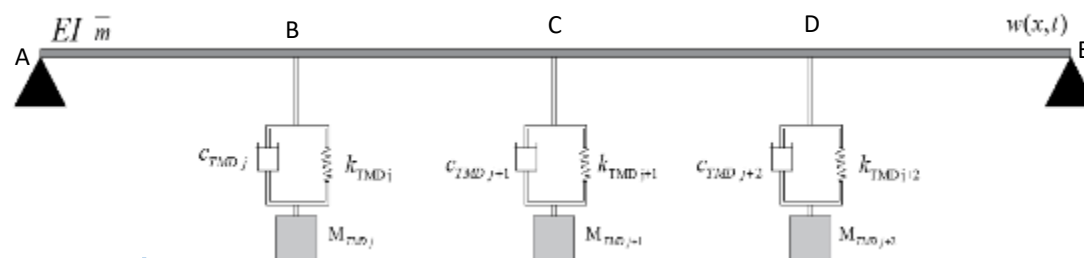


“Smart Damper”

Iain Dunn - ESR - 6



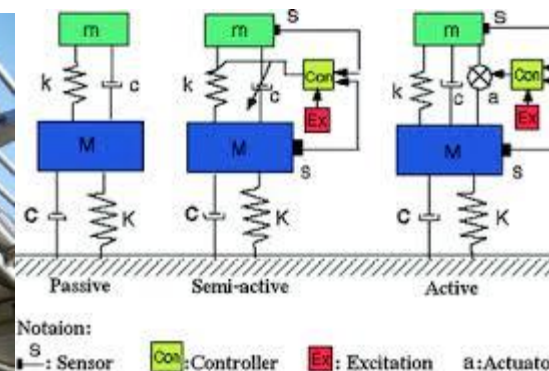
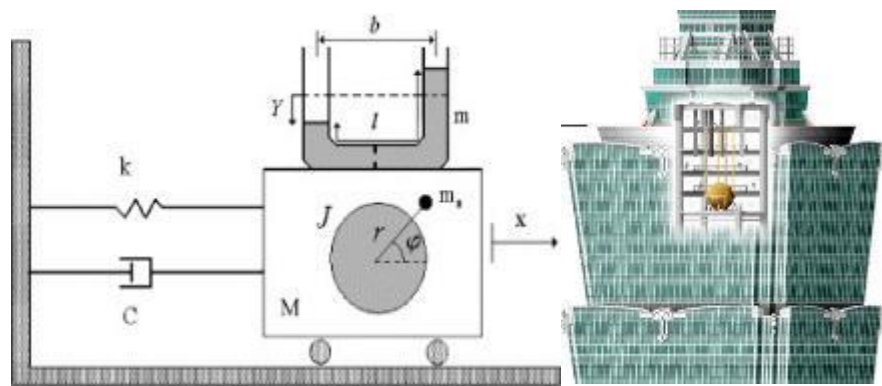
$$EI \frac{\partial^4 w_{AB}(x,t)}{\partial x^4} + m \frac{\partial^2 w_{AB}(x,t)}{\partial t^2} = f(t)$$

⋮

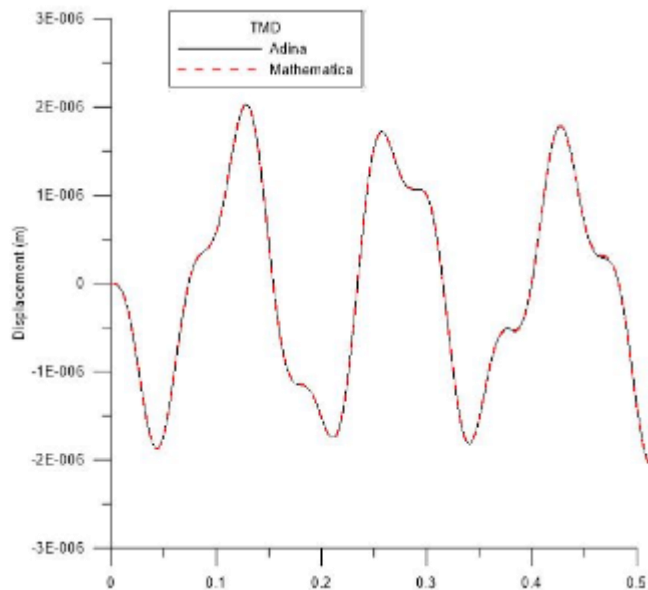
$$EI \frac{\partial^4 w_{DE}(x,t)}{\partial x^4} + m \frac{\partial^2 w_{DE}(x,t)}{\partial t^2} = f(t)$$

$$EI \frac{\partial^4 w(x,t)}{\partial x^4} + m \frac{\partial^2 w(x,t)}{\partial t^2} + R(x,t) = f(t)$$

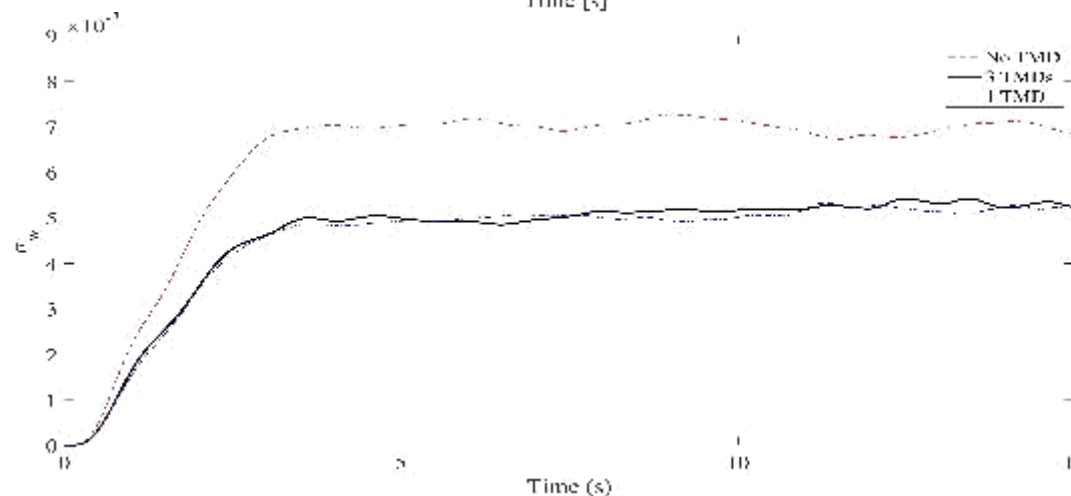
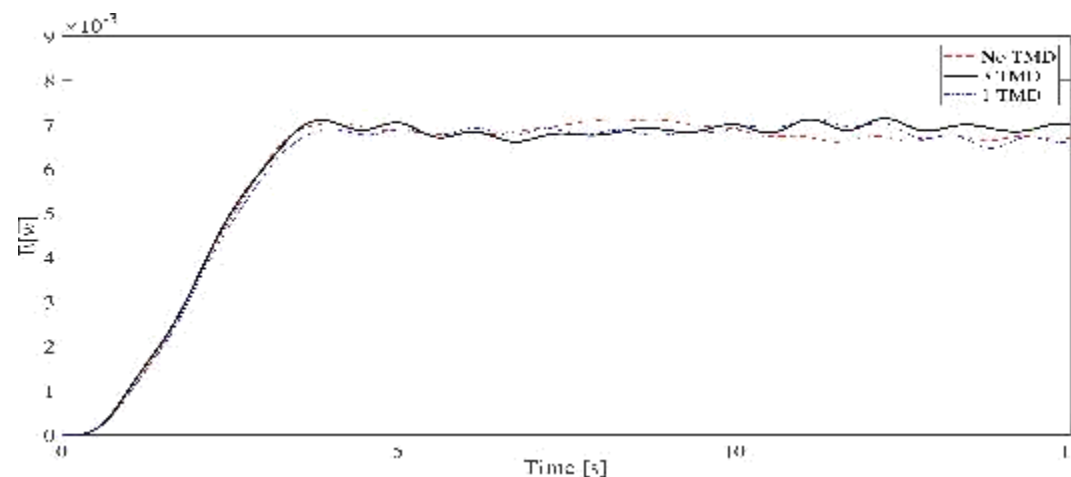
$$R(x,t) = \sum_{j=1}^N -P_j(t) \delta(x - x_j)$$



