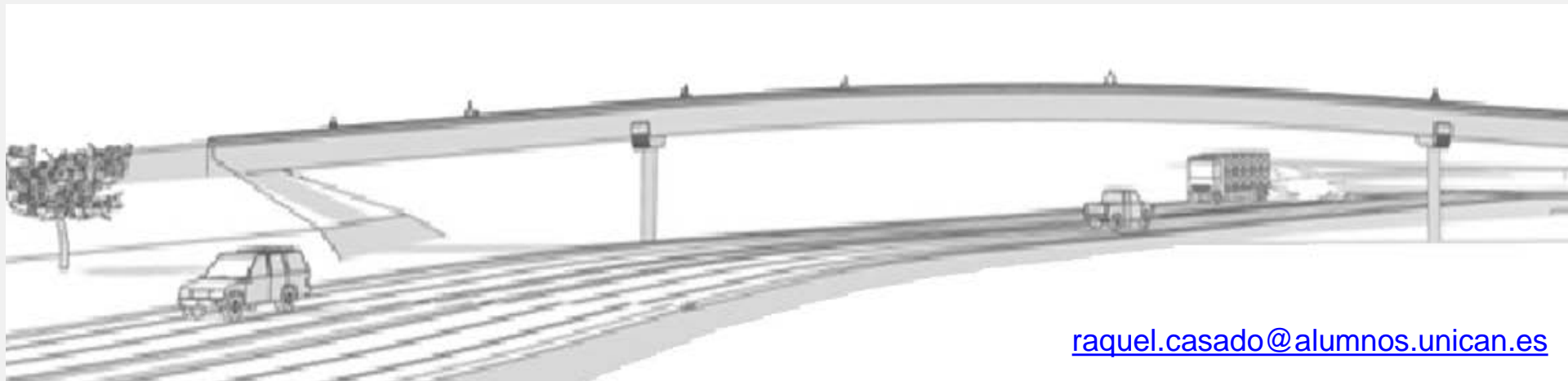


MULTIFUNCTIONAL ASPHALT MIXTURES

PhD student: Raquel Casado Barrasa

Director: Daniel Castro Fresno

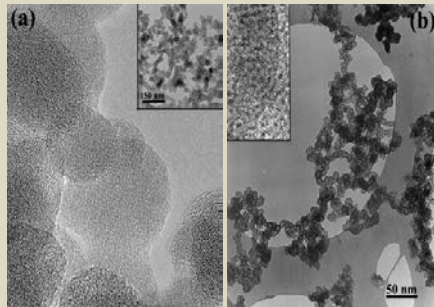
EIDEIC (18-05-2017)



1. HYPOTHESIS

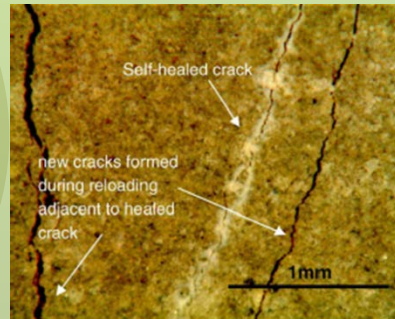
From the research....

DEVELOPMENT OF ADVANCED ASPHALT MIXTURES

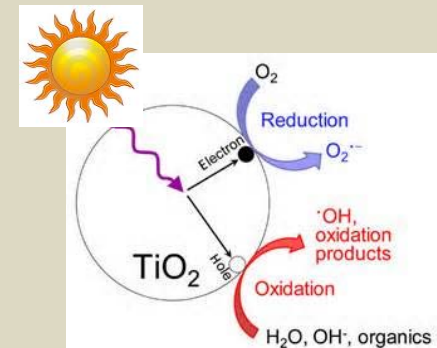


NANOTECHNOLOGY

DURABILITY



SELF-HEALING



PHOTOCATALYSIS

AIR DEPOLLUTION

... to the application

2. OBJECTIVES

To develop a self-healing asphalt with embedded capsules containing a self-healing agent.

- Literature review and SOTA ✓
- Selection of the raw materials: self-healing agent, carriers. ✓
- Development of an optimum impregnation method for the preparation of the capsules containing the self-healing agent. ✓
- Incorporation of the capsules prepared into the bituminous matrix and evaluation of their properties (*In progress*)
- To study the mechanisms for the release of the rejuvenator and evaluation of the SH ability (*In progress*)
- To validate the technology in a demo section (not started)

