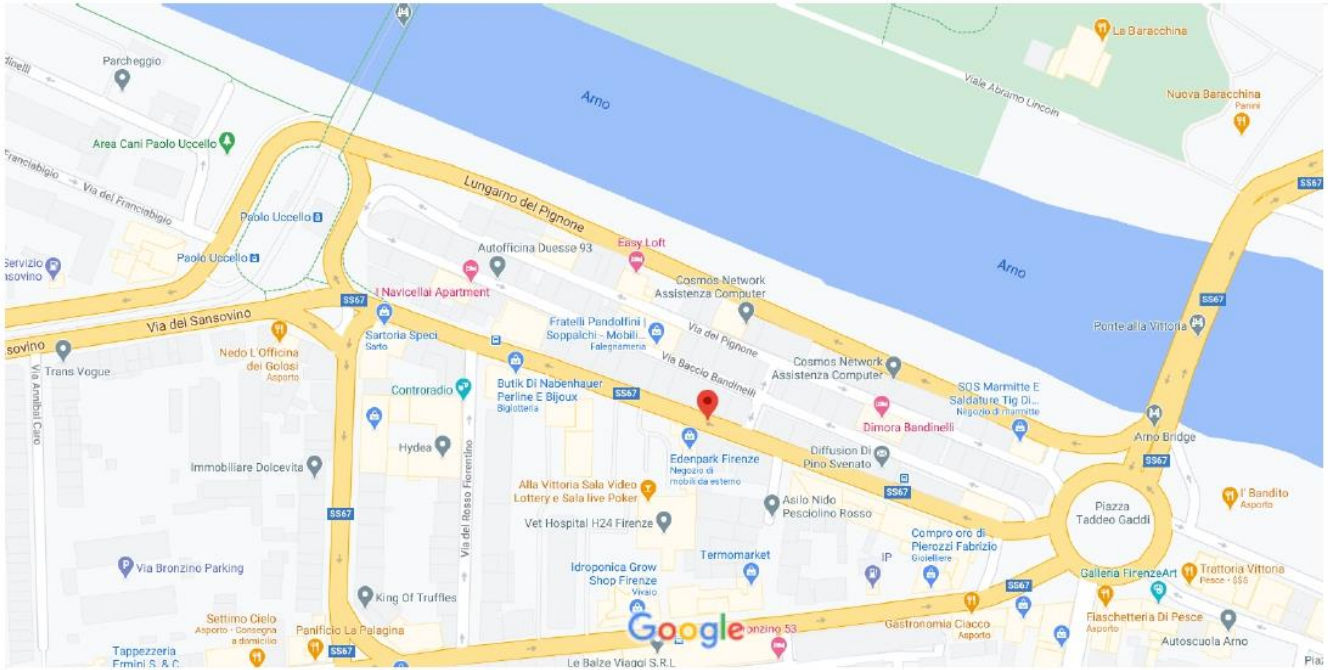
ACTION B3

PILOT AREA IMPLEMENTATION

- Via dei Vanni is first the street where we'll test the new asphalt

Google Maps Via dei Vanni



Dati cartografici ©2020 Google,Cybercity 20 m

Via dei Vanni

Via dei Vanni: characteristics of the road

1) one-way travel without curves
2) significant population density of the area
3) three bus lines (one electric)
4) at the end of the road there is the tramway
5) very busy road due to traffic leaving the city heading west
6) close to public offices (city council of Florence): employees use electric vehicles

Public tender

- Public tender for the extraordinary maintenance of the whole road
- Public tender: well'use the new mixture asphalt (*technical specifications)* for the 150m of our project

Construction related procedurees

- Technical documents: done (*september 2020*)
- New mixture (technical minimun requirements actions B1 e B2). We'll include in our documents (*december 2020*)
- Publish the tender and award notice (*march 2021*)
- Receive the winner legal documents (*june 2021*)
- Implementation (*september/october 2021*)

E-VIA LIFE 18 ENV/IT/000201

INTERNAL ONLINE MEETING
23 OCTOBER 2020

ACTIONS IN PROGRESS

ACTIONS

- **A2** - QUIET PAVEMENT TECHNOLOGIES AND THEIR PERFORMANCE OVER TIME
  COMPLETED

- **B2** - TYRE-PAVEMENT COUPLING STUDY AND PROTOTYPE IMPLEMENTATION
  Sub-action B2.3 – Characterization of the B1-based prototypal test section –
  IN PROGRESS

- **B4** - TRACK EFFICIENCY TESTS IN THE PILOT AREA
  Sub-action B4.1 – B1-road surface characterization –
  IN PROGRESS

ACTION A2

QUIET PAVEMENT TECHNOLOGIES AND THEIR PERFORMANCE OVER TIME

COMPLETED

During the implementation of this activity, IPOOL provided support for the study of the tyre-pavement interaction and related noise generation.

Particular attention was focused on the Low Noise Road Surfaces (**LNRS**) and their performance over time.

"A «low-noise» road surface provide a noise reduction of about 3dB(A) compared with the most common used one"
Sandberg, Tyre/road noise reference book, 2002

The acoustic performances of low-noise pavements over time are specified in the technical report: "Revision of Green Public Procurement Criteria for Road Design, Construction and Maintenance" – Technical report and criteria proposal; EUR 28013 EN June 2016

Requirement for low-noise pavement

GPP Lcpx limits

Conformity of production (within 4-12 weeks after opening of the road)

- 90 dB(A) @ 50 km/h,
- 95 dB(A) @ 70 km/h,
- 98 dB(A) @ 90 km/h.

Durability of performance of low-noise pavements (within 5 years)

- 93 dB(A) @ 50 km/h
- 98 dB(A) @ 70 km/h
- 101 dB(A) @ 90 km/h.

LOW NOISE ROAD SURFACES (LNRS) AS A MITIGATION ACTION

- The public administration needs to know **how many decibels** the installation of the low-noise road surface is able to lower at the receiver.
- Noise level lowering has necessarily to be defined **in comparison with another road surface**.
- Then, **a differential criterion** may be applied, for evaluating the low-noise road surface comparing its acoustical performances with the ones of a reference surface.

The differential criterion

G. Licitra, L. Teti, M. Cerchiai, Applied Acoustics 01/2014; 76:169–179

➢**During the same measurement sessions, data are recorded also over a second road surface, chosen as "reference".**

➢**Evaluating the acoustical effectiveness of a road surface comparing it with a second one is useful to avoid the influence of the surrounding conditions in a long time monitoring.**

RUBBERIZED ROAD SURFACES AS MITIGATION ACTION

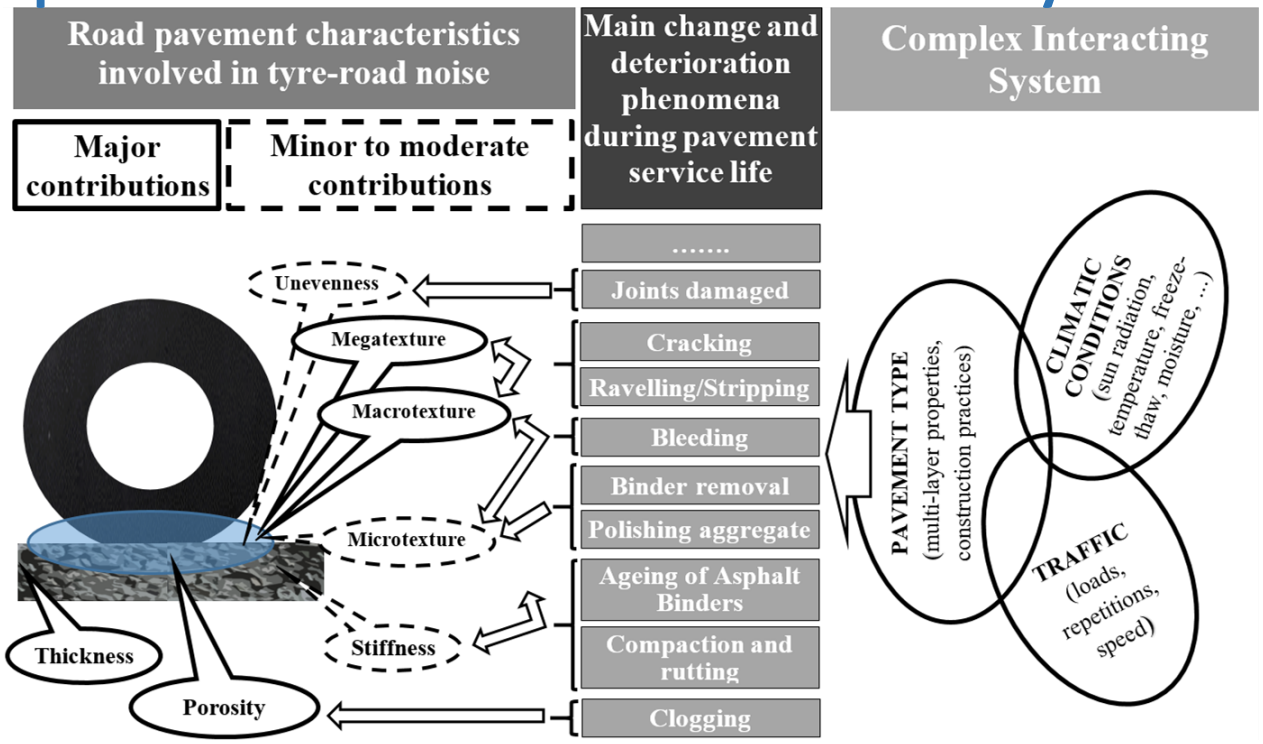
In its previous research experiences, IPOOL has surveyed over time several rubberized road surfaces laid in different sites located in Italy.

Part of these results was of support in the development of the A2 activity.

