

Long term performance of low temperature asphalt mixtures containing reclaimed asphalt

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WHO ?

Hello everyone! My name is Miguel Perez Martinez, and I'm the Early Stage Researcher 3 within the European Project SUP&R ITN.

I'm Civil Engineer, from Granada and working on the roads research area, now with particular emphasis on sustainable pavements.

WHERE ? & WHEN ?

At **IFSTTAR**, in **Nantes** (France), between 2014 and 2017, under the supervision of Mr. Paul Marsac. We have also the collaboration of the University of Huelva and EIFFAGE Travaux Publics



WHAT ?

Considering all the terms included in the title the aim and scope of my project can be imagined. It is the study of asphalt mixtures, but with some tricks. The **objective** is to study the **durability of asphalt mixtures combining high rates of reclaimed asphalt pavement (RAP) and warm mix asphalt technologies (WMA)**. This research must end up with my PhD thesis.

WHY ?

In this context of sustainable development, the project focuses on developing and designing efficient transport infrastructures for energy saving and non-renewable resources consumption reduction. With its multiple scientific challenge my PhD is centered in 3 points:

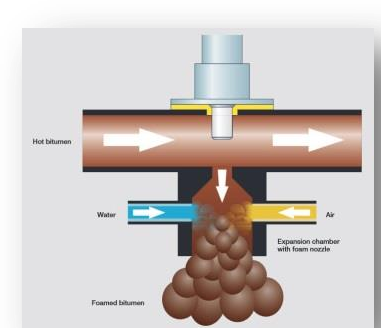
1. Enhance the confidence on the procedures that reduce asphalt mixture manufacture temperature.
2. Promote the addition of reclaimed asphalt pavement at high rates (50%) in order to reduce the amount of natural aggregates.
3. And finally the study of its durability. We will try to understand the damage process, the changes produced during ageing and their relationship with standard test.

HOW ?

3 STEPS

Type of Mixture

- HMA
- WMA surfactant
- WMA foaming



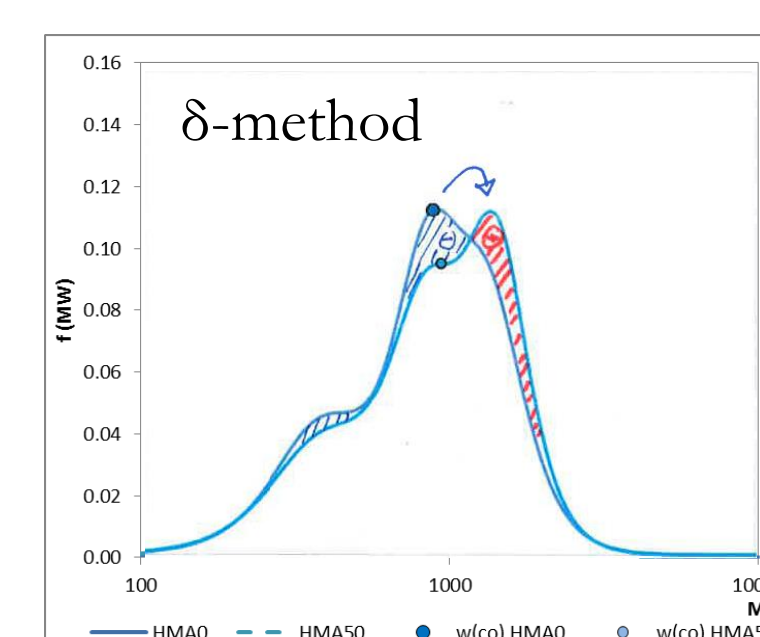
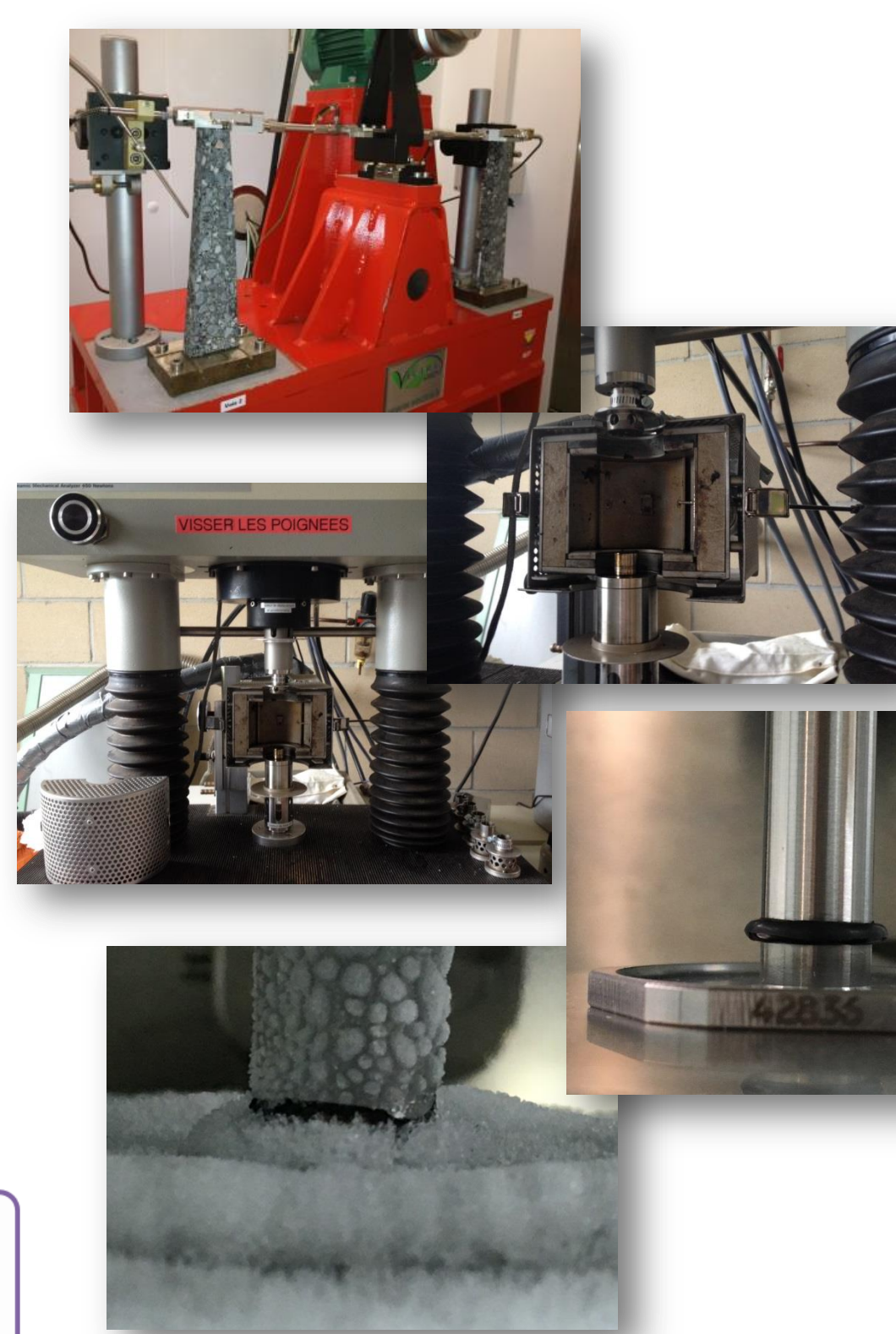
Modelling