First Findings



Mode	Mathematica (Rad/s)	Adina (Rad/s)
1	55.2426	55.2426
2	107.243	107.243
3	410.647	410.646
4	924.328	924.312
5	1642.59	1642.500
6	2566.68	2566.317
7	3695.83	3694.695



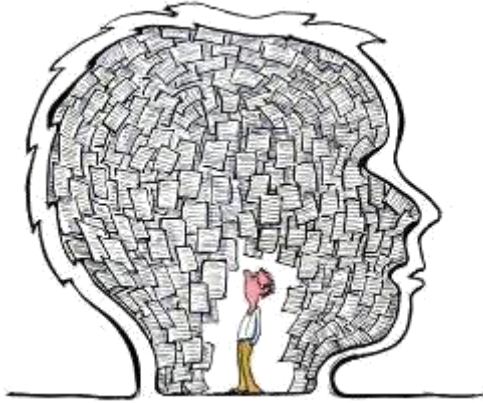
On the left, results presented at ESMC 2018 validating the proposed method. Above, results showing the mean and standard deviation of a beam subjected to Poissonian loading.

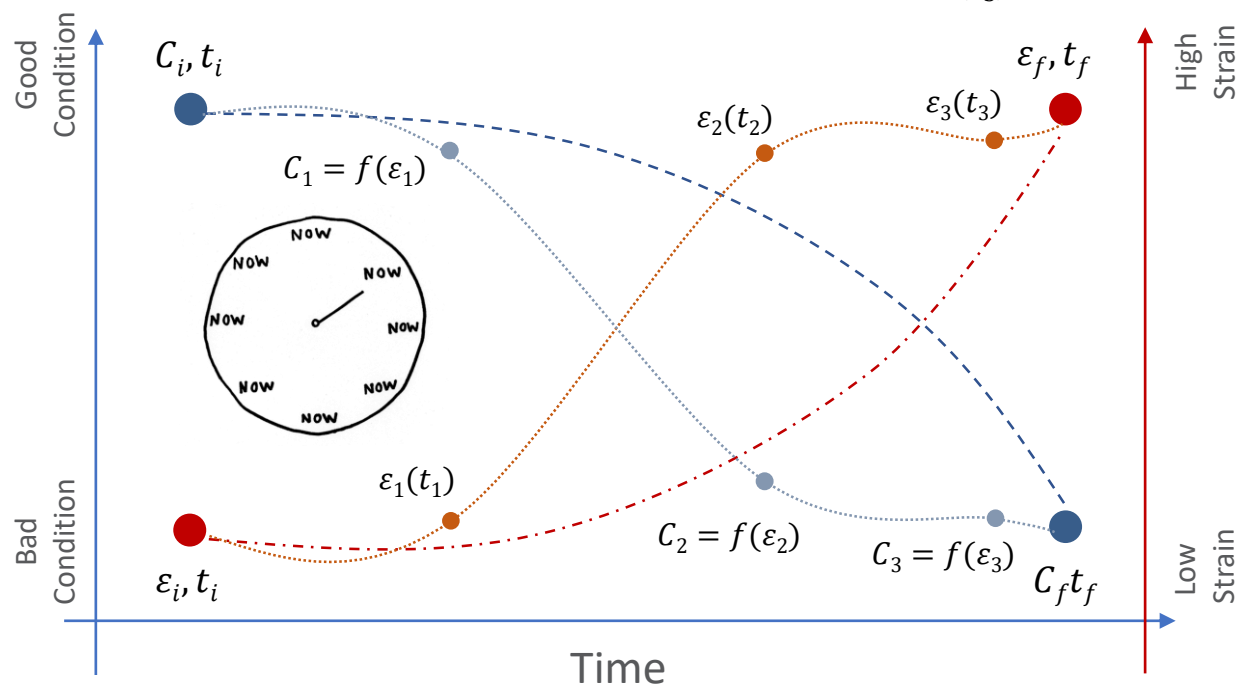
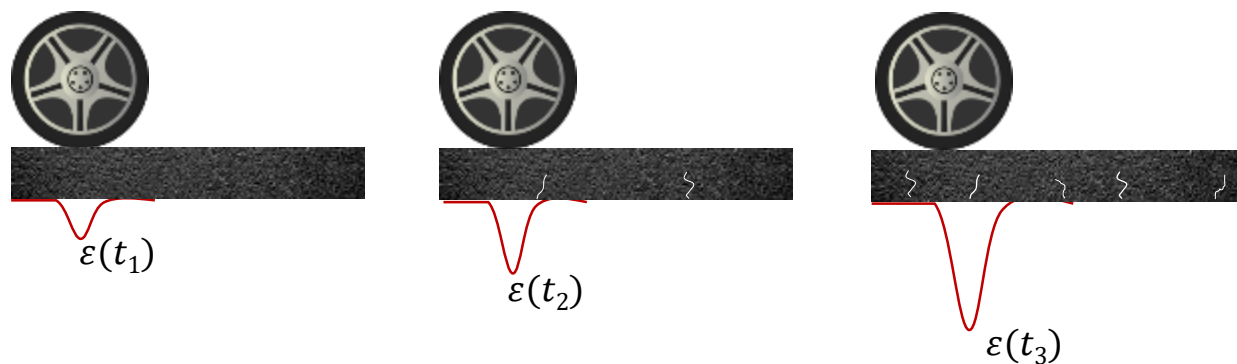
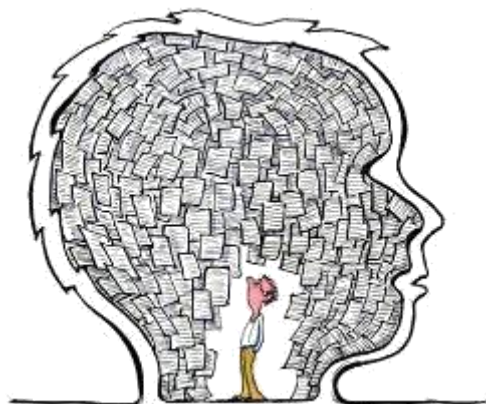


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SmartEcoPave – ESR7

Mario Manosalvas Paredes / ezmam@nottingham.ac.uk







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ESR8: “COMP2RHEO – Enhanced Rheometry for Complex Materials ”