ACOUSTIC AGEING

The worsening of acoustic performances of a road surface over time is the result of the interaction of **three** main complex elements: **pavement type**, **traffic loads** and **climatic conditions**.

Road pavement characteristics involved in tyre-road noise



G. Licitra, A. Moro, L. Teti, A. Del Pizzo, F. Bianco (2019). "Modelling of acoustic ageing of rubberized pavements". Applied Acoustics 146 (2019) pp. 237–245.

Models of acoustic aging of road surfaces

Linear models are often adopted in literature

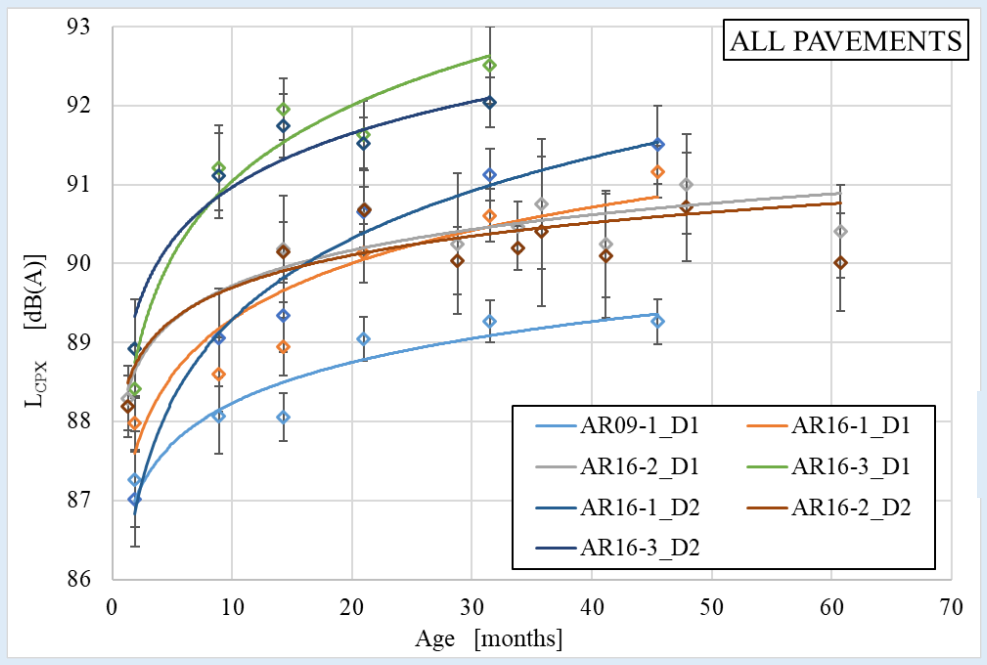
Pavement type	Method/ Indicator	Model	References
DGAC, OGAC, SMA, UTLAC	SPB	Lin, Exp, Log	[Iversen and Kragh, 2014]
SMA, ACMR, SDA	SPB, CPX	Exp, Log	[Hammer et al., 2015]
SMA, LN-SMA, 1L-PA, 2L-PA	SPB, RVS, CPX	Log	[Wehr et al. 2015]
DGAC, OGAC, 1L-PA, RAC, UTLAC, SMA	SPB, OBSI	Lin	[Bendtsen et. al. 2009]
ARFC	CPX	Lin	[Arizona, 2003]
1L-PA, 2L-PA, TSL, SMA DGAC, OGAC	SPB, CPX	Lin	[van Blokland et al. 2014]

Legend
1L-PA = Single-layer Porous asphalt; 2L-PA = Double-layer Porous Asphalt; ARFC = Asphalt Rubber Friction Course; CPX = Close Proximity method; Exp = Exponential; DGAC = Dense Graded Asphalt Concrete; Lin = Linear; LN-SMA = Low-noise Stone Mastic Asphalt; Log = Logarithmic; OBSI = On-Board Sound Intensity method method; OGAC = Open Graded Asphalt Concrete; RAC = Open and Dense Graded Asphalt Concrete with rubber; RVS = RVS 04.02.11 method; SMA = Stone Mastic Asphalt; SPB = Statistical pass-by method; TSL = Thin Surface Layers; UTLAC = Ultra thin asphalt layers.

Antonino Moro, Luca Teti, Francesco Bianco, Gaetano Licitra (2018), "Long Term Monitoring Of Acoustic Performances Of Rubberized Surfaces", RAR2018 (Rubberized Asphalt ‹› Asphalt Rubber 2018), National Kruger Park - South Africa - from 25th to 28th September 2018

Acoustic ageing trends of rubberized road surfaces (wet process)

A new regression model was applied to estimate the acoustic ageing of the investigated pavements.



G. Licitra, A. Moro, L. Teti, A. Del Pizzo, F. Bianco (2019). "Modelling of acoustic ageing of rubberized pavements". Applied Acoustics 146 (2019) pp. 237–245.

The best model resulted to be the logarithmic one.

$$L_{CPXi} = Y_{0i} + \alpha_i * ln\left(\frac{1+A}{A_0}\right) + \alpha_T \Delta T + \alpha_H \Delta H$$

- A: age of the pavement
- Y_{0i}: initial L_{CPX} value
- $\alpha_T \Delta T$: Air temperature correction
- $\alpha_H \Delta H$: Rubber Hardness correction

The coefficient α_i refers to the interaction of three factors: **pavement type**, **traffic actions** and **climatic parameters**.

LITERATURE [1/3]

- European Commission 2017. Report from the Commission to the European Parliament and the Council on the Implementation of the Environmental Noise Directive in accordance with Article 11 of Directive 2002/49/EC. COM/2017/0151 final.
- Muzet A. Environmental noise, sleep and health. Sleep Med Rev 2007; 11: 135–42.
- Hygge S, Ev ans GW, Bullinger M. A prospective study of some eff ects of aircraft noise on cognitive performance in schoolchildren. Psychol Sci 2002; 13: 469–74.
- Lercher P, Evans GW, Meis M. Ambient noise and cognitive processes among primary schoolchildren. Environ Behav 2003; 35: 725–35.
- Babisch, W., et al. (2012). "Exposure modifiers of the relationships of transportation noise with high blood pressure and noise annoyance." Journal of the Acoustical Society of America, 132(6): 3788–3808
- Miedema HME, Oudshoorn CGM. Annoyance from transportation noise: relationships with exposure metrics DNL and DENL and their confidence intervals. Environ Health Perspect 2001; 109: 409–16
- Ögren, Mikael, Peter Molnár, and Lars Barregard. "Road traffic noise abatement scenarios in Gothenburg 2015–2035." Environmental research 164 (2018): 516-521.
- Sandberg U, Ejsmont J. Tyre/road noise reference book, INFORMEX, Kisa, Sweden, 2002.
- Praticò F.G., Roads and loudness: a more comprehensive approach, International Journal of Road Materials and Pavement Design, Volume 2 - No 4/2001, Pages359 to 377, 2001.
- Lee, Han-Wool, Jin-Rae Cho, and Weui-Bong Jeong. Numerical method for simulating tire rolling noise by the concept of periodically exciting contact force. International Journal of Automotive Technology 18.5 (2017): 823-832.
- Winroth, J., Kropp, W., Hoever, C., Beckenbauer, T., & Männel, M. (2017). Investigating generation mechanisms of tyre/road noise by speed exponent analysis. Applied Acoustics, 115, 101-108.
- Losa M, Leandri P, Licitra G. Mixture Design Optimization of Low-Noise Pavements, Transportation Research Record: Journal of the Transportation Research Board, 2372, Pages 25-33, 2013
- ISO/TS 13473-4:2008 Characterization of pavement texture by use of surface profiles - Part 4: Spectral analysis of surface profiles
- ISO 13473-5:2009 Characterization of pavement texture by use of surface profiles Part 5: Determination of megatexture
- Klein, P. and Hamet, J. F. Research Report hal-00546120, Road texture and rolling noise: an envelopment procedure for tire-road contact, 2004
- Hamet, J. F. and Klein, P. Road texture and tire noise, INTER-NOISE 2000, Proceedings of the 29th international congress on noise control engineering, 27-31 August 2000
- Von Meier, A., van Blockland G. J. and Descornet, G. The influence of texture and sound absorption on the noise of porous road surfaces. PIARC 2nd International Symposium on Road Surface Characteristics, Berlin, Germany, 23-26 June, 1992
- Goubert, L., Sandberg, U., Enveloping Texture Profiles for Better Modelling of the Rolling Resistance and Acoustic Qualities of Road Pavements, 8th Symposium on Pavement Surface Characteristics: SURF 2018 – Vehicle to Road Connectivity, Brisbane, Queensland, 2018
- Bendat JS, Piersol AG. Random data analysis and measurement procedures. 3rd ed., John Wiley & Sons, USA, 2000
- SO/TS 11819-3:2017 Acoustics - Measurement of the influence of road surfaces on traffic noise -- Part 3: Reference tyres
- Losa, M., Leandri, P., Bacci, R., Empirical Rolling Noise Prediction Models Based on Pavement Surface Characteristics, Road Materials and Pavement Design, 11:sup1, Pages 487-506, 2010, DOI: 10.1080/14680629.2010.9690343

LITERATURE [2/3]

