

Design and characterisation of Reclaimed Asphalt mixes with bio-binders

Ana Jiménez del Barco Carrión

SUPER ITN

Sustainable Pavement & Railway Initial Training Network

www.superitn.eu

@anajimbc / esr2.superitn.eu

MOTIVATION

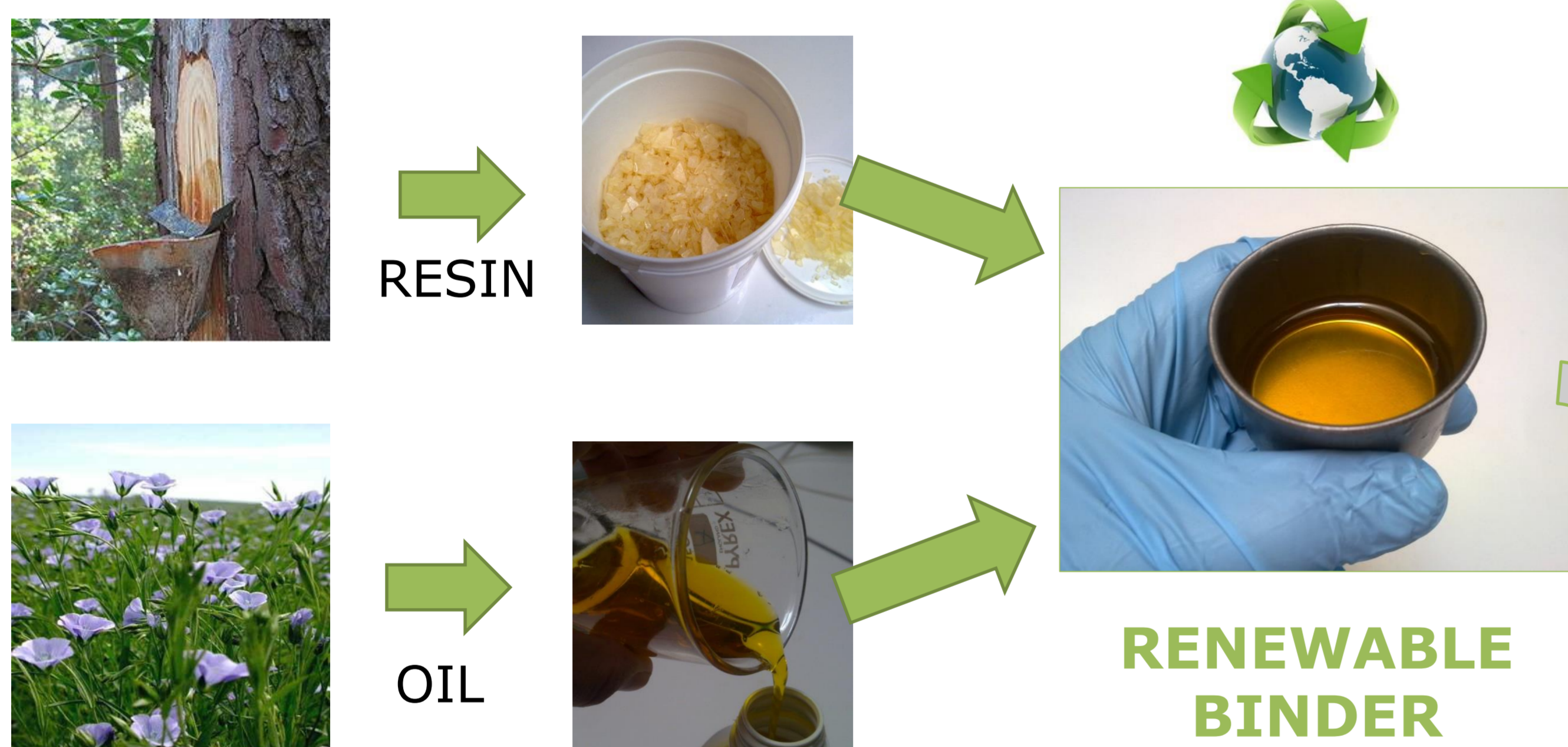
Current scarcity of raw materials for asphalt mixtures is encouraging the search of alternatives to traditional solutions for pavements. In this sense, Reclaimed Asphalt (RA) has shown great potential for being used in the construction or maintenance of roads. However, RA percentages in mixtures (especially in wearing courses) is still moderate ($\leq 30\%$) due to some issues in its performance. For the purpose of overcoming these issues and increase RA content in mixtures, new techniques, such as the use of rejuvenating agents for RA, are being applied in this field of research. At the same time, the relatively new concept of biobinders (binders manufactured from biomass), as suitable alternatives for oil-based materials, is gaining force in pavement engineering.

