order to maximize the recycling of materials and in compliance with the spirit of green roads, the WEAR LAYER WITH HIGHT PERCENTAGES OF RAP was tested . Open grade mixtures containing 20, 25, 30 and 35% of RAP were produced and tested . The goal is to guarantee the same performance achieved with a mix design of totally virgin materials . In addition, with a view to circularity, A35 BREBEMI has reused the RAP from the milling of its own highway!













Circular Pavement Strategy

Pubblico

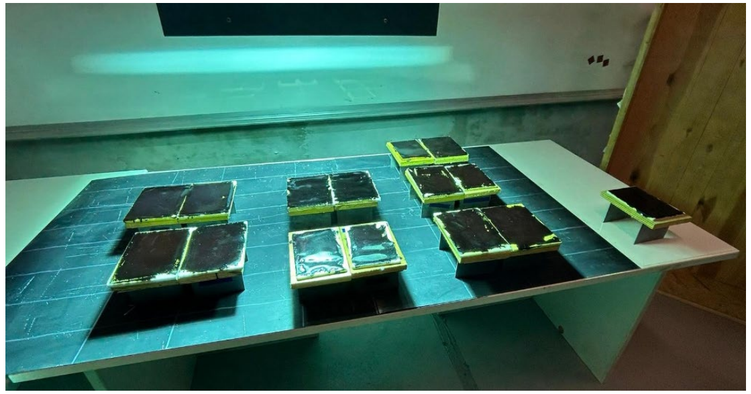
LABORATORY STUDIES & TRIAL PROTOCOL

A study was carried out to enhance the properties of RAP with innovative additives specifically designed and targeted to improve the mechanical performance of the bitumen . In accordance with the circular economy, this strategy allows us to add among the benefits a significant reduction in CO2 emissions, both with regards to the disposal of road materials in landfills and the resurfacing of the road pavement itself . The project of the perfect formula for the bituminous conglomerate was first studied in the laboratory with characterization tests aimed at improving the mechanical and functional behavior .

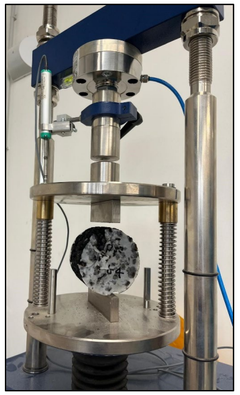
Several studies were carried out in the Laboratory with different types of aggregate and bitumen mixtures to be used in experimentation in order to define the optimal mix . Rheological characterization was performed, on hard bitumen and additive -modified hard bitumen, by simulating aging with exposure to ultraviolet radiation using mercury lamps .

Laboratory tests were performed on different mix designs to verify mechanical performance through :

- COMPACTION WITH GYRATORY PRESS
- CANTABRO TEST
- INDIRECT TENSILE TEST
- MARSHALL TEST
- SCUFFING TEST



Laboratory Test





Pubblico

INNOVATIVE ADDITIVES TO IMPROVE THE MECHANICAL PERFORMANCE OF THE BITUMEN

From the analysis of the results of the tests performed, it was possible to identify the optimal granulometric curve, the amount of bitumen and the additives to be used in order to obtain an asphalt mix that adheres to the requirements and with performances.

A special NEW GENERATION ANTI-RAVELING ADDITIVE useful for improving the mechanical performance of the mix has been specially DESIGN and PATENTED by Mapei SpA, A35 BREBEMI ALEATICA and the University of Parma, called Anti-raveling MAP. Anti-oxidant and anti-ravelling association for draining bituminous conglomerates, specifically formulated to compose asphalt mixes with high resistance to oxidative and crumbling actions resulting from weathering and the mechanical action of tires. Its specific formulation contains within it chemicals that can improve the performance of the bituminous mix, increasing its resistance to washout, compatibility with the aggregates, preserving its rheological characteristics longer, resulting from the less oxidation undergone, and increasing its durability and toughness .