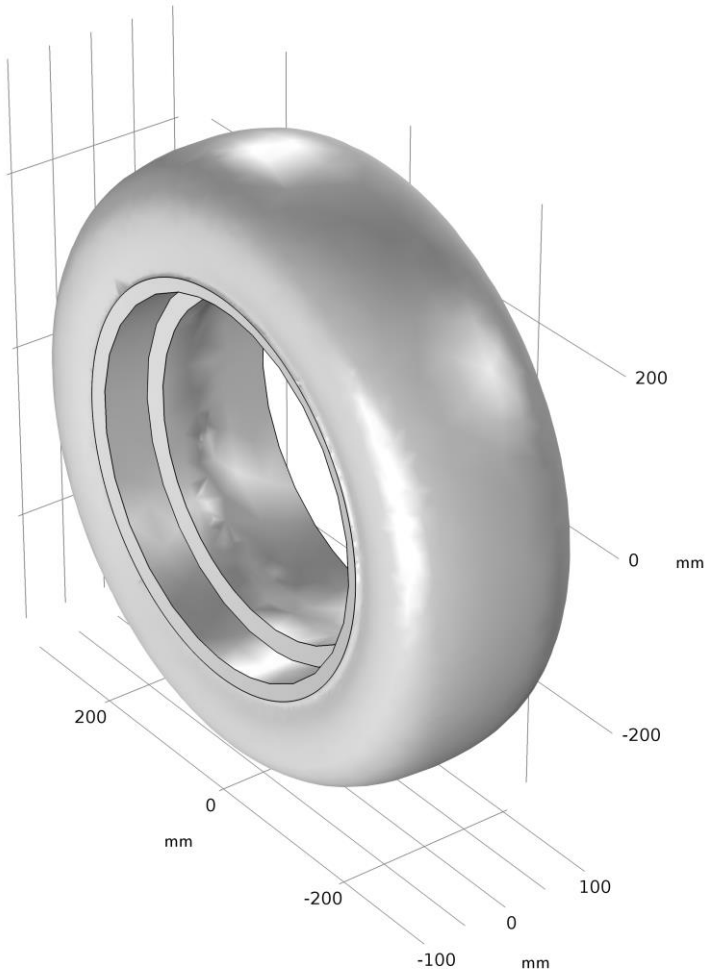
- Li, T., Burdisso, R., & Sandu, C. (2017). Effect of Rubber Hardness and Tire Size on Tire-Pavement Interaction Noise. Tire Science and Technology.
- Bravo, T. (2017). An analytical study on the amplification of the tyre rolling noise due to the horn effect. Applied Acoustics, 123, 85-92.
- Kindt, P., Berckmans, D., De Coninck, F., Sas, P., & Desmet, W. (2009). Experimental analysis of the structure-borne tyre/road noise due to road discontinuities. Mechanical Systems and Signal Processing, 23(8), 2557-2574.
- Praticò, F.G., On the dependence of acoustic performance on pavement characteristics, Transportation Research Part D: Transport and Environment, Volume 29, June 2014, Pages 79-87
- ISO 11819-2:2017 Acoustics - Measurement of the influence of road surfaces on traffic noise -- Part 2: The close-proximity method
- ISO 13473-2:2002 Characterization of pavement texture by use of surface profiles - Part 2: Terminology and basic requirements related to pavement texture profile analysis
- Berge T, Haukland F, Mioduszewski P, Wozniak R. Tyre/road noise of passenger car tyres, including tyres for electric vehicles – road measurements. In: Proceedings of EuroNoise 2015.
- Sandberg U, Ejsmont J. Influence of tyre rubber hardness on tyre/road noise emission. In: Proceedings of Inter-noise 2007, Istanbul, 2007.
- Praticò FG, Anfosso-Lédée F. Trends And Issues In Mitigating Traffic Noise Through Quiet Pavements. Procedia – Social and Behavioral Sciences 53 (2012) 203-212.
- Bendtsen H, Qing L, Kohler E. Acoustic aging of asphalt pavements A Californian/ Danish comparison. Report 171, Road Directorate, Danish Road Institute, 2009.
- van Loon R, Tollenaar C, van Blokland G. Mechanism of acoustic aging of road surfaces. In: Proceedings of EuroNoise 2015, 31 May – 3 June, Maastricht.
- Andriejauskas T, Vaitkus A, Čygas D. Tyre/Road Noise Spectrum Analysis of Ageing Low Noise Pavements. In: Proceedings of Euronoise 2018, Crete, 2018.
- Xiaohu L, Talon Y, Redelius P. Ageing of bituminous binders - laboratory tests and field data, In: Proceedings of the 4th Eurasphalt and Eurobitume Congress, May 2008, Copenhagen, Denmark, 2008.
- Lopes MM, Zhao D, Chailleux E, Kane M, Gabet T, Petiteau C. Characterization of aging processes on the asphalt mixture surface. In: Proceedings of 2nd International Symposium on Asphalt Pavements et Environnement, Oct 2012, France.
- Kragh J, Andersen B, Pigasse G. Acoustic ageing of pavement. DVS-DRD joint research programme – Super Silent Traffic. Report 460. December 2013, ISBN: 978-87-93184-06-0.
- Iversen LM, Kragh J. Acoustic ageing rates for pavements estimated by means of regression analysis. N. 538, Danish Road Directorate, 2014.
- Hammer E, Steiner S, Dias M, Bühlmann E. Long-term acoustical performance of low noise road surfaces in urban areas in Switzerland. In: Proceedings of EuroNoise 2015, 31 May – 3 June, Maastricht.
- Wehr R, Conter M, Haider M. On the acoustic long-term performance of asphalt and concrete road surfaces on Austrian motorways. In: Proceedings of EuroNoise 2015, 31 May – 3 June, Maastricht.
- Arizona Department of Transportation (ADOT). Quiet Pavement Pilot Program 4/16/03.
- van Blokland G, Tollenaar C, van Loon R. Modelling of Acoustic Aging of Road Surfaces. QUESTIM, Quietness and Economics Stimulate Infrastructure Management, Deliverable D2.2 8/2014, CEDR Call 2012: Noise.
- Sandberg U, Bühlmann E, Conter M, Mioduszewki P, Wehr R. Improving the CPX method by specifying reference tires and including corrections for rubber hardness and temperature. In: Proceedings of Inter-noise 2016, Amburg 2016.
- Werh R, Fuchs A. A combined approach for CPX tire hardness and temperature correction. In: Proceedings of Inter-noise 2016, Amburg 2016.
- Werh R, Fuchs A, Aichinger C. A combined approach for correcting tyre hardness and temperature influence on tyre/road noise. Applied Acoustics 134 (2018) 110-118.
- Bühlmann E, Dias M, Steiner S. Influence of environment- and traffic-related factors on acoustic ageing

LITERATURE [3/3]

- A. Del Pizzo, L. Teti, A. Moro, F. Bianco, L. Fredianelli, G. Licitra (2020). "Influence of texture on tyre road noise spectra in rubberized pavements". Applied Acoustics 159 (2020) 107080.
- G. Licitra, A. Moro, L. Teti, A. Del Pizzo, F. Bianco (2019). "Modelling of acoustic ageing of rubberized pavements". Applied Acoustics 146 (2019) pp. 237–245.
- A. Moro, L. Teti, F. Bianco, G. Licitra (2018). "Long Term Monitoring Of Acoustic Performances Of Rubberized Surfaces". Rubberized Asphalt Rubber 2018 (RAR2018) Conference September 25-28, 2018.
- A. Del Pizzo, F. Bianco, L. Teti, A. Moro, G. Licitra (2018). "Sviluppo di un profilometro laser per misure di tessitura stradale e studio della correlazione tra tessitura e rumore da rotolamento". Rivista Italiana di Acustica, Vol. 42, N. 1-2, pp. 1-16, 2018.
- Freitas E, Antunes L. Assessment of the traffic noise on thin layers. In: Proceedings of 16th World meeting, international road federation; 2010.
- Bühlmann E, Ziegler, T. Temperature effects on tire/road noise measurements and main reasons for their variation. In: Proceedings of Inter-noise 2013, Innsbruck 2013.
- Bühlmann E, van Blokland G. Temperature effects on tire/road noise – A review of empirical research . In: Proceedings of Forum Acusticum, 7-12 September Krakow, 2014.
- A. Del Pizzo, F. Bianco, L. Teti, A. Moro, G. Licitra (2018). "A new approach for the evaluation of the relationship between road texture and rolling noise". 25th International Congress on Sound and Vibration 2018. (ICSV 25). Hiroshima, Japan. July 8-12, 2018.
- A. Del Pizzo, F. Bianco, L. Teti, A. Moro, G. Licitra (2018). "Analisi spettrale di tessitura e rumore da rotolamento in pavimentazioni a bassa emissione". 45° Convegno Nazionale AIA – Aosta, Giugno 20-22, 2018.
- G. Licitra, L. Teti, M. Cerchiai, F. Bianco (2017). "The influence of tyres on the use of the CPX method for evaluating the effectiveness of a noise mitigation action based on low-noise road surfaces". Transportation research Part D: Transport and Enviroment 55, August 2017, pp. 217-226.
- Kim, B. S. Sound Radiation due to Tire Tread Vibration. JSME International Journal. Series C, Mechanical Systems, Machine Elements and Manufacturing, 26 Vol. 46, No. 2, Pages. 675-682, 2003
- Brinkmeier, M., U. Nackenhorst, S. Petersen, and O. von Estorff. A Finite Element Approach for the Simulation of Tire Rolling Noise. Journal of Sound and Vibration, Vol. 309, No. 1, 2008, pp. 20-39.
- G. Licitra, M. Cerchiai, L. Teti, M. Chetoni, F. Bianco (2016). "The influence of tyres on the CPX method used for evaluating the efficacy of a noise mitigation action". Proceedings of ICSV 23, Athens, July 2016.
- G. Licitra, M. Cerchiai, L. Teti, F. Bianco, M. Chetoni, E. Ascari (2016). "Relationship between Pass By results, CPX ones and roadside long-term measures: some considerations". Proceedings of Inter-Noise, Hamburg, August 2016.
- G. Licitra, M. Cerchiai, L. Teti, E. Ascari, L. Fredianelli (2015). "Durability and variability of the acoustical performance of rubberized road surfaces". Applied Acoustics 94 (2015) pp. 20–28.
- G. Licitra, M. Cerchiai, L. Teti, E. Ascari, F. Bianco, M. Chetoni. (2015). "Performance Assessment of Low-Noise Road Surfaces in the Leopoldo Project: Comparison and Validation of Different Measurement Methods". Coatings 5 (2015) pp. 3-25.