- New methods

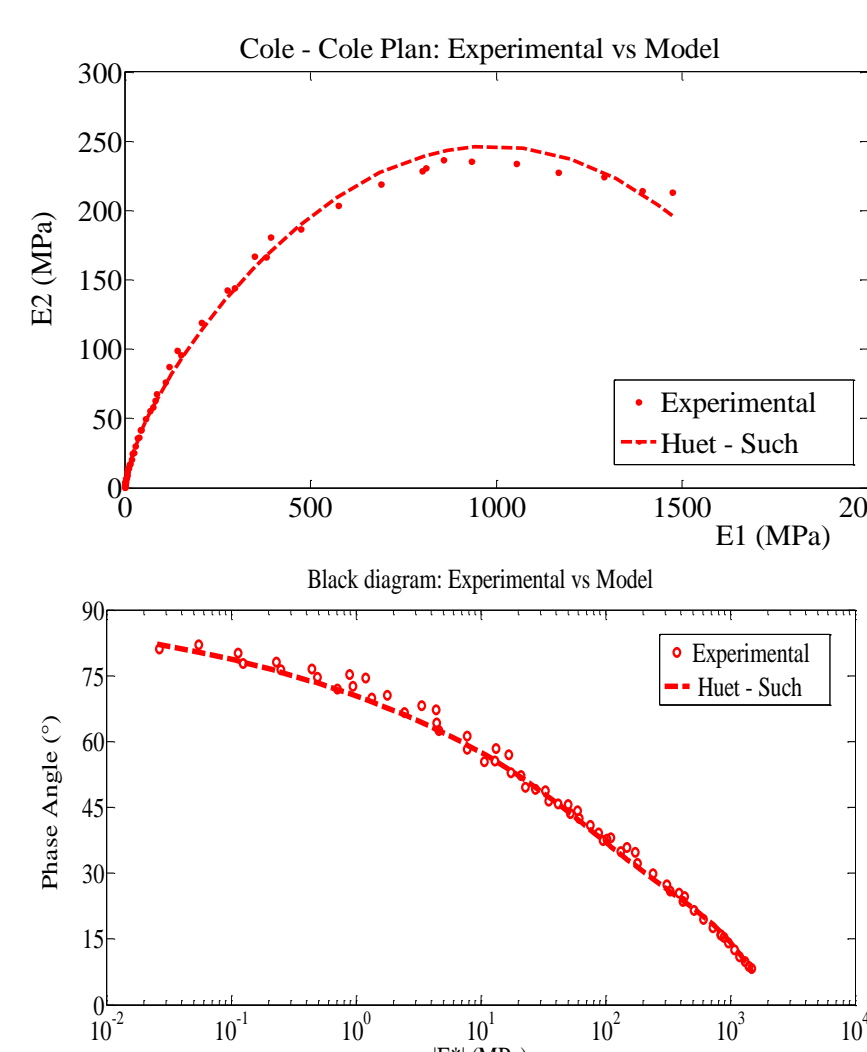
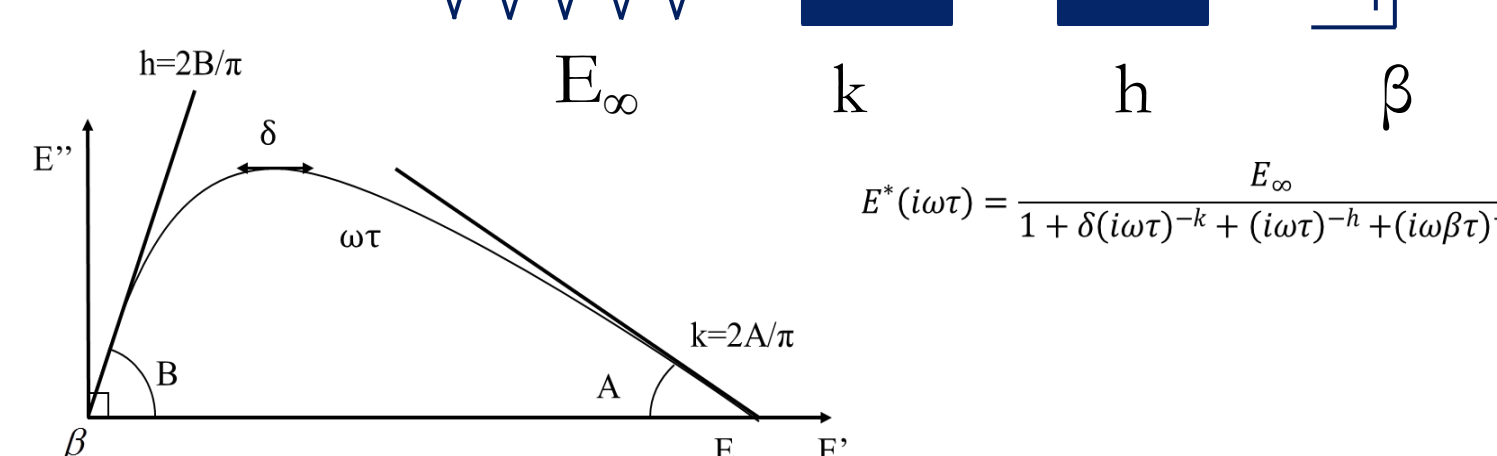