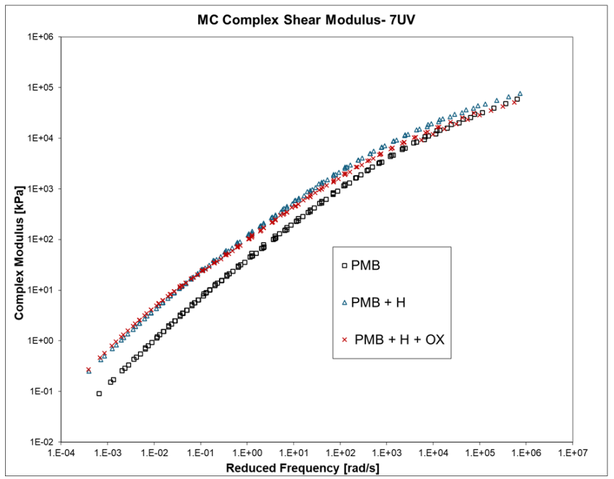
Rheological analysis on Anti-raveling Additive

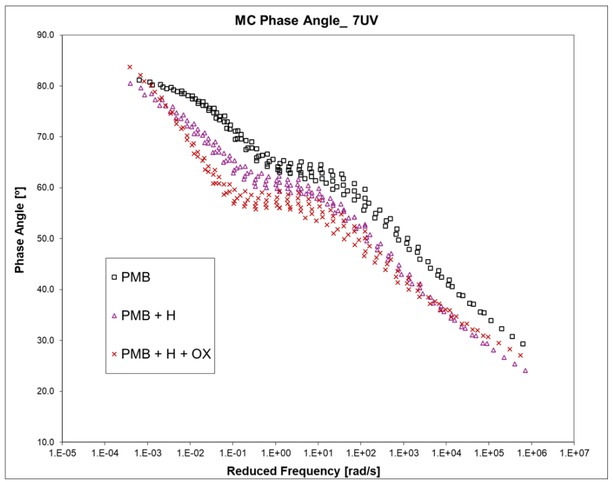
MAPEI ADHESIVES · SEALANTS · CHEMICAL PRODUCTS FOR BUILDING

ALEATICA Smart & Sustainable Infrastructure

UNIVERSITÀ DI PARMA

Bituminous mechanical performance proceeding with the severity of the photo -oxidative ageing (UV -aging)





Pubblico

INNOVATIVE ADDITIVES TO IMPROVE THE MECHANICAL PERFORMANCE OF THE BITUMEN

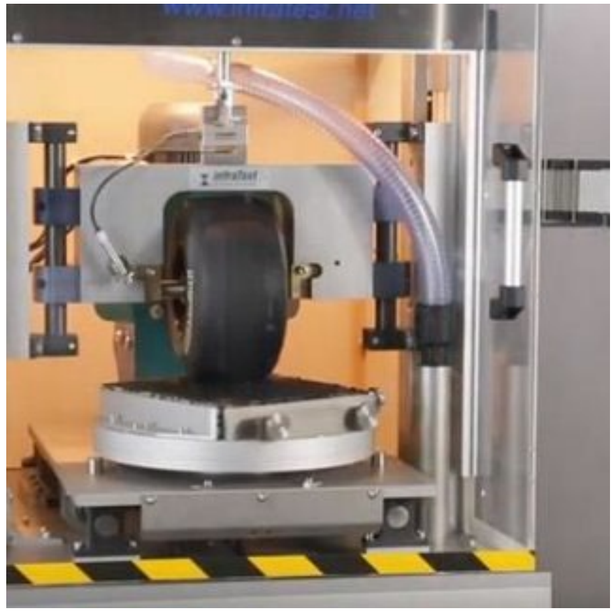
CANTABRO TEST - UNI EN 12697-17

On the left: samples resulting from the mixture Anti -raveling MAP
On the right: samples resulting from the Virgin mixture





SCUFFING RESISTANCE TEST - UNI EN 12697-50:2018
Part 50: Resistance to stripping





VIRGIN MIX





VIRGIN MIX+30%RAP





VIRGIN MIX+30%RAP+
Anti-raveling MAP



Pubblico

THE INSTALLATION OF THE INNOVATIVE PAVEMENT

After the laboratory study phase was completed, test fields were conducted to calibrate all elements of the process (materials, plant, production, paving, rolling, etc .).







After all elements were calibrated, scheduled maintenance work on the open grade wear layer was subsequently carried out .



Pubblico

LCA (LIFE CYCLE ASSESSMENT) ANALYSIS

A35 BREBEMI also carried out an LCA study with the aim of comparing the environmental performance of different open grade wear mixtures in order to quantify the environmental benefit of replacing 20-30-35% of virgin material with recycled material from milled material (RAP). This strategy is in line with circular economy principles, which prescribe that waste products be enhanced rather than disposed of at the end of their life, in order to make them a new resource and to avoid the environmental impacts associated with waste disposal and virgin material extraction .