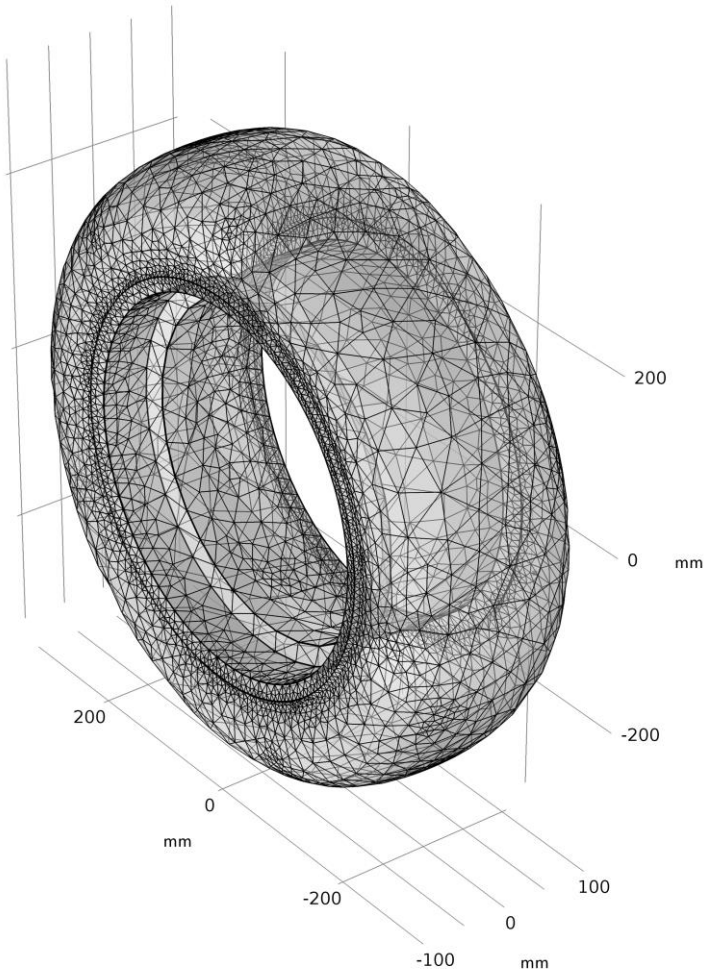
SEARCHING EIGENFREQUENCIES VALUES OF SRTT TIRE WITH FEM

1) Geometry Modeling



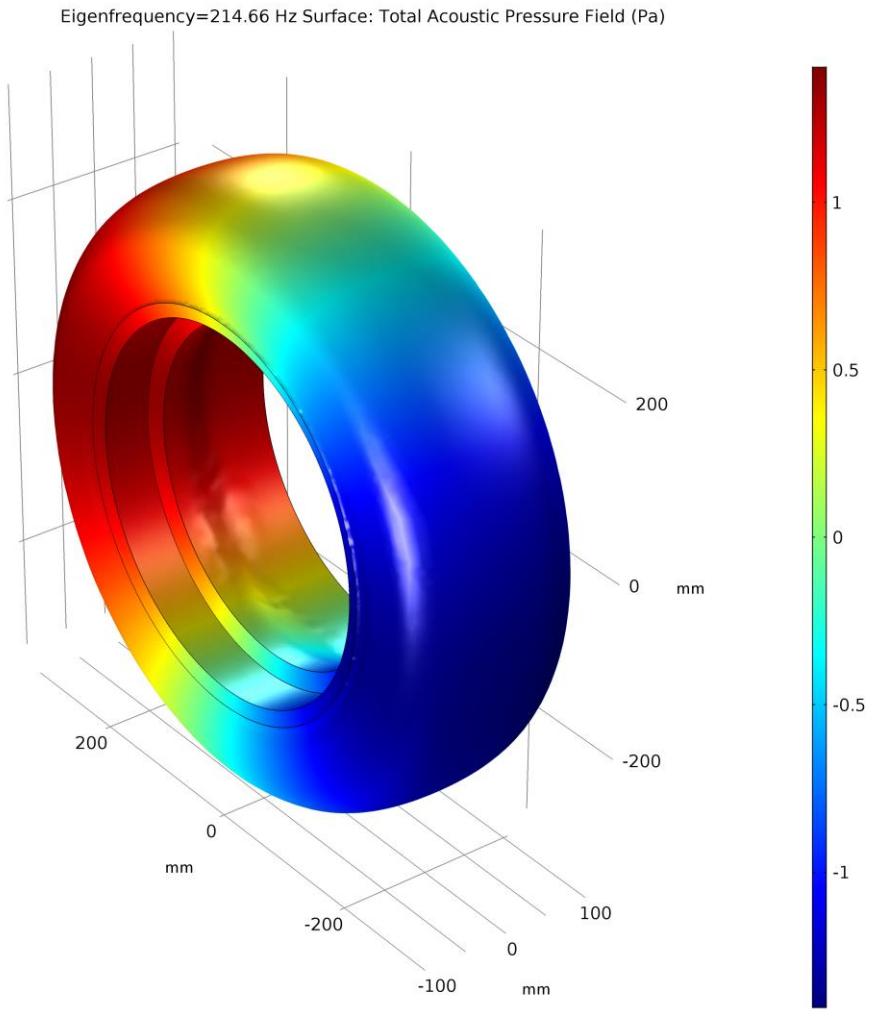
SEARCHING EIGENFREQUENCIES VALUES OF SRTT TIRE WITH FEM

1) Geometry Modeling
2) Meshing



SEARCHING EIGENFREQUENCIES VALUES OF SRTT TIRE WITH FEM

1) Geometry Modeling
2) Meshing
3) Eigenfrequencies Study



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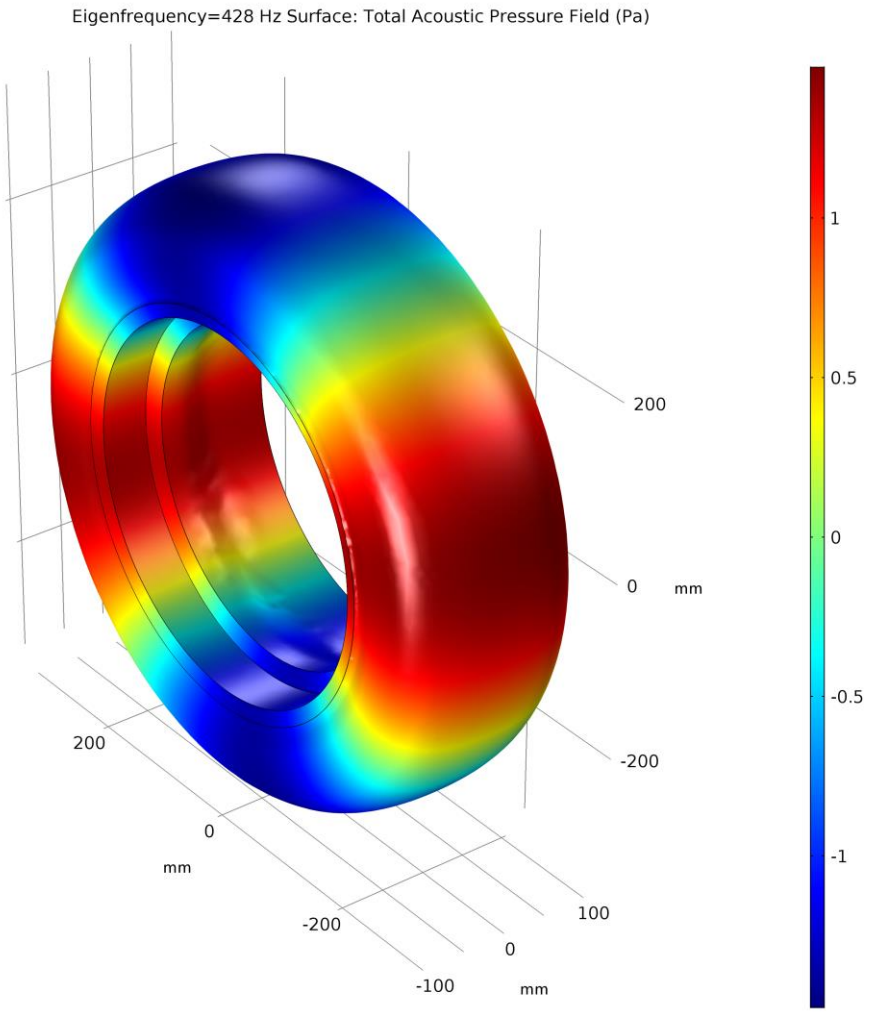