OBJECTIVES

Under the framework described, the main objective of this project is to study mixtures with high RAP content including biobinders as fresh binder in order to encourage the development of environmental friendly solutions for roads. Therefore, specific objectives are:

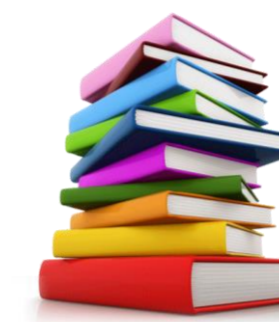
- ✓ To identify and characterize biobinders
- ✓ To develop binder blend design with RA
- ✓ To study a mix design with biobinders and RA
- ✓ To find a mix solution with high-RAP content and biobinders

BIO-BINDERS

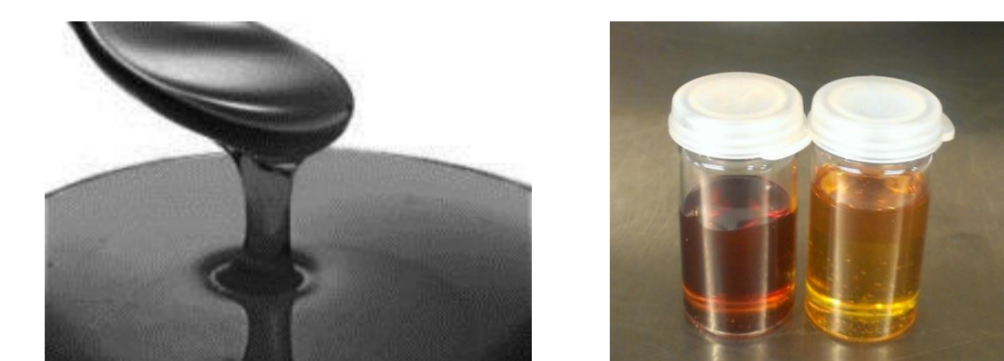


RESEARCH APPROACH

LITERATURE REVIEW

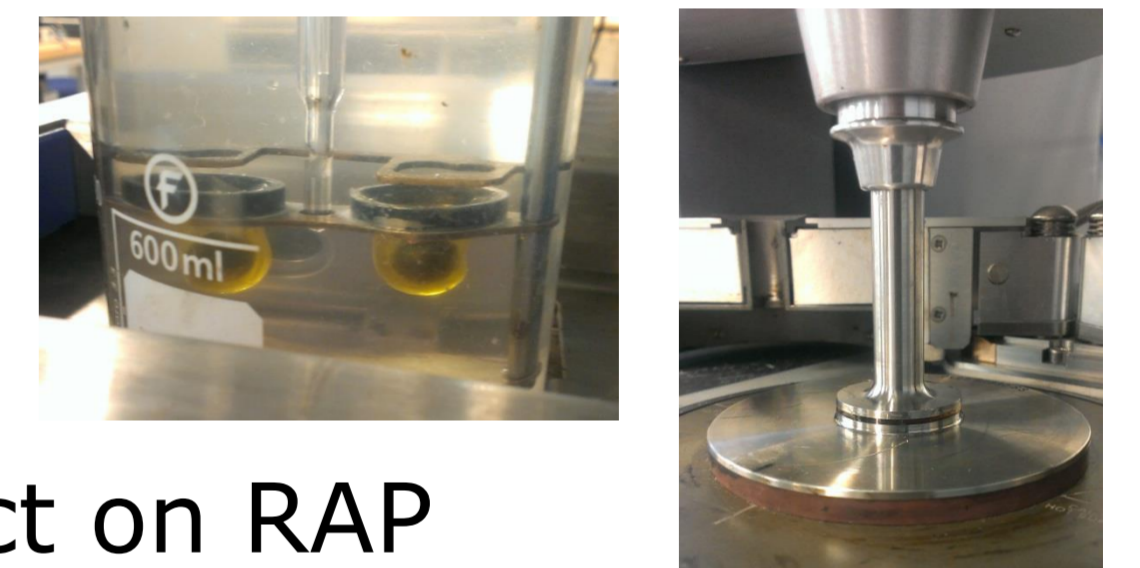


RAP BINDER AND BIO-BINDERS BLEND DESIGN



How will a blend of recycled binder and bio-binder behave?