Speaker:

Gaspare Giancontieri

gaspare.giancontieri@unipa.it

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de Huelva**

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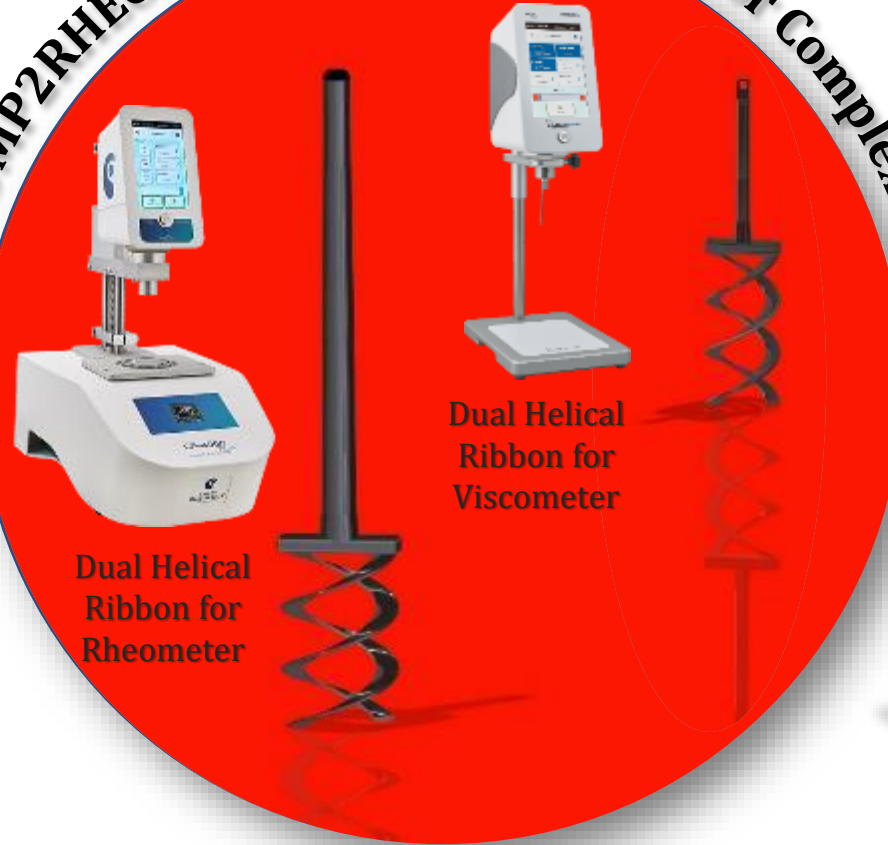
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Bitumen
Emulsions

Modified
Bitumen

Bituminous
Cement
Mixture

ESR 8 - COMP2RHEO - Enhanced Rheometry for Complex Materials



Super-Asphalt
Binders

Bio-Binders

Gaspare Giancontieri – ESR8

Findings

Modified Bitumen

- Novel equipment
- Computational platform
- Investigation aimed to provide rheologists with recommendations for storage/design purpose

Bituminous Cement Mixture and Bitumen Emulsions

- Assessment of long-term material performance
- Optimised/standardised procedures
- Promote the use of cold recycling mixes

Gaspare Giancontieri – ESR8

The research presented in this presentation was carried out as part of the H2020-MSCA-ETN-2016. This project has received funding from the European Union's H2020 Programme for research, technological development and demonstration under grant agreement number 721493



Mr Gaspare Giancontieri





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ESR9: “ResilRoad”

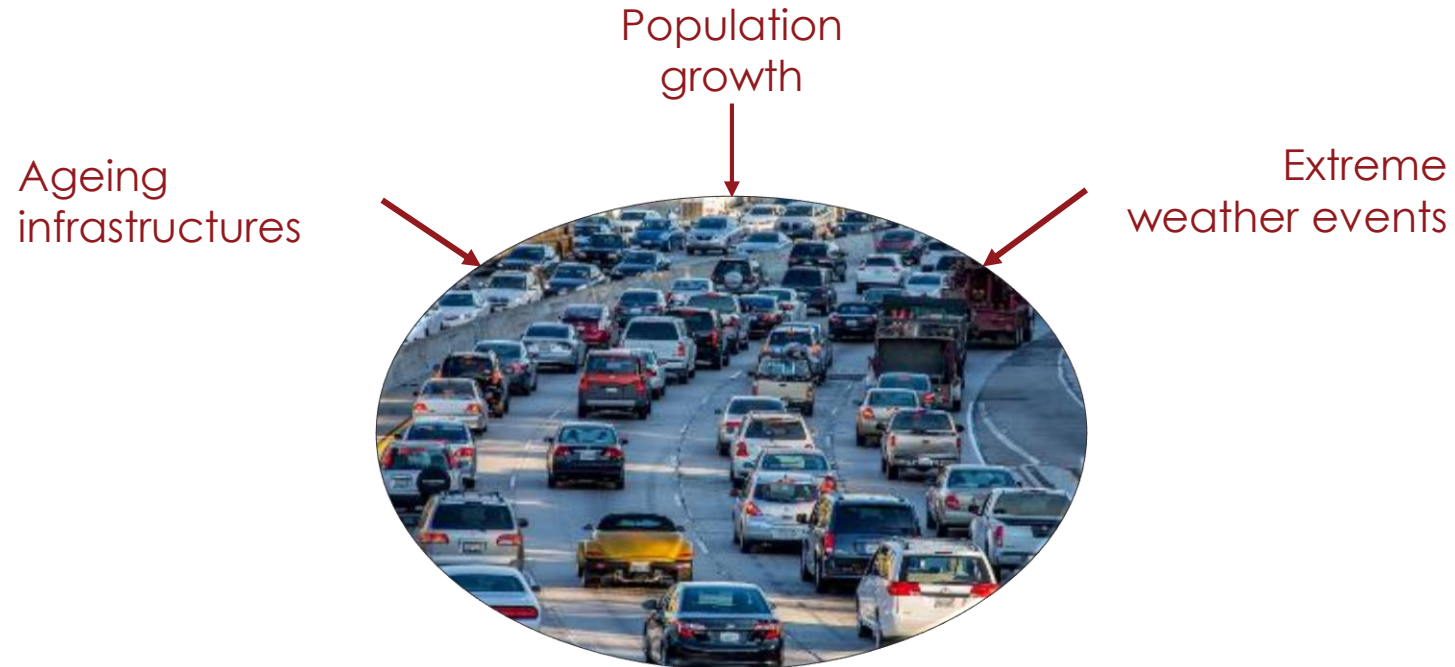
Risk-based Resilience indicators for Road networks

Philippe Sohounou
philippe.sohounou@nottingham.ac.uk
twitter: @p_sohounou

Partners:

- European Commission’s Joint Research Centre (JRC)
- Highways England

Background



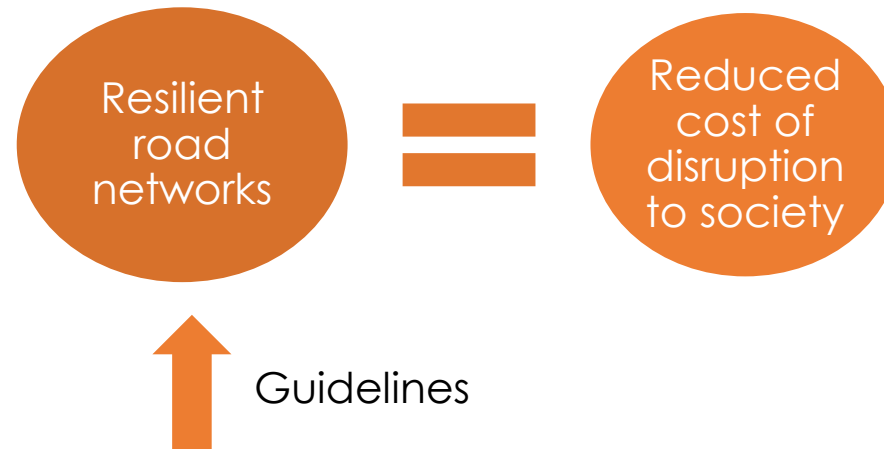
Cost of road congestion in Europe: €110 billion per year (Christidis & Rivas, 2012)

- Value of fuel & time wasted
- Increased cost of doing business (e.g. freight transport)
- Environmental cost (e.g. higher emissions of GHG and pollutants)

Resilient Road networks

Resilience: ability of a system (e.g. road networks) to absorb, recover from and adapt to adverse events

- adapted from The National Academies (2012)



- What resilience means in the context of road networks?
- How it can be measured?
- How it can be implemented?

Proposed Framework

Output from ResilRoad: Framework to quantitatively assess and enhance the resilience of road networks

Three main features:

Risk-model characterizing the hazards depending on the size and distribution of the impacts

Resilience indicators measuring the impact on the travel time of road users (Traffic modelling & simulations)

Method to identify and compare resilience-enhancement opportunities (i.e. network design & repair strategies)



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ESR10: "LCSA4TRANSPORT"

Life Cycle Sustainability Assessment for Transportation Infrastructure



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Speaker:

Mr. Konstantinos Mantalovas
konstantinos.mantalovas@unipa.it

GreenDELTA

Tools & Consulting for Sustainability



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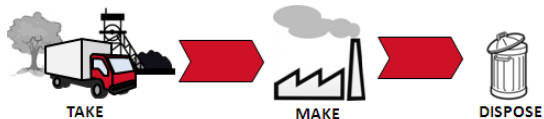
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- Air, Soil, Water Pollution
- Resource Depletion
- Waste Production
- **Exceeding the capacity of planet's natural sinks**
- Budget Restrictions
- **Under-utilisation of wastes and by-products**



LINEAR ECONOMY

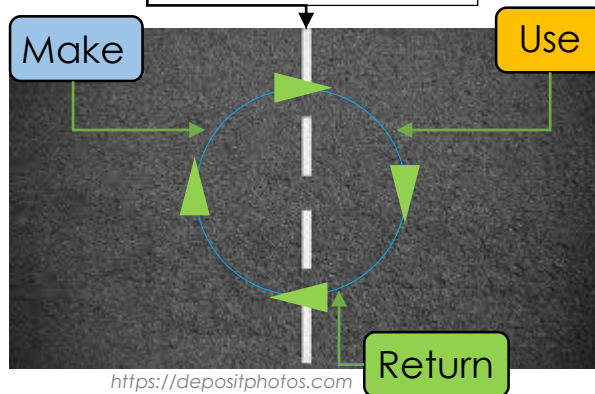


<https://www.urbanmining.it>

- Life Cycle Management
- Life Cycle Cost Analysis
- Life Cycle Assessment
- Circular Economy



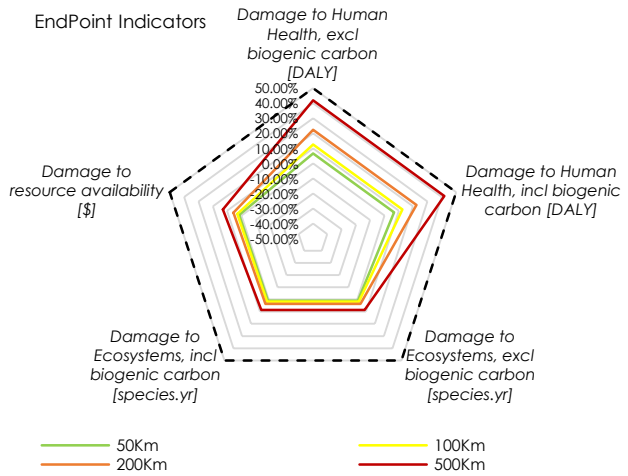
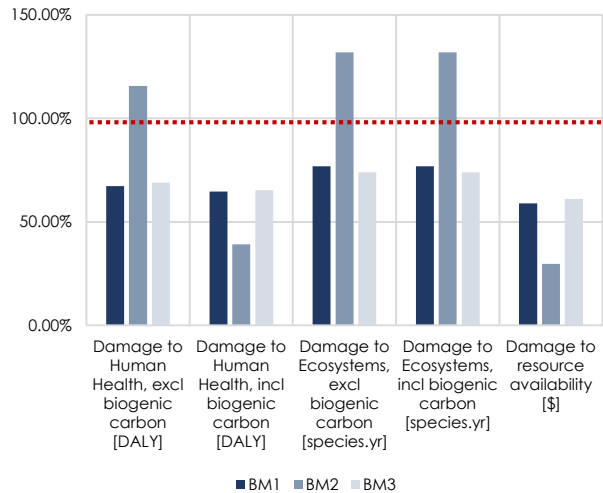
“Circular Pavement Life Cycle Management”



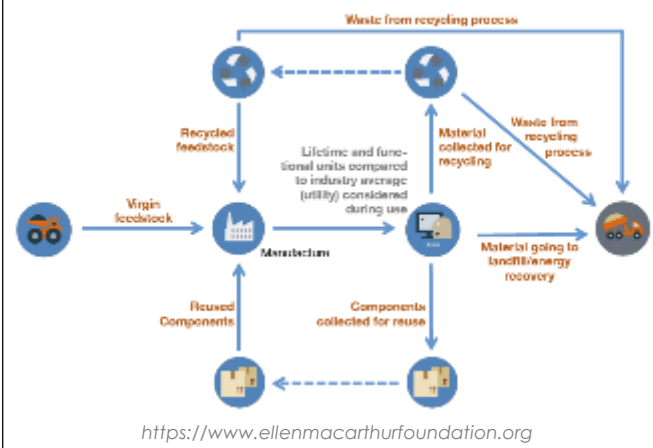
Development of a roadmap for NRA's and involved key parties, of how to make the transition to CE, validating their and the universal benefits over the whole lifecycle of their assets by means of **Material Circularity Index**, **Life Cycle Assessment** and **Monetary values**. Thus, a solid suggestion for the development of a circular business model for the road construction and management industry.