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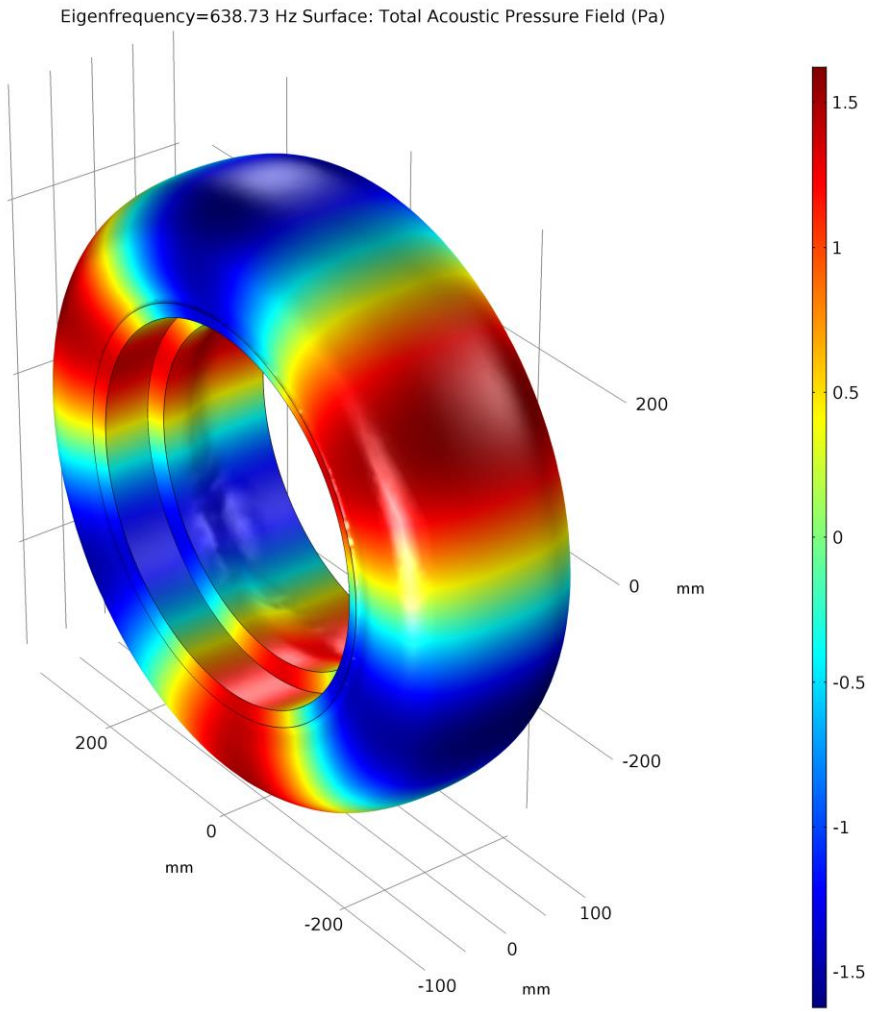

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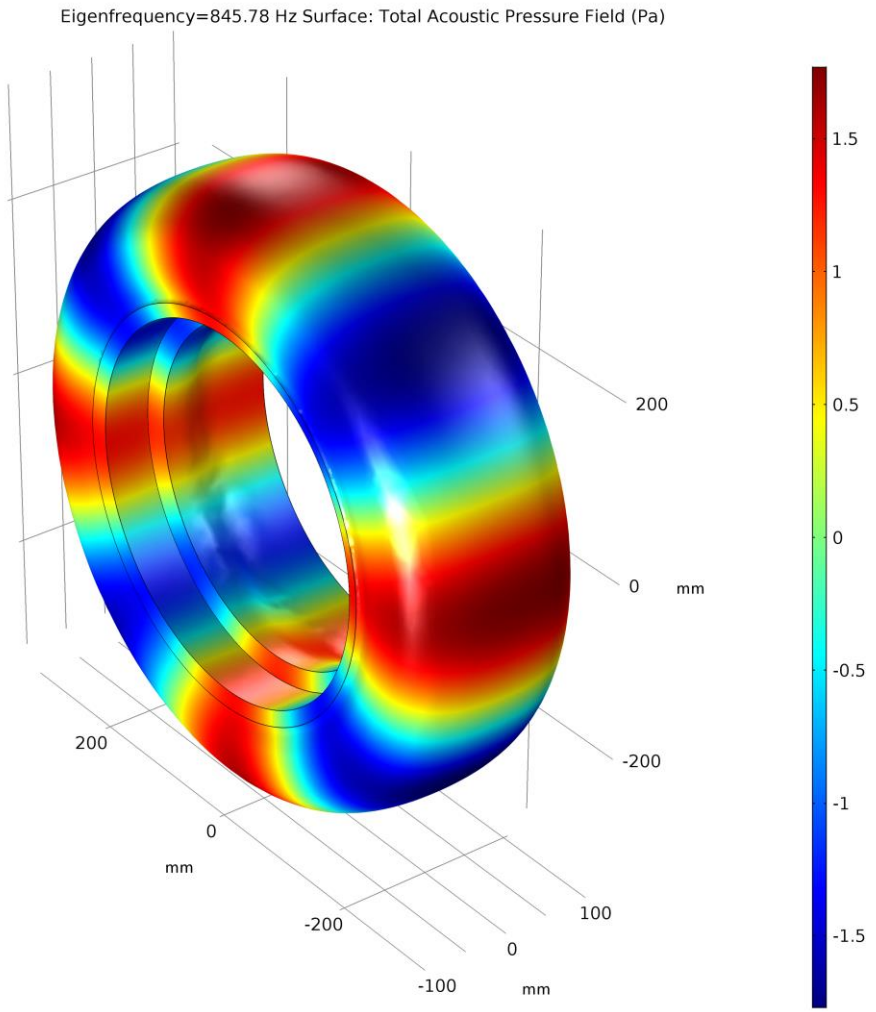

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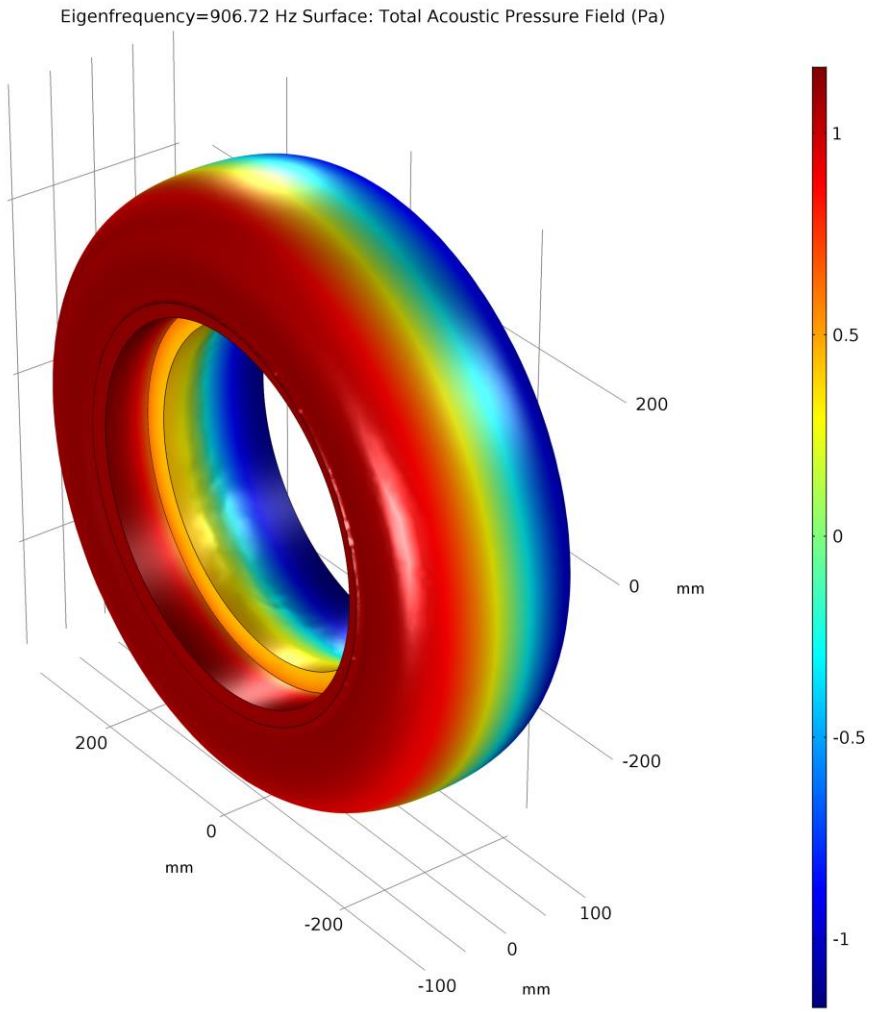

