



ESCUELA DE CONSTRUCCIÓN CIVIL
FACULTAD DE INGENIERÍA

CURING AND HEALING OF COLD ASPHALT MIXTURES BY MAGNETIC INDUCTION.

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Introduction: Cold asphalt mixtures.

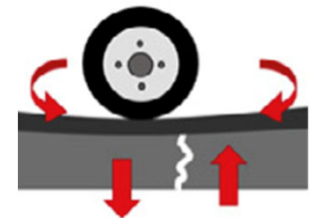
Benefits

- ✓ Lower energy consumption
- ✓ Low CO₂ emissions
- ✓ Increased building safety



Disadvantages

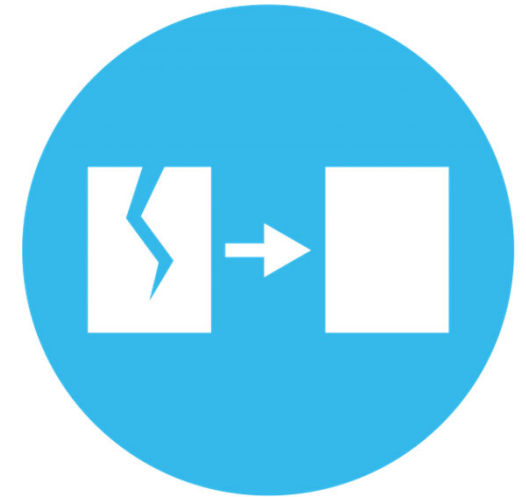
- X Longer construction time
- X Lower durability



Main objectives.



Reduce curing time



Develop self-healing capacity

Methodology.

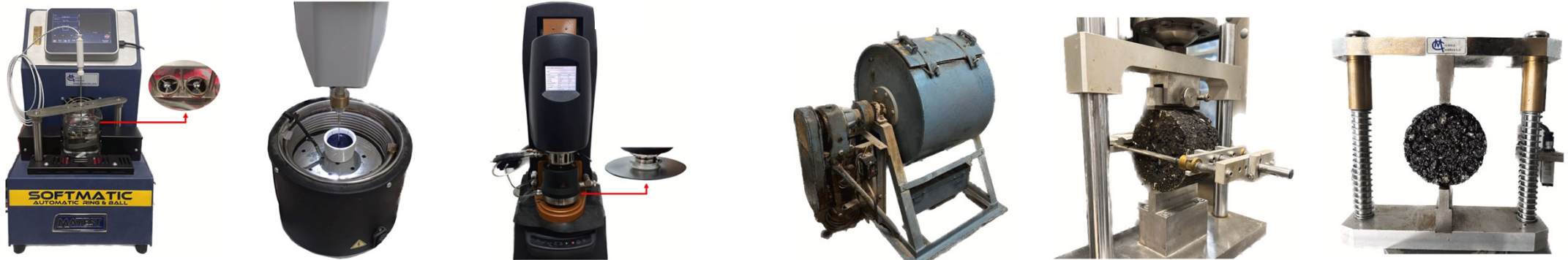


Fast magnetic induction curing	Curing evaluation	 Water evaporation	 Time spent	 Energy used
	Rheological analysis	 Ring and ball test	 Penetration test	 Dynamic shear rheometer
	Mechanical assessment	 Cantabro test	 Stiffness test	 Indirect tensile strength test
	Self healing evaluation	 Flexural test	 Healing process	 Flexural test
	Particle loss assessment	 Cantabro test	 Healing process	 Cantabro test
	Functional study	 Permeability test	 Healing process	 Permeability test

Conclusions

It is possible to reduce the curing time of cold asphalt mixtures by magnetic induction:

- Reduction of particle loss, modulus of stiffness and indirect tensile strength.



Conclusions

It is possible to heal cold asphalt mixtures with magnetic steel shot blasting:

- Repeated healing cycles improve the particle loss performance of asphalt mixtures.
- Repeated healing decreases the permeability of porous asphalt mixtures.



Scientific activities

[1] (Q1. I.F 6.2 Elsevier) **C. DeLaFuente-Navarro**, P. Lastra-González, M. Á. Calzada-Pérez, and D. Castro-Fresno, “Rheological and mechanical consequences of reducing the curing time of cold asphalt mixtures by means of magnetic induction.,” Case Stud. Constr. Mater., 2023, doi: 10.1016/j.cscm.2023.e02573.