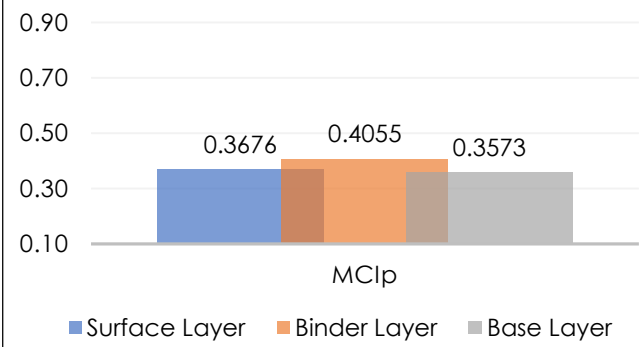
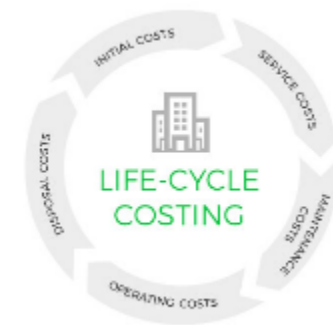
▪ **Life Cycle Assessment (Hotspot & Sensitivity Analyses)**



▪ **Circular Economic Metrics**



▪ **Life Cycle Cost Analysis**
▪ **Life Cycle Management**





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ESR11: “**DYSER**”

Dynamic **S**tructural **E**valuation of **R**unways



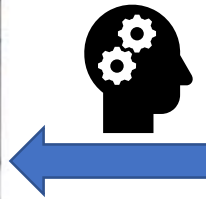
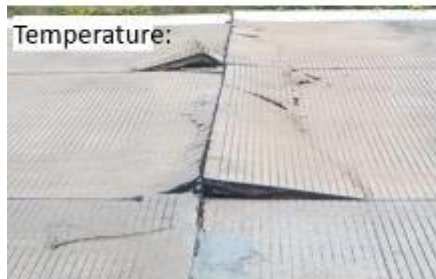
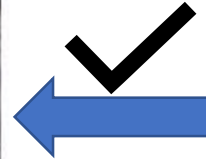
Speaker:
Pawan Deep
pdeep@dyantest.com

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Why this project?



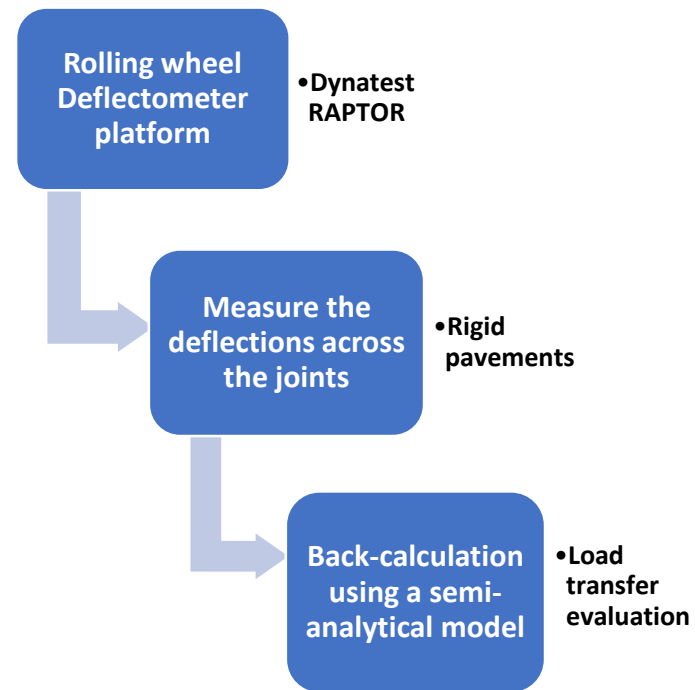
Major distresses in rigid pavement occur across the **joints**.

How do we detect rigid pavement distresses with this new technology?



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How to asses?





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ESR12: “**SuRoMa**”

SUstainable **RO**ad **MA**agement through Low Cost Techniques

Speaker:

Ronald Anthony Roberts

ronaldanthony.roberts@unipa.it

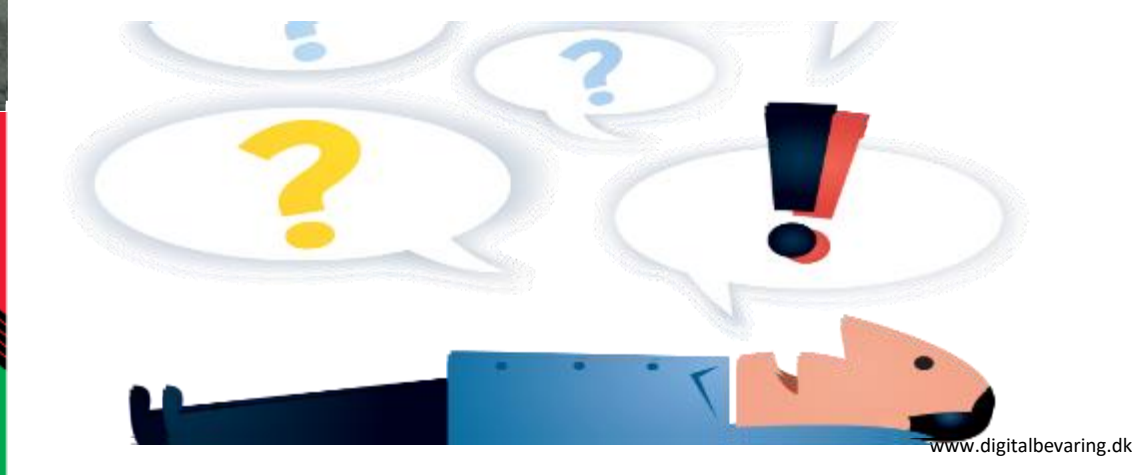


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Ronald Anthony Roberts

ESR 12: **S**ustainable **R**oad **M**anagement through Low Cost Techniques

The research presented in this presentation was carried out as part of the H2020-MSCA-ETN-2016. This project has received funding from the European Union's H2020 Programme for research, technological development and demonstration under grant agreement number 721493

What will we achieve?



www.digitalbevaring.dk

Ronald Anthony Roberts
ESR 12: SUstainable **RO**ad **MA**nagement through Low Cost Techniques

The research presented in this presentation was carried out as part of the H2020-MSCA-ETN-2016. This project has received funding from the European Union's H2020 Programme for research, technological development and demonstration under grant agreement number 721493





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ESR13: “Safe-Earth”

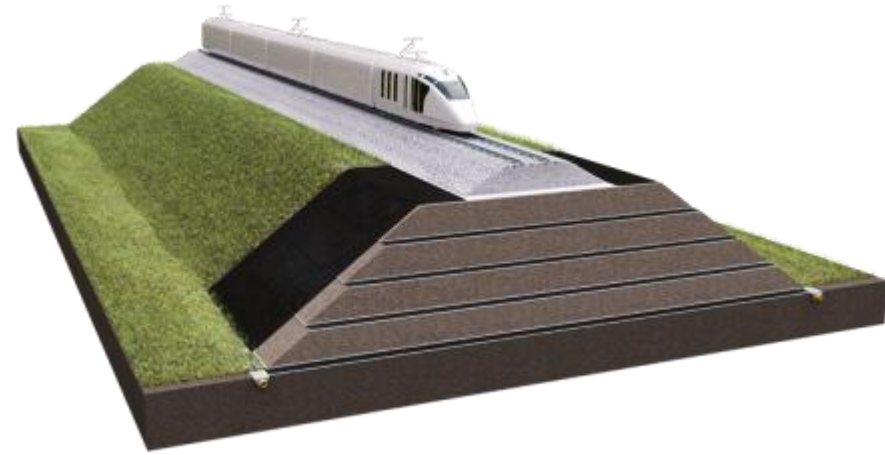
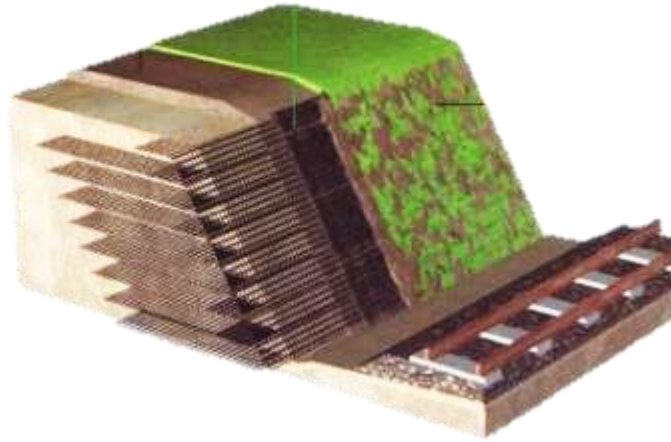
**Advanced Methods of Safety Assessment for Earthworks
along Transport Networks**