SEARCHING EIGENFREQUENCIES VALUES OF SRTT TIRE WITH FEM

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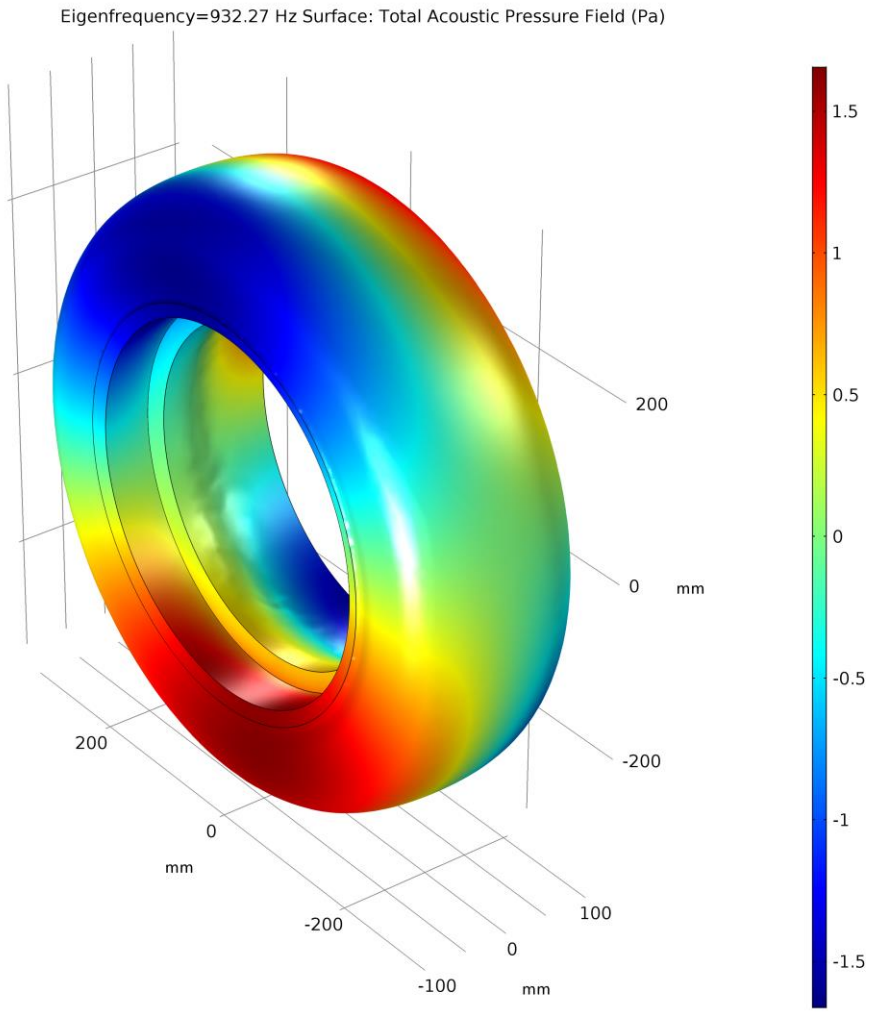
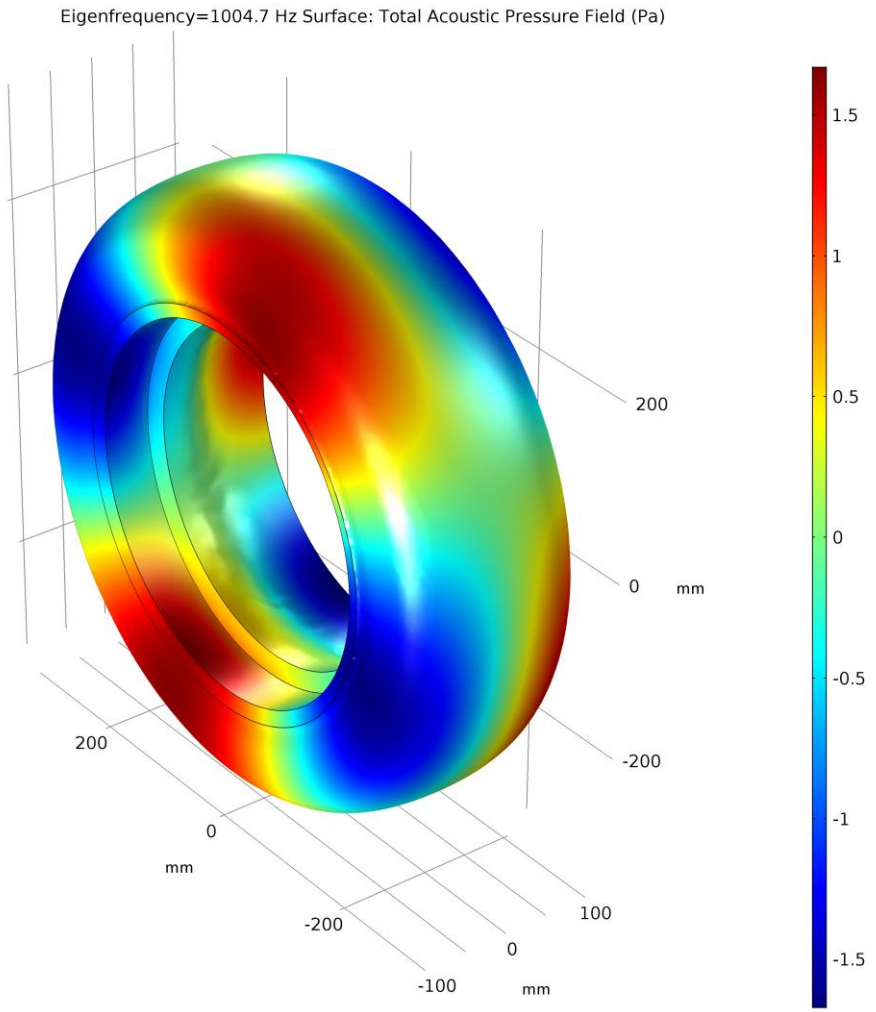
2) Meshing
3) Eigenfrequencies Study



SEARCHING EIGENFREQUENCIES VALUES OF SRTT TIRE WITH FEM

1) Geometry Modeling
2) Meshing
3) Eigenfrequencies Study



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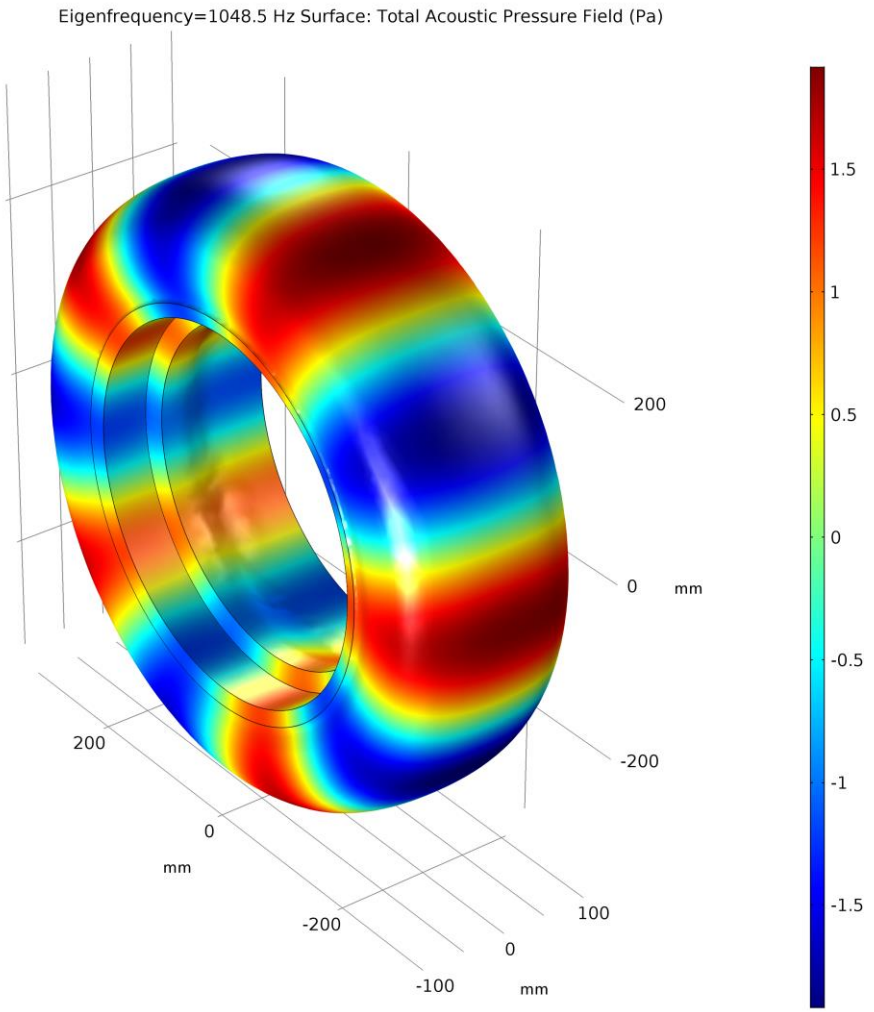
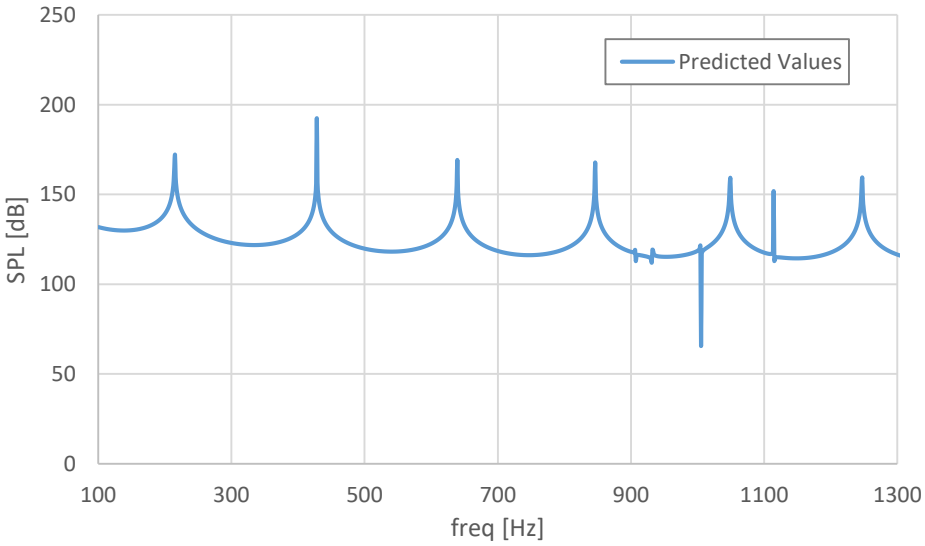
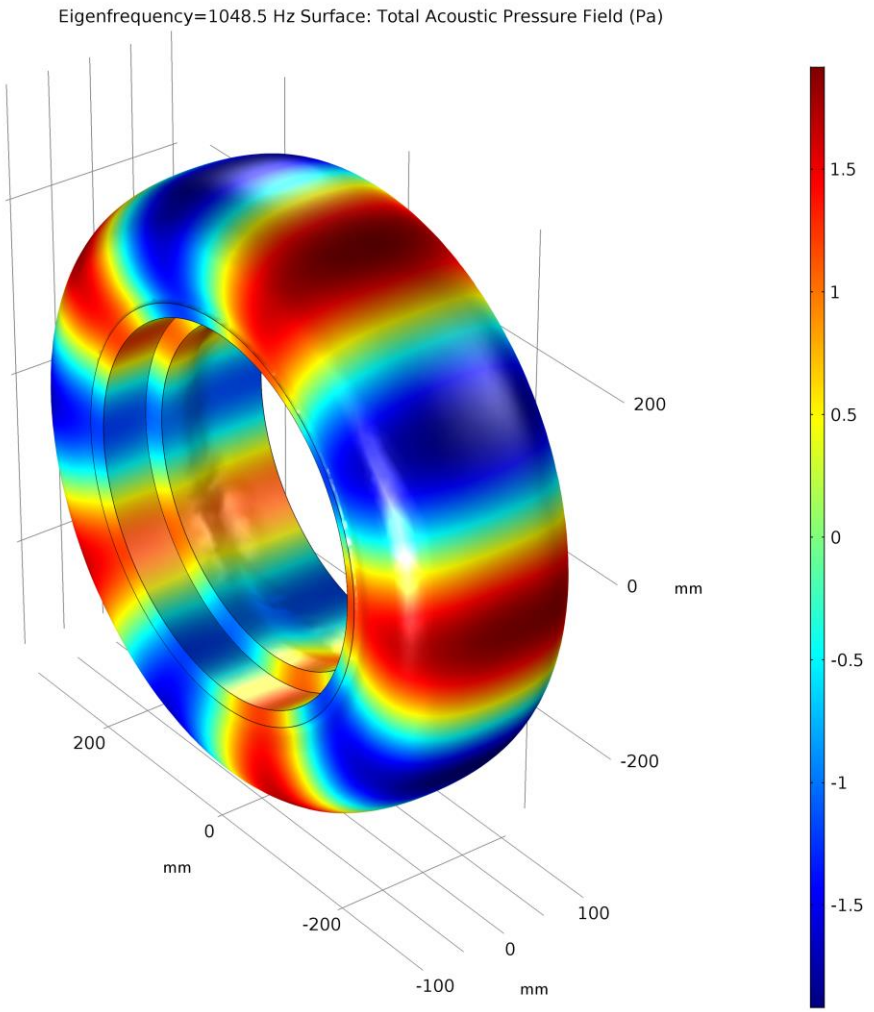


