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Impact of recycled asphalt content on physico-mechanical properties of cement-retreated materials

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INTRODUCTION & AIM

1. Context

Asphalt milling →

- **Environmental pollution**
- **Depletion of natural resources**

How to reduce carbon emissions in road construction ?

2. Objective

- Study the influence of Recycled Asphalt Pavement (RAP) content on the physico-mechanical properties of tested mix
- Evaluate the impact on the LCA of these mix

METHOD

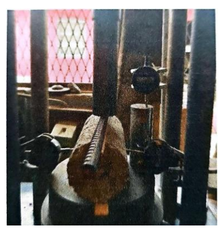
Three mix are studied:

Mix 1 (M1): based on Unbound Granular Materials (UGM)

Mix 2 (M2): based on Cement-bound Granular Materials (CBGM) (2% of cement)

Mix 3 (M3): with UGM and three proportions of RAP (10%, 20% and 30%)

Curing: 3 days in air and 28 days in water, 25°C and 80% RH

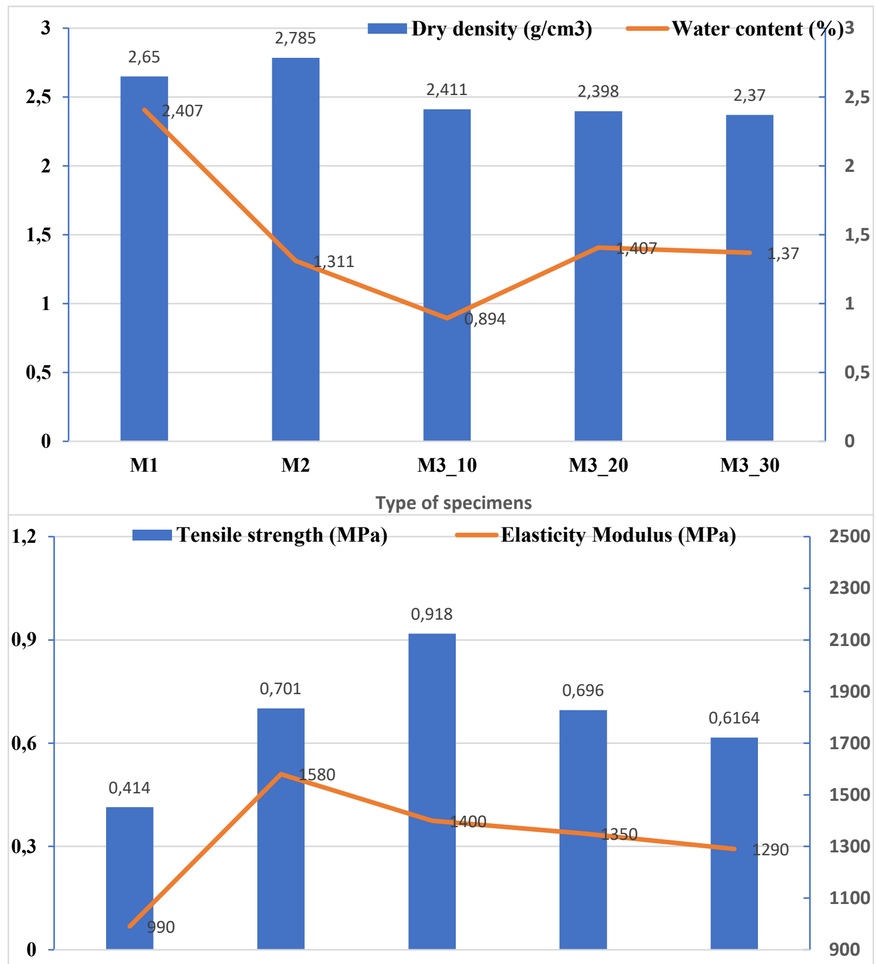


Physical tests: Dry density, Water content

Mechanical tests: Tensile strength, elasticity modulus

According NF EN 13286-42 standard

RESULTS & DISCUSSION



N°	STEPS	NEW ROAD (KG-CO2)	RAP ROAD (KG-CO2)
1	Extraction and production of materials	18.16	9.70
2	Transport of materials	4.25	4.25
3	Production and transport of the bituminous mixture	50.05	20.85
4	Intermediate processing / milling, recycling	37.95	22.60
5	Road construction	22.35	22.35
TOTAL (CO_2/ m² of flexible pavement)		132.76	79.75

CONCLUSION

- Mechanical strengths decrease with an increase in RAP aggregate content
- Modulus of RAP-based specimens in between UGM modulus and CBGM one
- 10% RAP in the mix have significant impact on carbon emission

REFERENCES

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2. Kuchiishi et al. (2021). *Effect of mixture composition on the mechanical behaviour of cold recycled asphalt mixtures*, Int. Jour. Pav. Eng. https://doi.org/10.1080/10298436.2019.1655564