BIO-BINDERS STUDY



Need for viscoelasticity
Need for rejuvenation effect on RAP

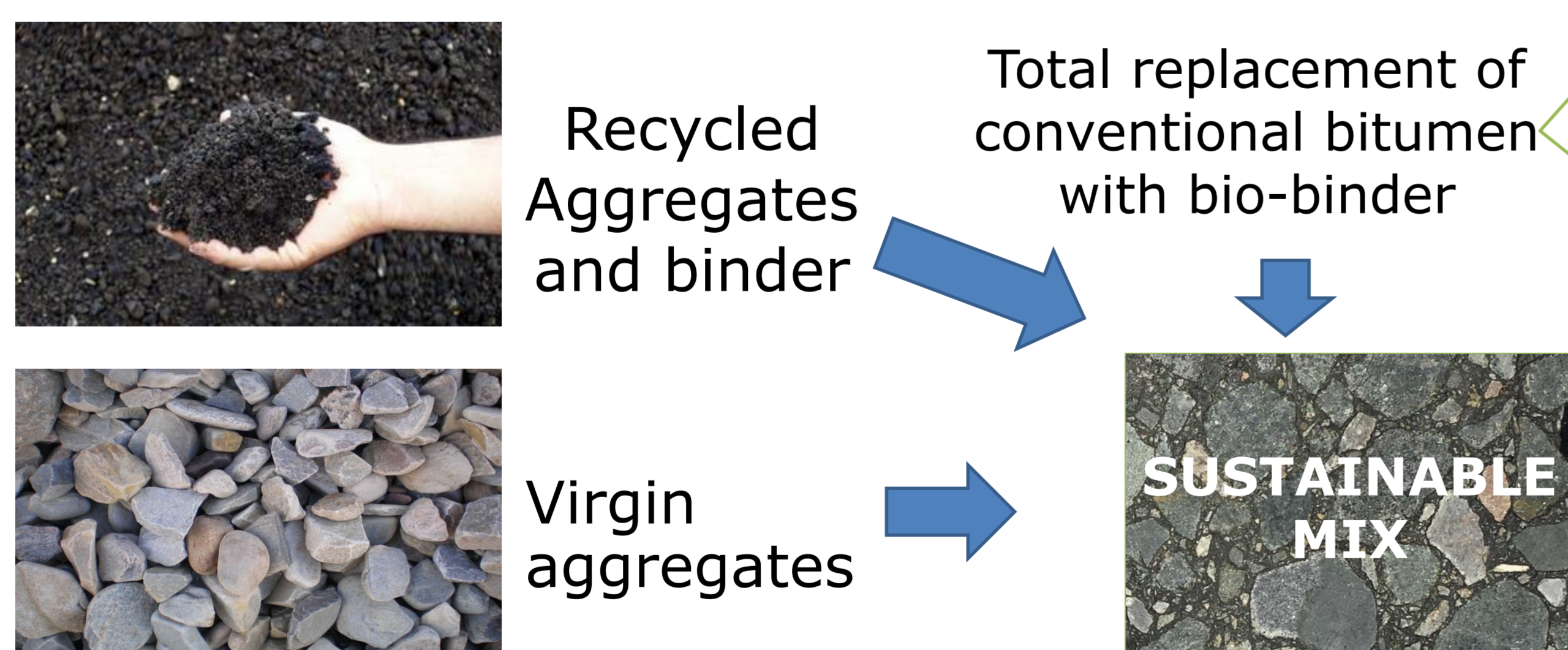
MIXTURES STUDY

Need for a mix design
How will bio-binders and RAP perform?

MIX WITH HIGH-RAP CONTENT AND BIO-BINDERS



High Reclaimed Asphalt content mixtures



RESULTS

Current results have shown that biobinders could be used as rejuvenators for RA materials in order to restore aged binder properties and increase RA content in asphalt mixes.

Bioasphalt mixtures still need further development for commercial exploitation; however the take-away fact of this investigation is that it is possible to manufacture asphalt-like mixtures with acceptable viscoelastic properties while being composed only of RA and non-petroleum based binders.

CONTACTS

Ana Jiménez del Barco
Davide Lo Presti
Gordon D. Airey

ana.jimenezdelbarcocarrion@nottingham.ac.uk
davide.lopresti@nottingham.ac.uk
gordon.airey@nottingham.ac.uk



The research presented in this presentation was carried out as part of the Marie Curie Initial Training Network (ITN) action, FP7-PEOPLE-2013-ITN.

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement number 607524.



UNITED KINGDOM · CHINA · MALAYSIA