SEARCHING EIGENFREQUENCIES VALUES OF SRTT TIRE WITH FEM

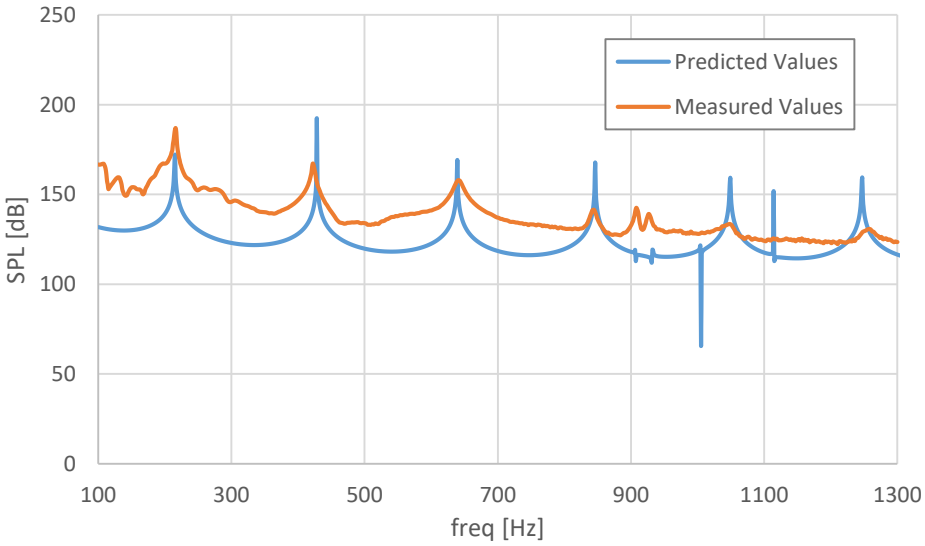
1) Geometry Modeling
2) Meshing
3) Eigenfrequencies Study
4) Frequency Domain Study

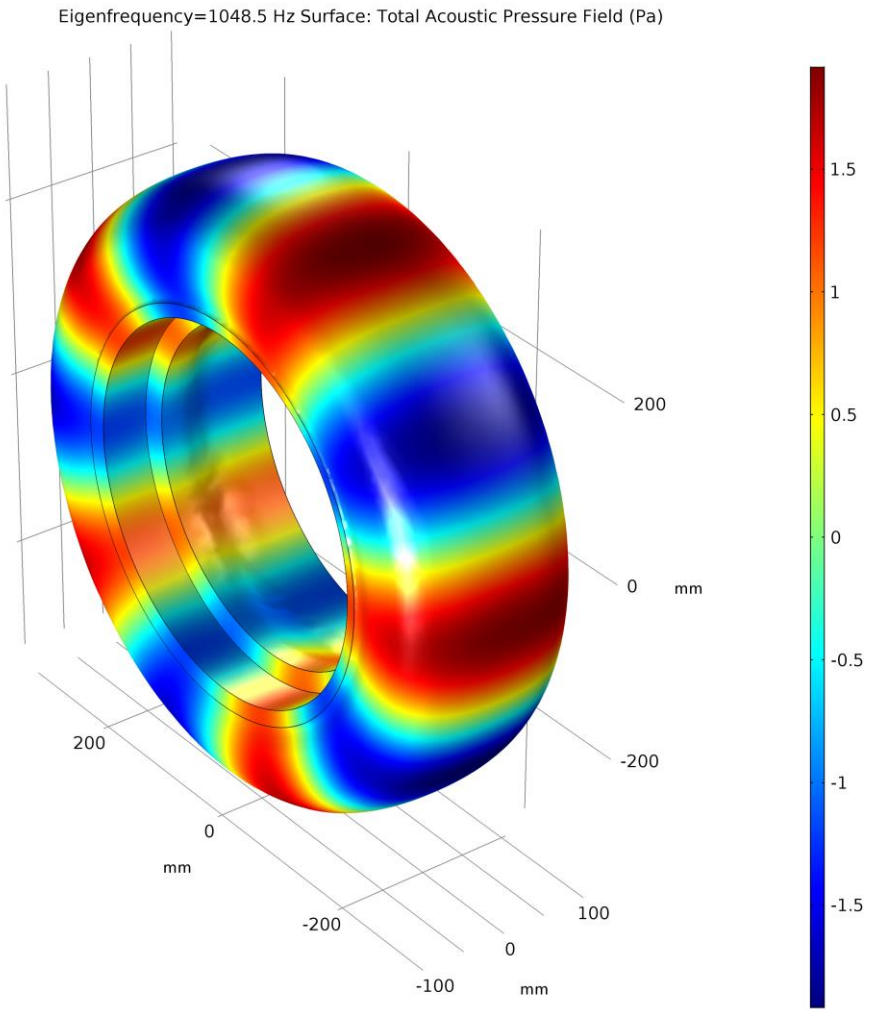




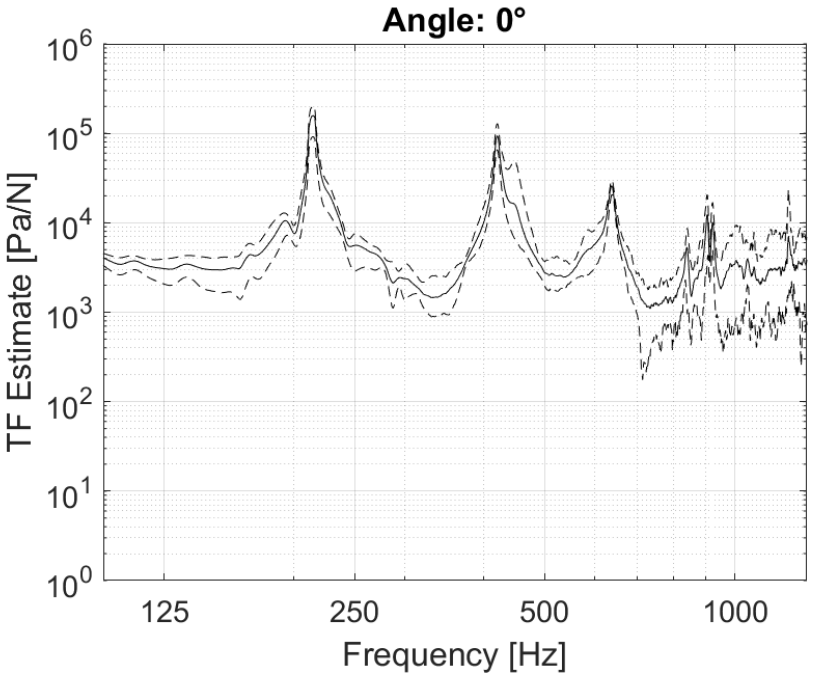
SEARCHING EIGENFREQUENCIES VALUES OF SRTT TIRE WITH FEM

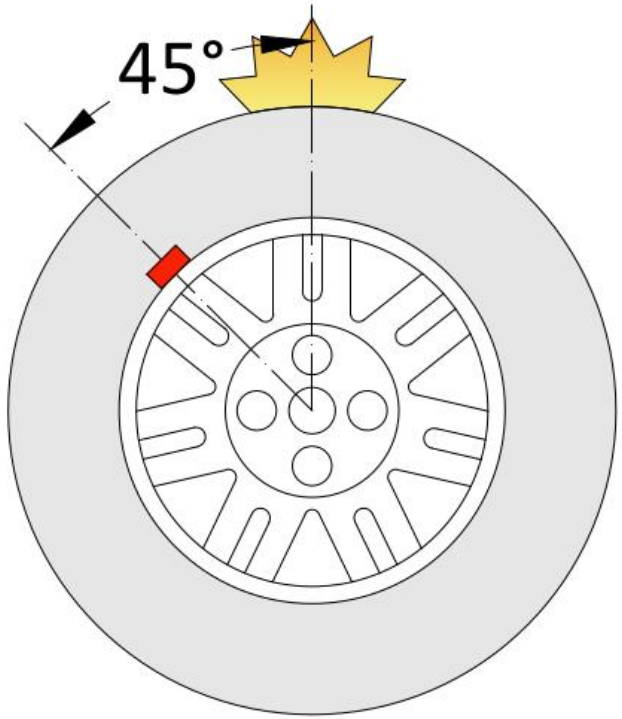
1) Geometry Modeling
2) Meshing
3) Eigenfrequencies Study
4) Frequency Domain Study
5) Comparison with experimental measurements