Comparison of wear with only VIRGIN AGGREGATE vs RAP.

[Reference unit = 1km highway lane - width 4 m - thickness 4 cm]

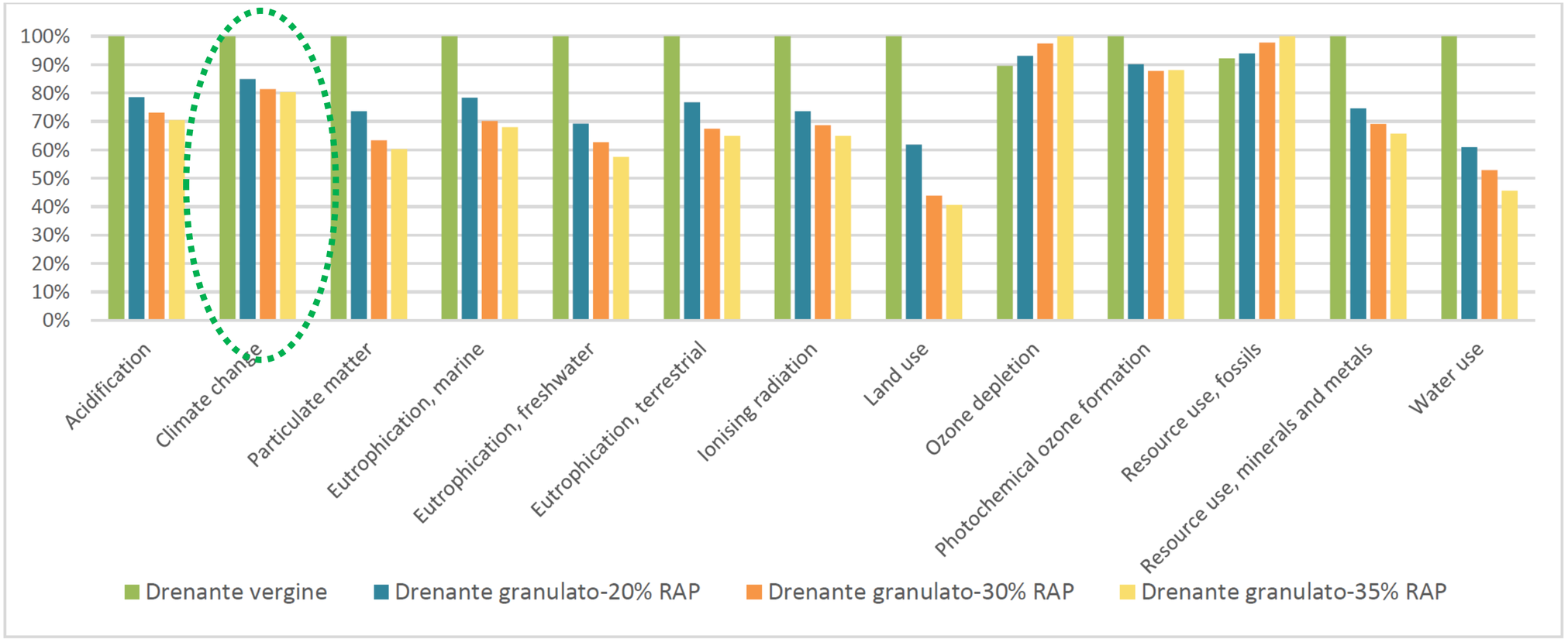
The analysis defined system borders and product lifecycle stages with "cradle-to-gate" approach included all stages from raw material extraction to mixture rolling out .

Virgin raw material Extraction -> Quarry-to-plant Transport -> VIRGIN/RAP open grade wear Production -> Plant-to-site Transport -> Paving

Pubblico

LCA (LIFE CYCLE ASSESSMENT) ANALYSIS

Result of the impacts associated with the input data defined in the analysis phase :
[Reference unit = 1km highway lane - width 4 m - thickness 4 cm]