[2] (Q1. I.F 8.2 Elsevier) **C. Delafuente-Navarro**, P. Lastra-González, I. Indacoechea-Vega, and D. Castro-Fresno, “Developments in the Built Environment Healing by magnetic induction of a novel cold pavement with asphalt emulsion and industrial by-products .,” no. December 2023, 2024, doi: 10.1016/j.dibe.2024.100417.

[3] (Q1. I.F 7.4 Elsevier) **C. Delafuente-Navarro**, P. Lastra-González, C. Slebi-Acevedo, I. Indacoechea-Vega, and D. Castro-Fresno, “Multi-criteria analysis of porous asphalt mixtures with aramid fiber under adverse conditions,” Constr. Build. Mater., vol. 429, no. April, 2024, doi: 10.1016/j.conbuildmat.2024.136438.

EIDEIC, 2024.



Rheological and mechanical consequences of reducing the curing time of cold asphalt mixtures by means of magnetic induction

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Healing by magnetic induction of a novel cold pavement with asphalt emulsion and industrial by-products.

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Multi-criteria analysis of porous asphalt mixtures with aramid fiber under adverse conditions

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Scientific activities

- Transport Research Arena (TRA2024). April 2024. Title of the oral presentation: “Curing and healing of cold asphalt mixtures by magnetic induction”. **Author presenting: Christopher de la Fuente Navarro. Dublin (Ireland)**
- Transport Research Arena (TRA2024). April 2024. Title of the poster: “Recycled fibers in asphalt mixtures as method to improve the mechanical behaviour”. **Author presenting: Christopher de la Fuente Navarro. Dublin (Ireland)**
- Congreso iberoamericano del asfalto (CILA2024). April 2024. Title of the oral presentation: “Curado y sanado de mezclas asfálticas frías mediante inducción magnética”. **Author presenting: Christopher de la Fuente Navarro. Granada (Spain)**
- Workshop Sight of Universidad Nacional Mayor de San Marcos (CILA2024). April 2024. Title of the oral presentation: “Curado y sanado de mezclas asfálticas frías mediante inducción magnética”. **Author presenting: Christopher de la Fuente Navarro. (Perú)**

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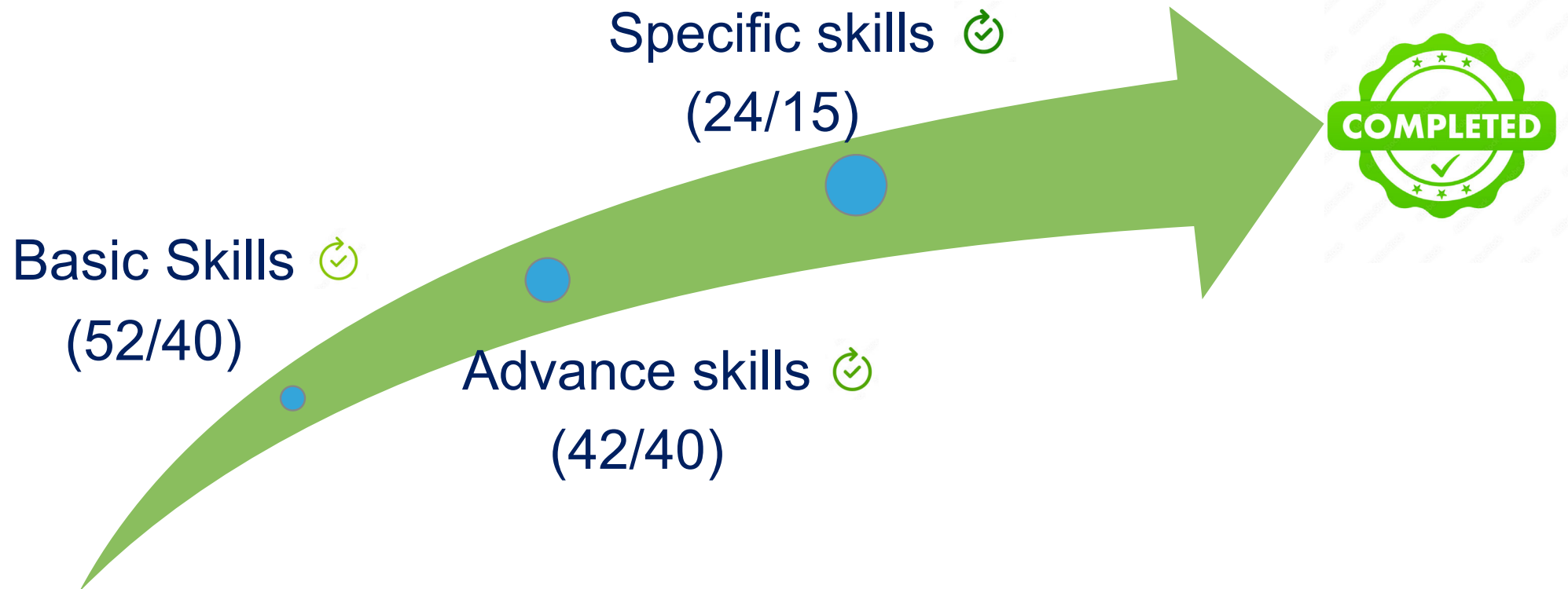