Mechanical Testing

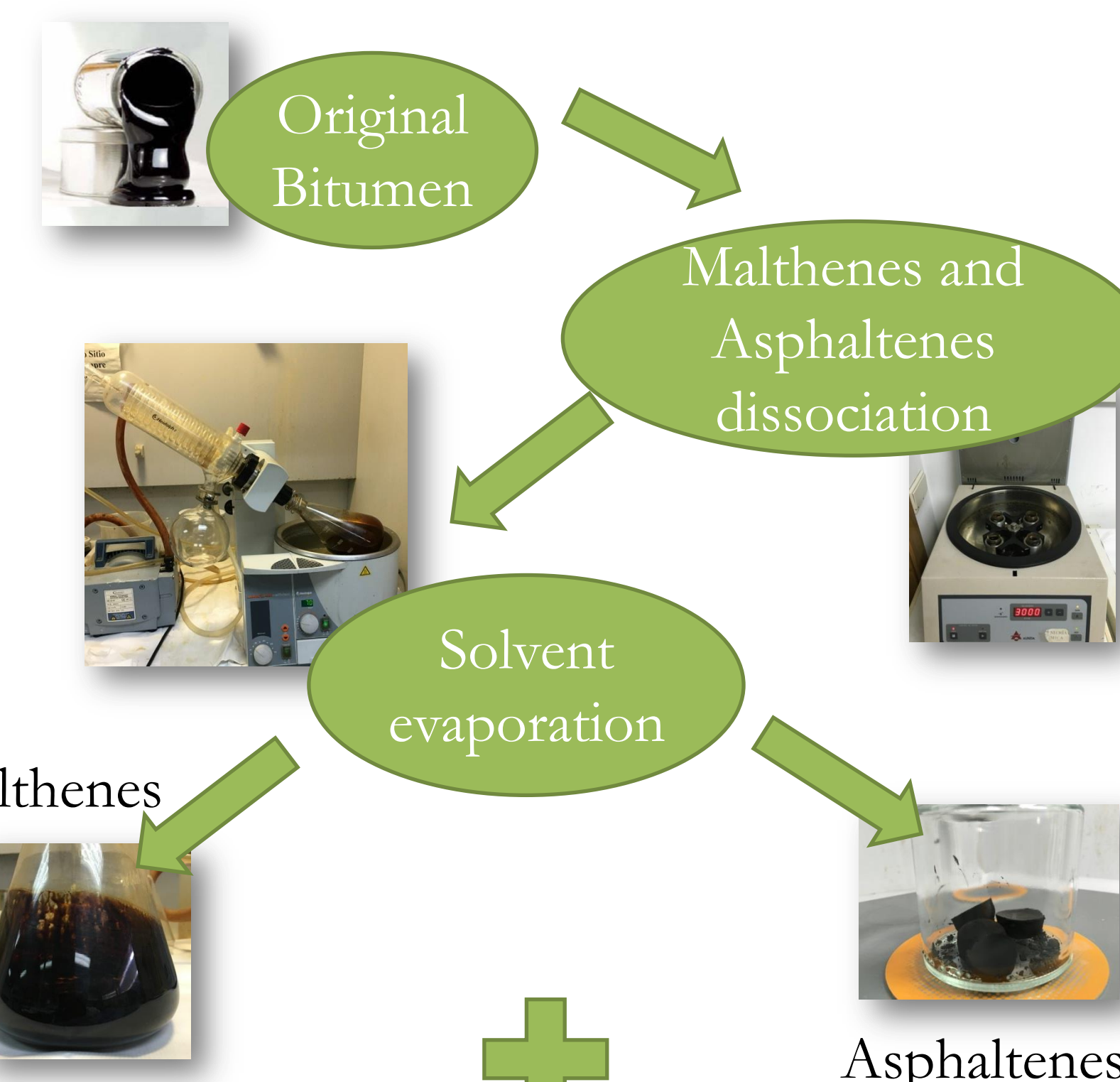
- Mixtures
- Bitumens



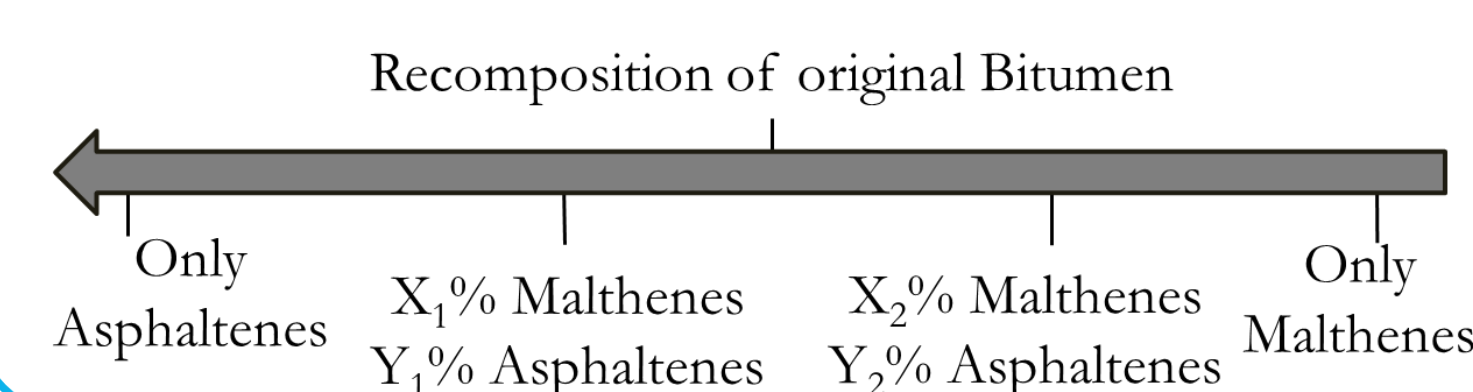
Some math work later...



In order to study **how bitumen evolve** and the **influence in its internal structure** we are going to separate it in its two principal fractions: **Malthenes** and **Asphaltenes**, and then re-combine them in different percentages.



Asphaltenes influence on Rheology



EXPECTATIONS

At the end of this project work it is expected:

- To identify specific damage processes that affects the combination of temperature reduction procedures combined with the use of high percentages of reclaimed asphalt pavements,
- As well as to determine the mix components properties and interactions involved at micro/macro scale.

The understanding of theses damage processes would guide towards some recommendations with regards to mix design procedure and mechanical tests analysis adaptation.



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