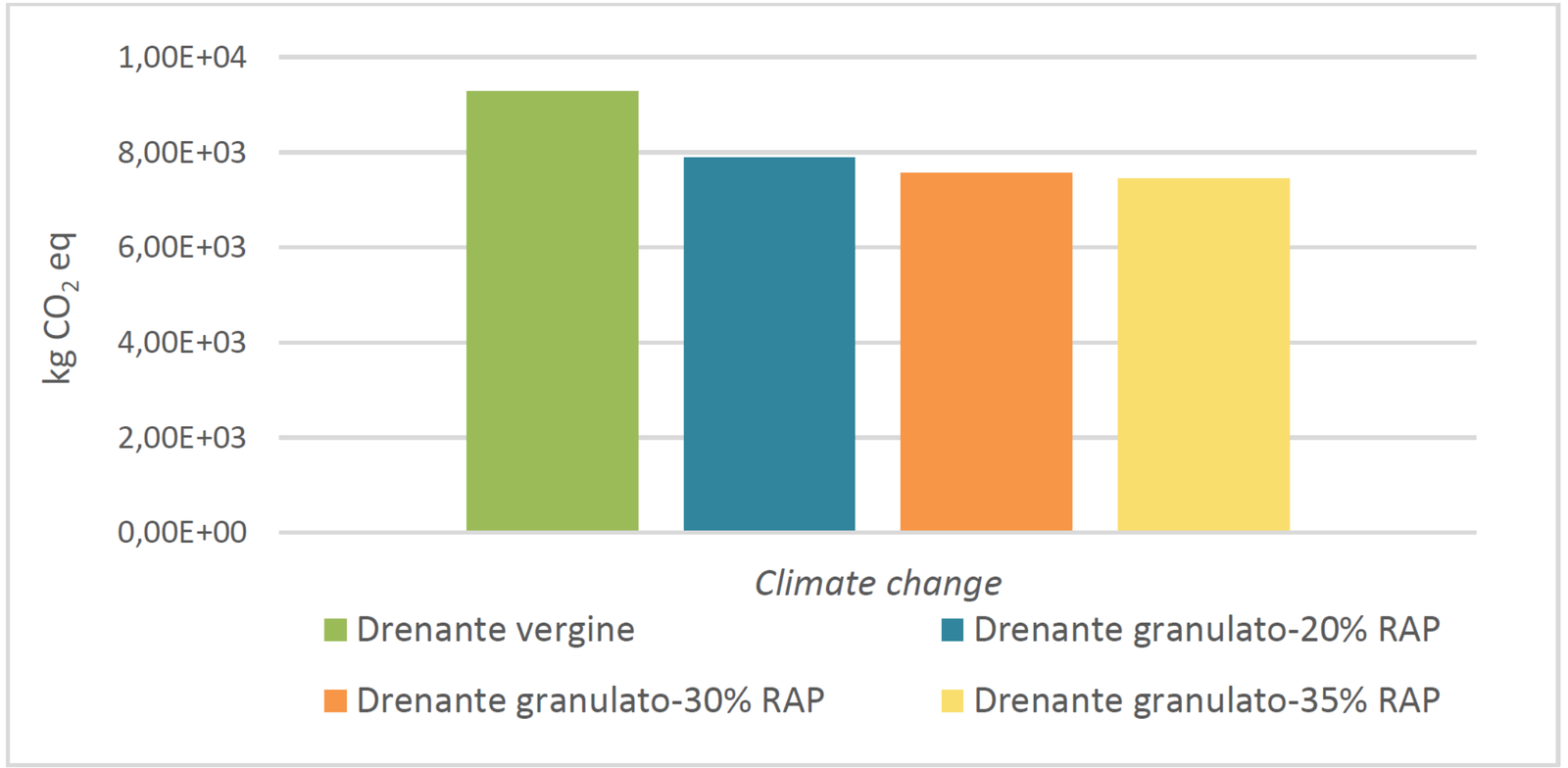


Virgin vs 20% RAP vs 30% RAP vs 35% RAP - Impact categories

Pubblico

LCA (LIFE CYCLE ASSESSMENT) ANALYSIS

Focusing on the Climate Change category , it can be seen that using the mix with 20% RAP results in a 15% reduction in impact (GWP-Gobal Warming Potential reduction) respect Virgin . Increasing the percentage to 30% and 35% achieves reductions of 19% and 20%.

