Asphacal®

Case Study
Asphacal® H

ASCS2 EN - 1502

Production of durable asphalts in a mountainous region

Context

Mountain Asphalt Concrete (AC) is subjected to harsh conditions due to the severe climate and the topographical constraints. Thus it is accepted that the service life of a standard AC for wearing courses is 25 to 50% shorter in a mountainous region than in plains. These asphalts, however, represent about 10% of the total tonnage of asphalt laid every year in France (i.e. 4 Mt).

Stripping constitutes the primary cause of the encountered damage, due to:

- more humid climate in mountainous region (→500m altitude)
- existence of constantly wet zones due to their geographic orientations
- increasing permeability of asphalt over time
- zones which are difficult to compact homogeneously (winding roads, slopes...) and then creating more weak points with higher porosity
- freeze/thaw cycles

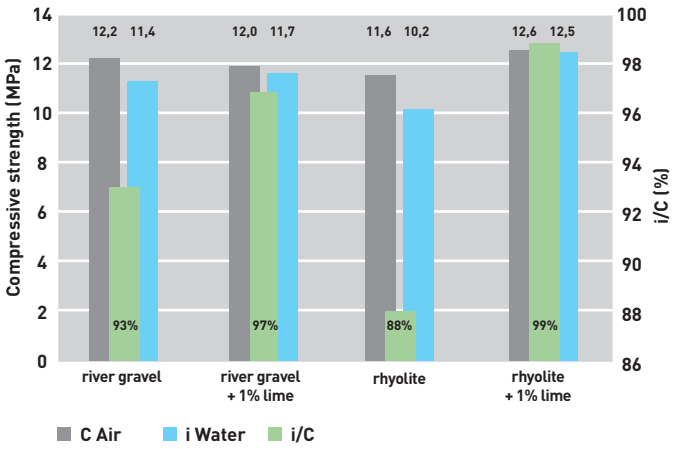
As a consequence, the presence of moisture can induce volume changes when turning into ice and the repeated use of deicing salts weaken the asphalt and make it less durable.

The solution: Asphacal® H

A laboratory study concluded that the addition of Asphacal® H products into the production of a specific mountain AC allows to:

- increase the durability of the mix by strengthening the adhesion between the bitumen and the aggregate.

Influence of the addition of hydrated lime on the moisture resistance of different asphalt concretes



C = compressive strength in air
i = compressive strength after immersion in water
i/C = water sensitivity

Validation using the Duriez test, NF EN 12697-12, on BBSG 0/10
Source: ESTP 2010 study

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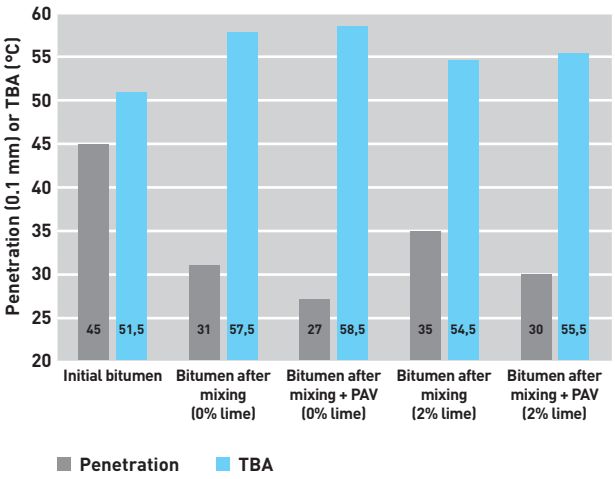
- improve crack resistance by limiting the hardening of the binder due to chemical aging.

Penetration and "Ring and Ball" softening temperature (R&B) of the bitumen extracted from the AC after mixing and accelerated aging



Source: LCPC 2001 study

450t of "mountain" asphalt with 1% Asphacal® H100 were employed in the Doubs department (France). This experiment was conducted on a T3- traffic mountain road. After 4 very severe winters, this asphalt does not yet show any damage.

Application

Asphacal® H products are used in all types of mixing plants (continuous, batch, fixed, mobile). They are incorporated in the same manner as a conventional filler, at rates making it possible to obtain generally between 1 and 2 wt.% hydrated lime based on the asphalt. The exact proportion is defined by a formulation study according to the type of material and the desired specifications. Lhoist can advise its customers in using this product and can support them in setting up tailor-made technical solutions.

Conclusion

Asphacal® H products are hydrated limes and limestone fillers activated with hydrated lime at different percentages, designed specifically for increasing the durability of asphalt pavings. Asphacal® H can be used alone for improving regular AC or in synergy with other additives especially polymers.

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With its Asphacal® range (Asphacal® C, Asphacal® TC, Asphacal® H, Asphacal® Q and Asphacal® BK), Lhoist supports the civil engineering industry in seeking high-performing solutions for more durable roads.