IEEE SIGHT

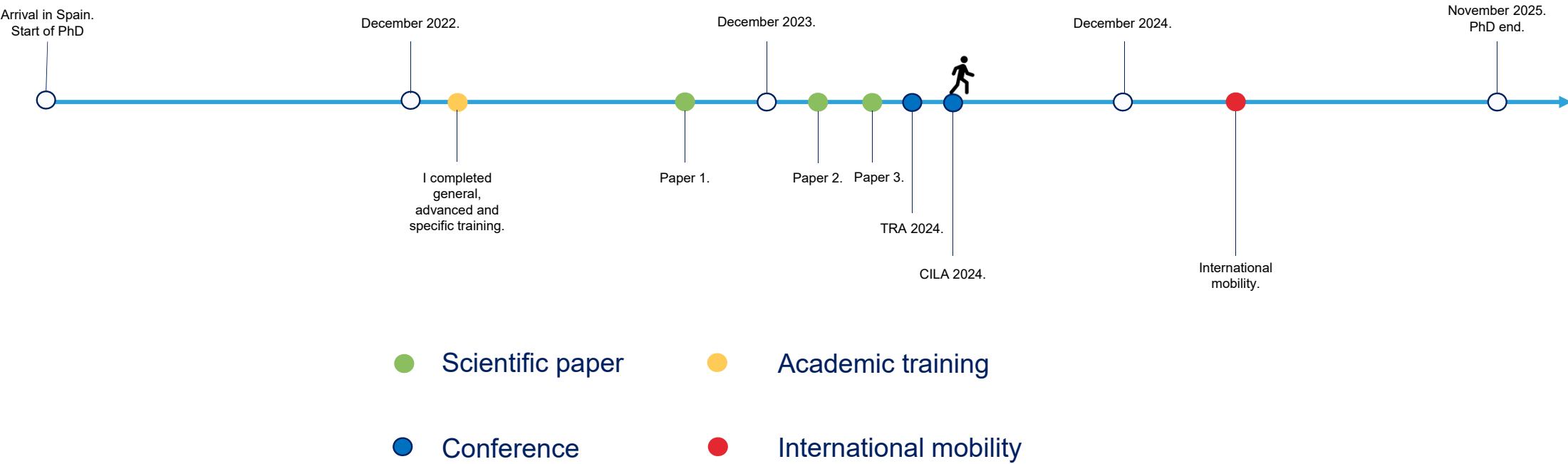
Special Interest Group on
Humanitarian Technology