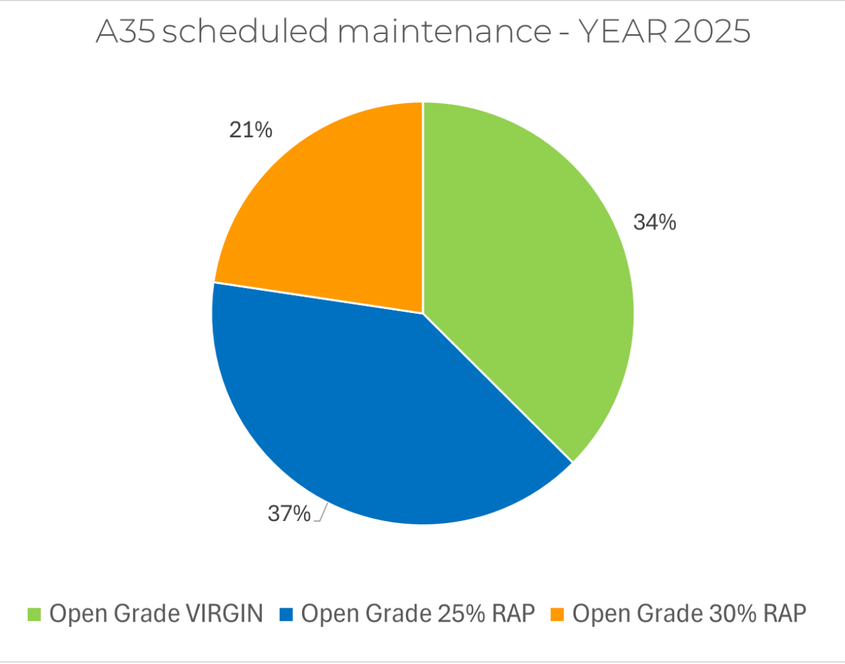


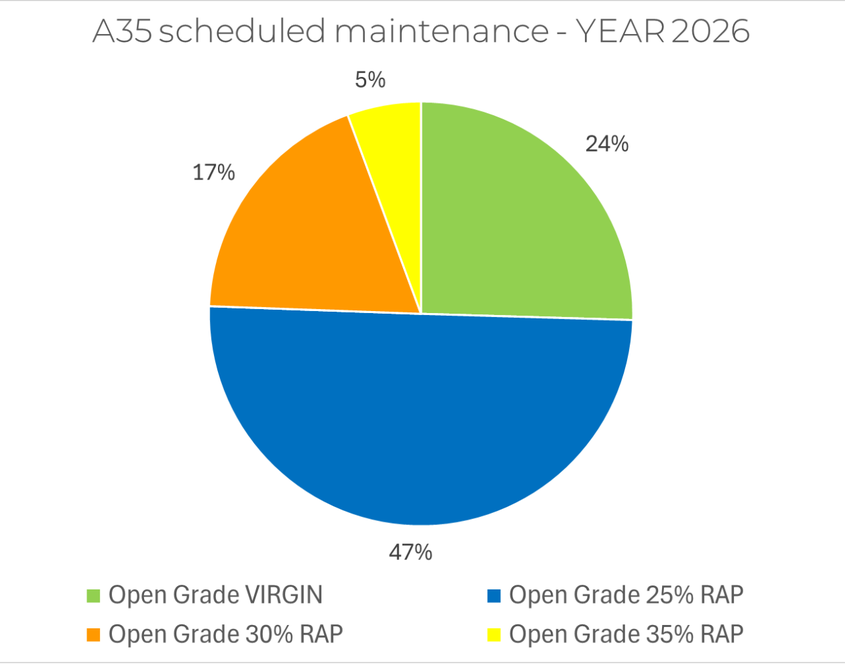
Virgin vs 20% RAP vs 30% RAP vs 35% RAP – Climate Change Category

Pubblico

CONTINUOUS PAVEMENT MONITORING CYCLES -> OPTIMISATION OF PRODUCTION AND LAYING CYCLES

For scheduled maintenance operations A35 Brebemi want to continue to study innovative and eco-sustainable solutions for the porose bituminous layer with the use of asphalt recycled from the highway itself (RAP) instead of virgin aggregates in order to introduce, with the same performance, a reduction in natural resources, giving a new and strong impulse in terms of eco-sustainability and bringing a very important turning point in the field of "green - pavement" also through the use of new generation additives which allow low production and laying temperatures of the asphalt, improving the environmental impact . At the same time we will evaluate and study any new innovative proposals .





Virgin vs 20% RAP vs 30% RAP vs 35% RAP – Scheduled Maintenance Year 2025 - 2026

Pubblico

ASECAP DAYS

MADRID 2025

Thank You

Contact Us

+39-030-2926311

giuseppe.mastroviti@brebemi.it

lorenzo.cicciu@brebemi.it

www.brebemi.it

A35 Brebemi

ALEATICA

Pubblico