**Speaker:
Antonino Scalia**




ESR13: "Safe-Earth"

Advanced Methods of Safety Assessment
for Earthworks along Transport Networks

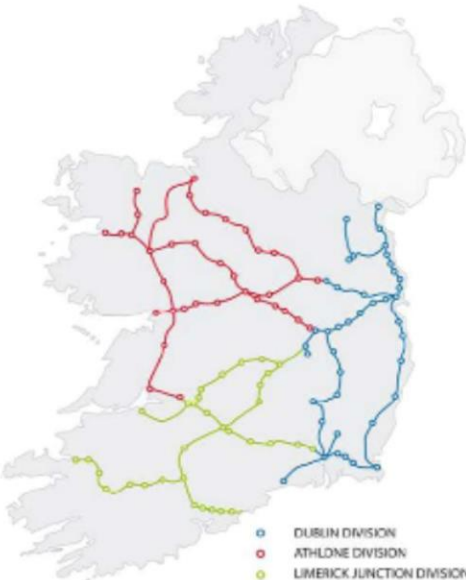


ESR13: "Safe-Earth"

Advanced Methods of Safety Assessment for Earthworks along Transport Networks



Iarnród Éireann Irish Rail Network




● DUBLIN DIVISION
● ATHLONE DIVISION
● LIMERICK JUNCTION DIVISION

C&E DST - VIEW ASSET INFORMATION \ Charts

Reports Go To... Help Contact

C&E Decision Support Tool \ View Assets Information \ Graphs



Date: 24-Aug-2018 10:02:32

Computed:
ATH
DUB
LNK

- Number of Assets: 3514
- Assets analysed: 3271

Mileage:
- Start [Mls / Yds]: 25 / 586
- End [Mls / Yds]: 86 / 1584

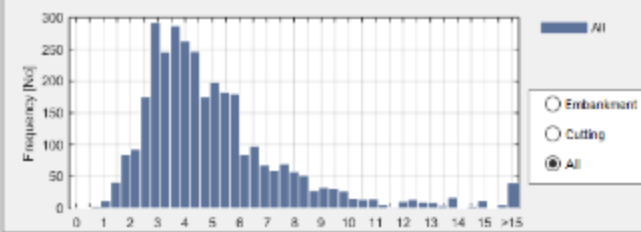
Asset Type:
- Embankment [%]: 56.25
- Cutting [%]: 43.75

Asset Height:
- Min Height [m]: 0.5
- Max Height [m]: 45
- Avg Height [m]: 5.12

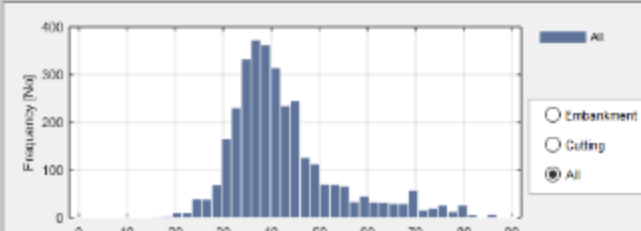
Asset Angle:
- Min Angle [deg]: 15
- Max Angle [deg]: 90
- Avg Angle [deg]: 42.42

[Back](#) [PDF](#)

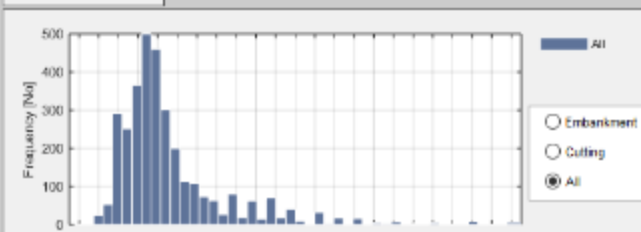
Class: Height



Class: Angle

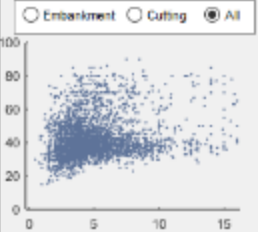


Class: Slope

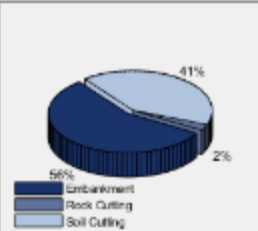


Height vs Angle

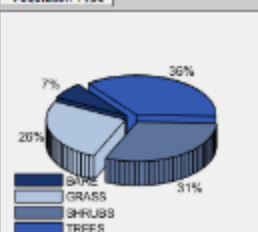
Embankment Cutting All



Object Type



Vegetation Type



TII National Roads Conference 2016



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ESR14: “Mechanomutable Asphalt Materials for the Construction of Smart Pavements”



Speaker:
Paulina Leiva-Padilla
pleiva@ugr.es

Mam
MECHANOMUTABLE ASFALT MATERIALS



Universidad de Granada

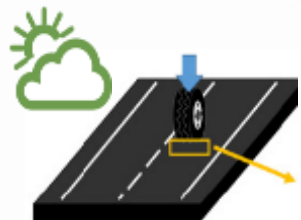
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ESR14: MAM