SIGHT Universidad Nacional
Mayor de San Marcos

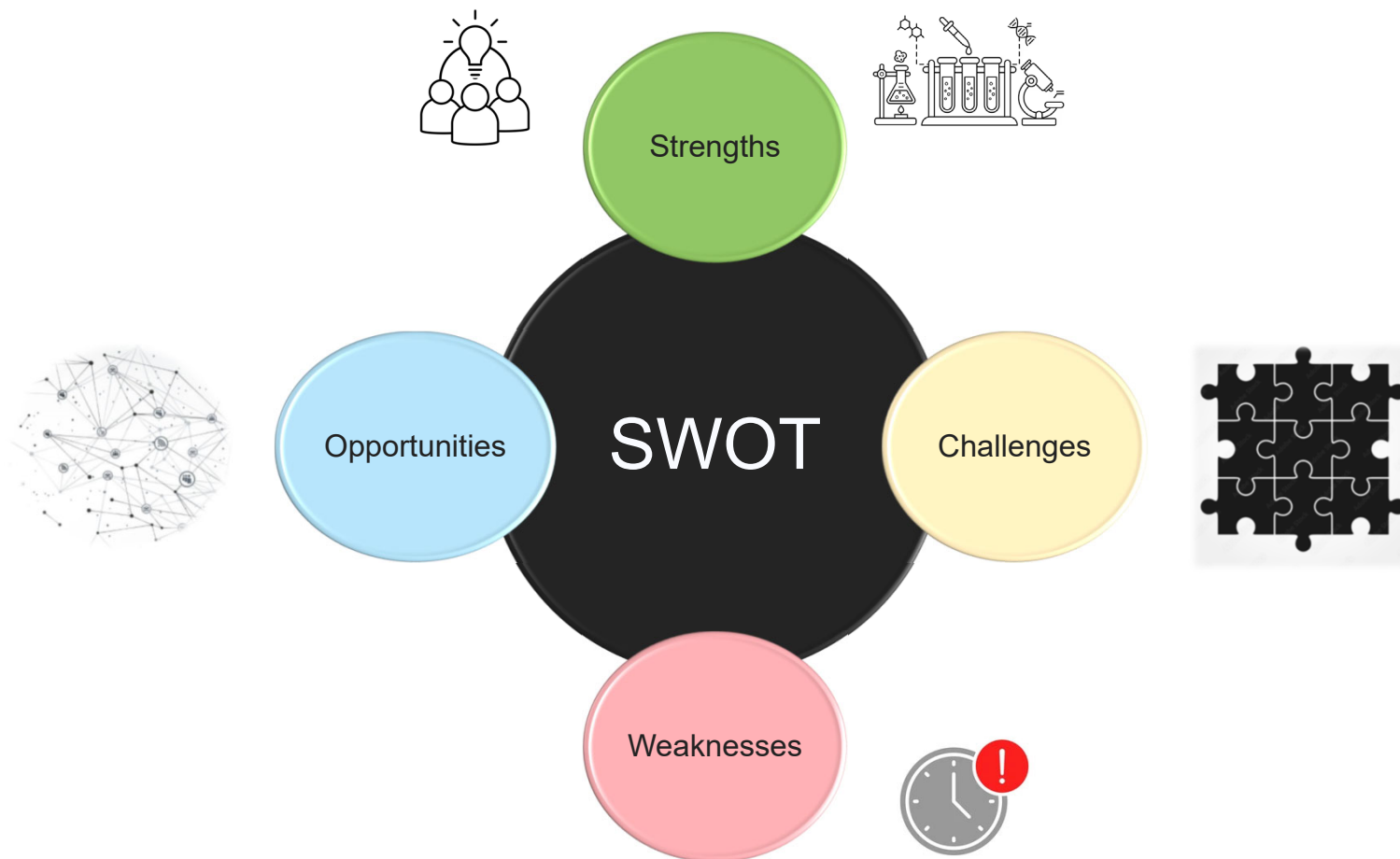
Academic Status: Multidisciplinary training



Academic Status: timeline

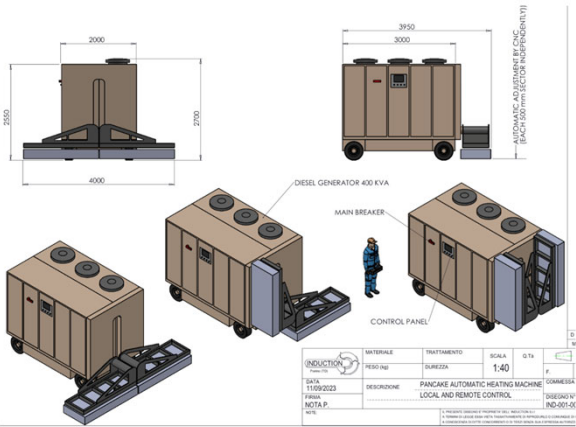


Scientific activities



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Future work





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