3. MAIN RESULTS - ACADEMIC ACTIVITY

Conferences

- ❑ Casado, Raquel; Martín-Portugués Montoliu, Carlos, **“Synthesis and characterization of encapsulated healing agents for asphalt”**. 7th Transport Research Arena, Vienna 2018.
Status: Abstract submitted.
- ❑ Casado Barrasa, Raquel; Kowalski, Karol; Berruezo Martínez-Illescas, Pedro; Klimaszewski, Artur, **“Field evaluation of a sustainable road pavement structure concept”**. 7th Transport Research Arena, Vienna 2018.
Status: Abstract submitted.
- ❑ Rodríguez-Fernández, Israel; Lastra-González, Pedro; Indacoechea-Vega, Irune; Jato-Espino, Daniel; Castro-Fresno, Daniel; Casado Barrasa, Raquel; László, Gáspár. **“Development of greener and climate resilient roads”**. 7th Transport Research Arena, Vienna 2018.
Status: Abstract submitted.
- ❑ Raquel Casado, Daniel Castro, Irune Indacoechea, José Díez. **“DURABROADS EU Project: Towards a more durable and resilient pavement”**. 6th Euroasphalt & Eurobitume Congress. June 2016, Prague.
Poster presentation.

3. MAIN RESULTS - ACADEMIC ACTIVITY

- ❑ K. Kowalski, J. Król , P. Radziszewski , R. Casado , V. Blanco, D. Pérez, V. Viñas , Y. Brijisse , M. Frosch , D. Le, M. Wayman “**Eco-friendly materials for a new concept of asphalt pavements**”. TRA2016 6th European Transport Research Conference, Warsaw, 18-21 April 2016
- ❑ R. Casado, V. Blanco, C. Martín-Portugués, V. Contreras, JF. Pedrajas, J. Santarén, “**Addressing durability of asphalt concrete by self-healing mechanism**”. 6th International conference on Bituminous Mixtures and Pavements, Tessaloniki, Greece, 10-12 June, 2015.
- ❑ V. Blanco, R. Casado, E. Saez, C. Martín-Portugués, “**Asphalt mixtures improved by the use of nanotechnology**”.6th International Conference on Bituminous Mixtures and Pavements, Tessaloniki, Greece, 10-12 June, 2015.

Technical papers

- ❑ V. Blanco, R. Casado, E. Saez, C. Martín-Portugués, “**Asphalt mixtures improved by the use of nanotechnology**”. Asphalt Professional Issue 68, April 2016 (p. 14-19).
- ❑ Casado, R., Blanco, V., Martín-Portugués, C., Contreras, V., Pedrajas, JF., Santarén, J. **Addressing durability of asphalt durability of asphalt concrete by self-healing mechanism**. Procedia - Social and Behavioral Sciences 162 (2014) 188 – 197. doi: 10.1016/j.sbspro.2014.12.199.

3. MAIN RESULTS - ACADEMIC ACTIVITY

Seminars

- ❑ XXXVI Seminario Técnico PSWNA (Warsaw, 2017). *Polish Asphalt Pavement Association, PSWNA.*
- ❑ VII Jornada de ensayos para mezclas bituminosas (Madrid, 2017). *Asefma*
- ❑ 2nd Joint Meeting: US – EU collaboration on infrastructure projects. FHWA – EU Commission (Madrid, 2015)
- ❑ Taller PTEC: Proyectos CIEN e Interconecta (Madrid, 2015).

Training courses

- ❑ PMP Certification (2017). *Project Management Institute*
- ❑ EDUC Advanced training course (2016). 40 hours. *EDUC.*
- ❑ *Basic course on international occupational health and safety.* 60 hours.

3. MAIN RESULTS - ACADEMIC ACTIVITY














- Statistics for research in Construction Engineering I and II (2016). 20 hours. EDUC.
- Excel – intermediate level (2015). 25 hours. Acciona Universidad Corporativa.
- Powerpoint- advanced level (2015). 20 hours. Acciona Universidad Corporativa .
- EDUC Basic course training (2014). 40 hours. EDUC.

Mobility

- Short stay for attendance to follow up EU projects. (1-5 days)

4. EVALUATION GUIDE

CAPACITIES & PERSONAL SKILLS

	1. Science & Technique (literature review)	
	2. Technology (tools and instruments)	
	3. Training activities(courses-seminars)	
	4. Results (scientific publications)	
	5. Scientific critique (SWOT analysis)	
	6. Work Plan	
	7. Mobility	
	8. Funding	
	9. Ethics	

A word cloud of thank you phrases in various languages. The central and largest words are 'THANK' and 'YOU'. Other prominent words include 'GRACIAS', 'ARIGATO', 'SHUKURIA', 'JUSPAXAR', 'DANKSCHEEN', 'TASHAKKUR ATU', 'YAQHANYELAY', 'SUKSAMA', 'EKHMET', 'BİYAN', 'SHUKRIA', 'TINGKI', 'GRAZIE', 'MEHRBANI', 'PALDIES', 'GOZAIMASHITA', 'EFCHARISTO', 'KOMAPSUMNIDA', 'MARKE', 'MERTSI', 'MERCI', 'BOLZİN', and 'MERCİ'. The words are arranged in a roughly circular pattern, with 'THANK' and 'YOU' being the most prominent.