ROADS OF FUTURE: SMART structures that require **SMART MATERIALS**

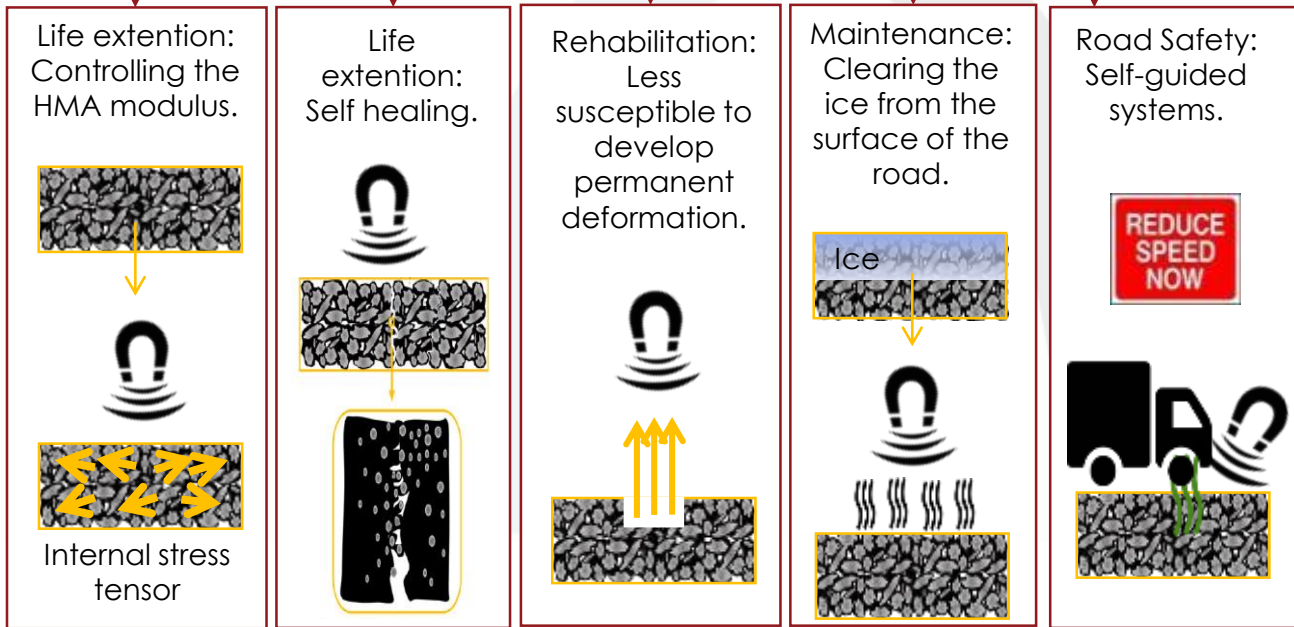
What?



Mam
MECHANOMUTABLE ASFALT MATERIALS

Main potential applications:

Why?



How?



PHASE 1
Bibl. Review



PHASE 2
Laboratory Tests



PHASE 3
Field application

LITERATURE REVIEW

Asphalt materials modified with metallic materials

Aggregate substitution (%volume)



Steel fibres from tires or produced
(0 to 6% Fine Ag.)



Ferrite filler
(0 to 100% Fine Ag.)



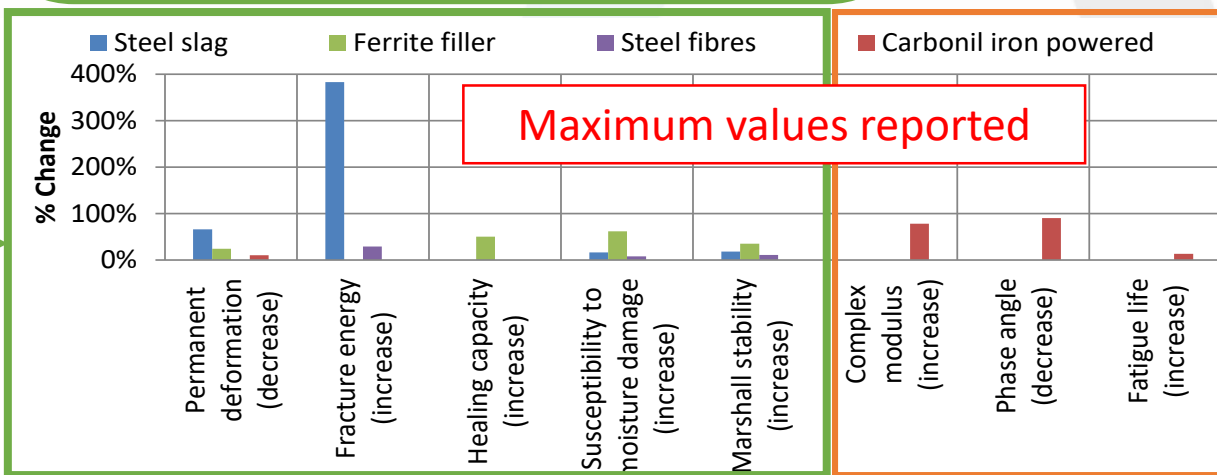
Steel slag
(0 to 100% Coarse Ag.)

Binder substitution (%weight)



Carbonyl iron powder
(0% to 10%)

Just this considers the activation of **Magnetic Fields!!!**



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ESR15: "Title"
WirelessBox-Multifunctional Road Monitoring System

Speaker:
Natasha Bahrani
Natasha.bahrani@ifsttar.fr



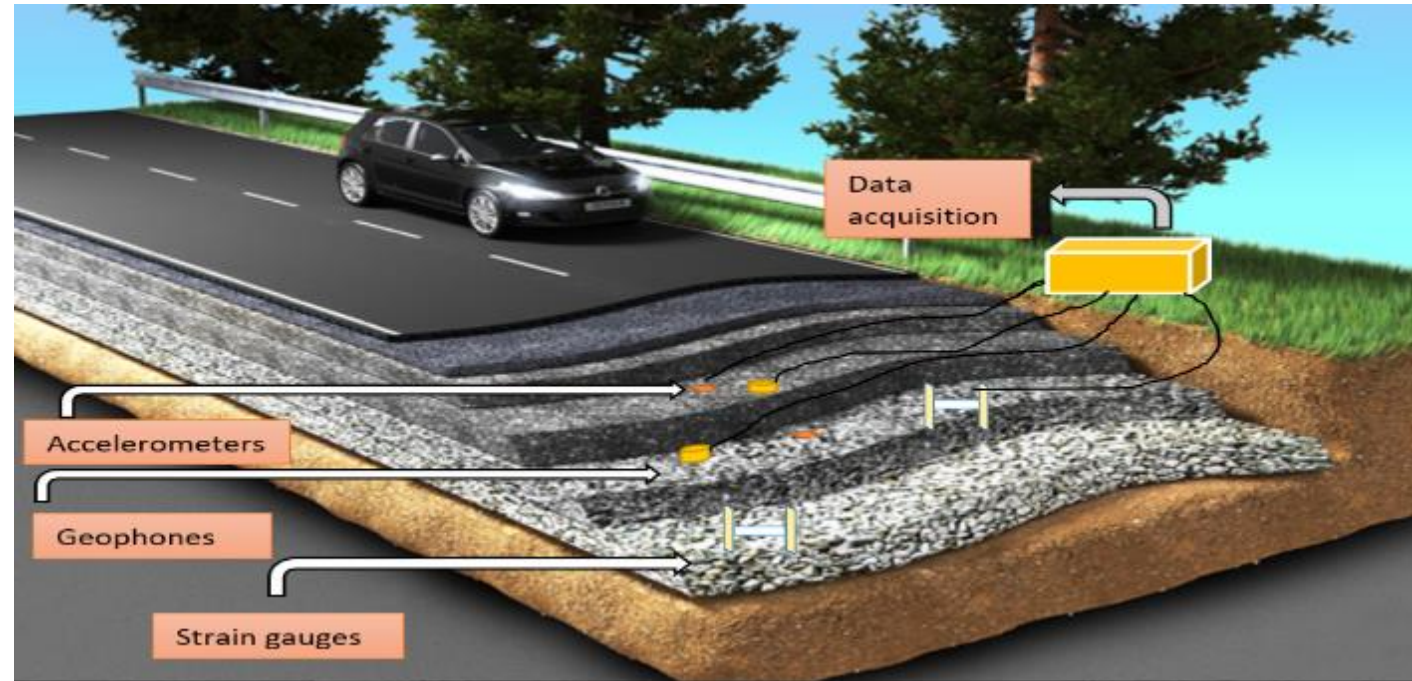
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Problems

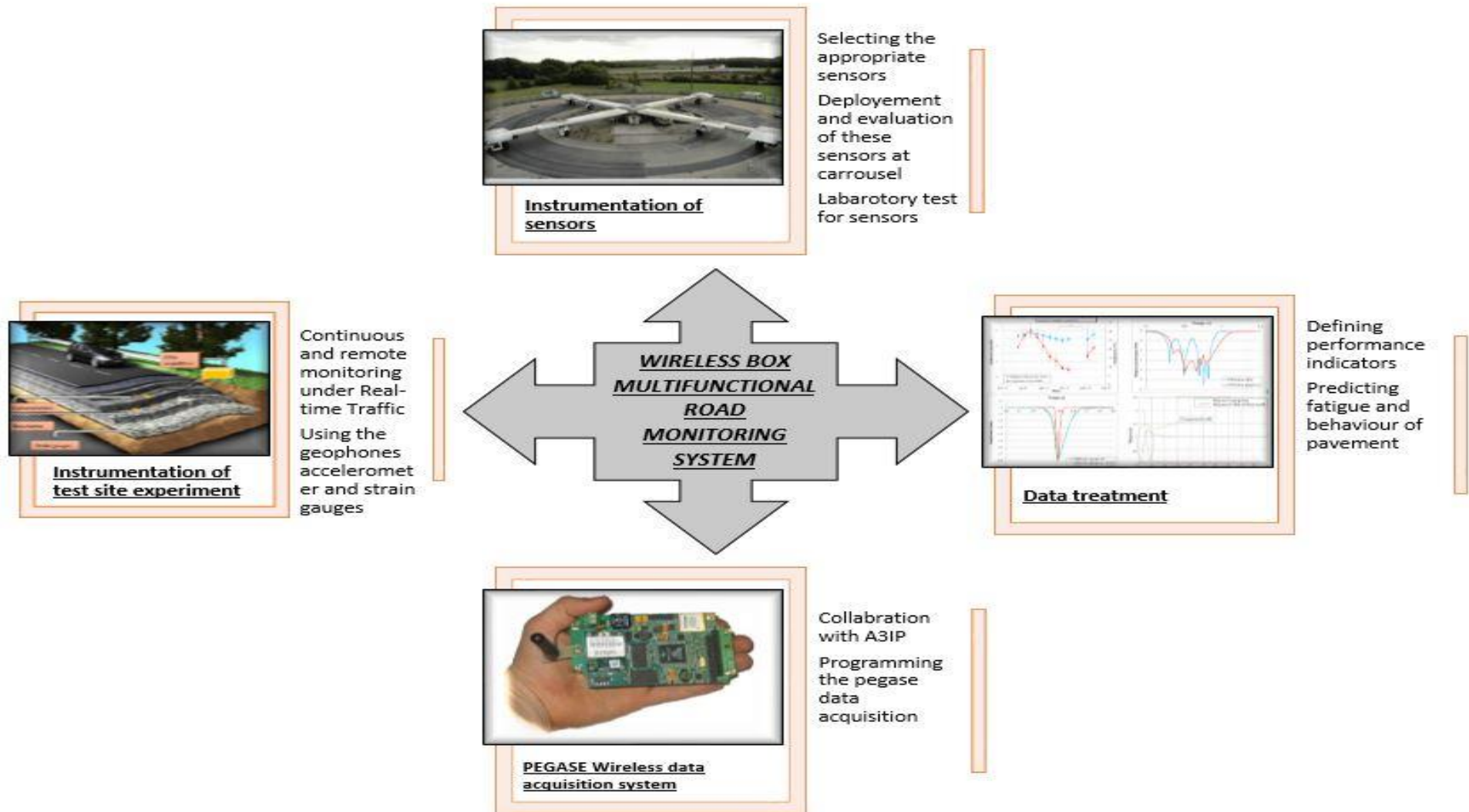


Solution



sta Project Approach

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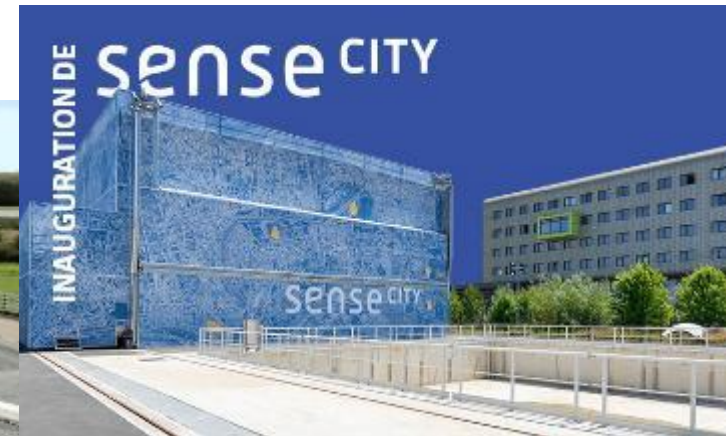


- ✓ The consortium will combine and share expertise to offer **advanced scientific training structured into network-wide thematic taught modules** combined with original research supported by **secondments that will expose fellows to both academia and industry** and will also allow them with the possibility of being awarded with Doctoratus Europeus.
- ✓ The training programme will be enriched by specific modules to support **job creation by enabling the fellows with business, entrepreneurship, communication, project management and other transferrable skills.**
- ✓ Furthermore, a **tailored Dissemination strategy** will evaluate the variety of channels and means appropriate to allow the fellows to be prepared and successful in reaching both scientific and larger public audiences.
- ✓ As a result, SMARTI ETN will create a **new generation of highly-skilled and appealing professionals that will hopefully benefit Europe in the long term**

MULTIFUNCTIONAL TRANSPORT INFRASTRUCTURES

Location: Ifsttar, Paris and Nantes

Dates: 22nd – 25th January 2019





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- ✓ Projects
- ✓ People
- ✓ Fellow's contacts
- ✓ Fellow's blogs
- ✓ Social media
- ✓ Newsletter

#SMARTIETN



Meet SMARTI ETN Fellows



Ignacio Nilo Ruiz Riancho

ESR1 "REJUCAPHALT" Encapsulated rejuvenators for asphalt mixture



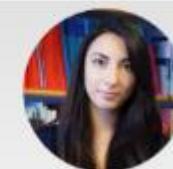
Maria Barrera

ESR2 "Nano Asphalt" Nanosensor technology for road pavements



Domenico Vizzari

ESR3 "RA2ROAD" Development of a pavement system able to capture solar energy



Giulia Stino

ESR4 "RaCoMo" Development of a railway system component, remote condition monitoring methodology and analysis tools to predict future system deterioration



sta Contacts

Smart Transportation Alliance



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Research Building, University Park, Nottingham, NG7 2RD,
United Kingdom (<http://nottingham.ac.uk/ntec>)

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The SMARTI ETN project has received funding from the European Union's Horizon 2020 Programme under the Marie Skłodowska-Curie actions for research, technological development and demonstration, under grant n.721493.

Thanks



Thanks for your attention