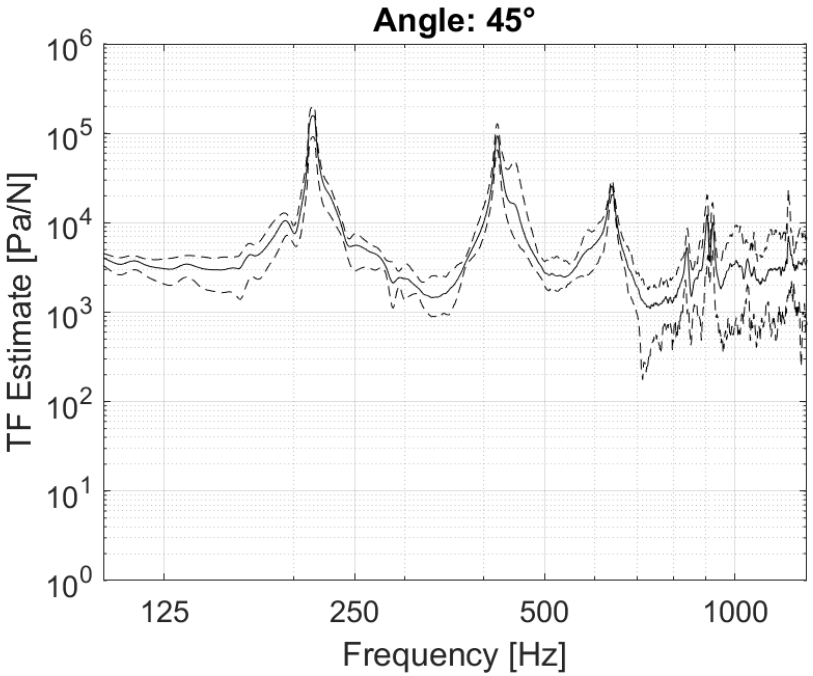


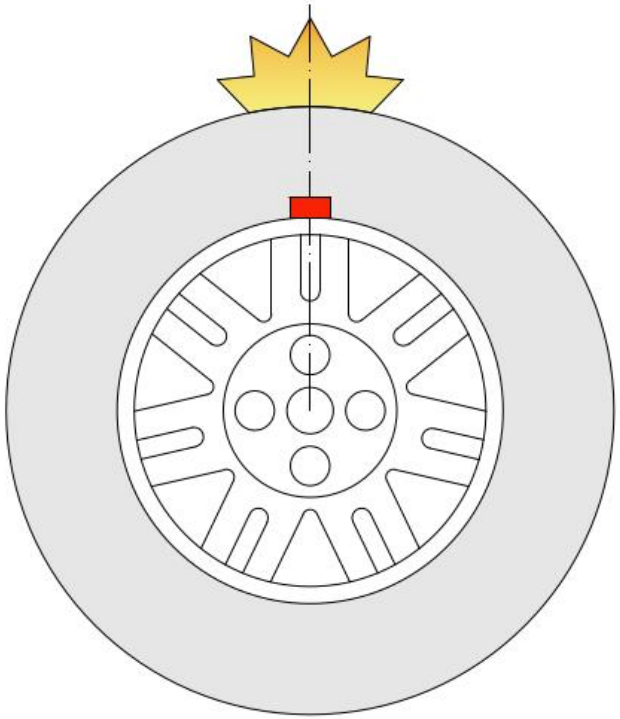
EXPERIMENTAL MEASUREMENTS TIRE FUNCTION TRANSFER





EXPERIMENTAL MEASUREMENTS TIRE FUNCTION TRANSFER





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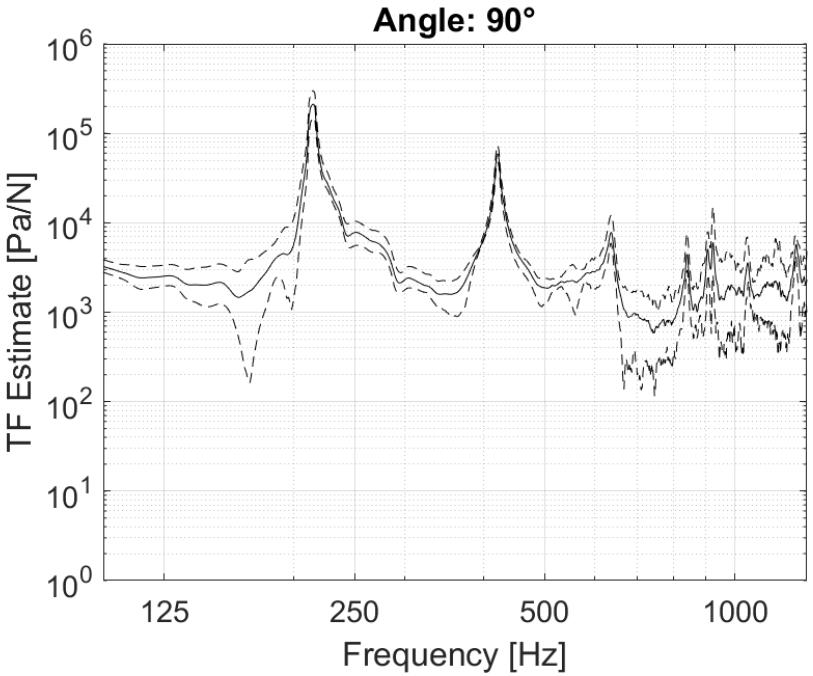

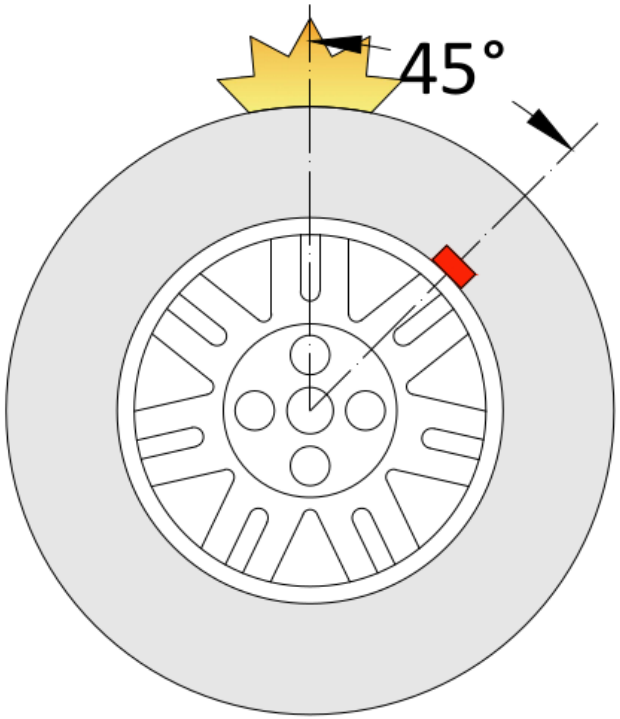

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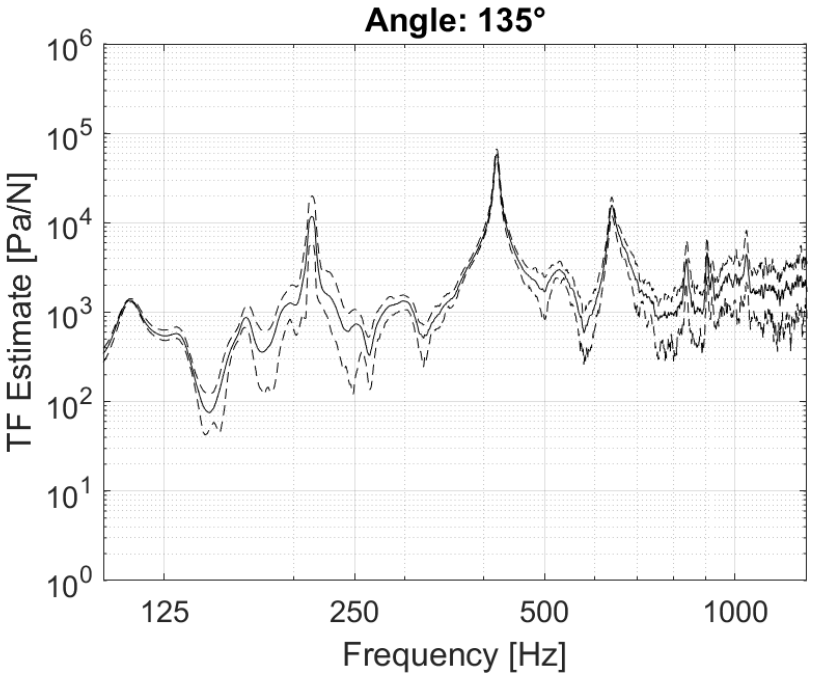

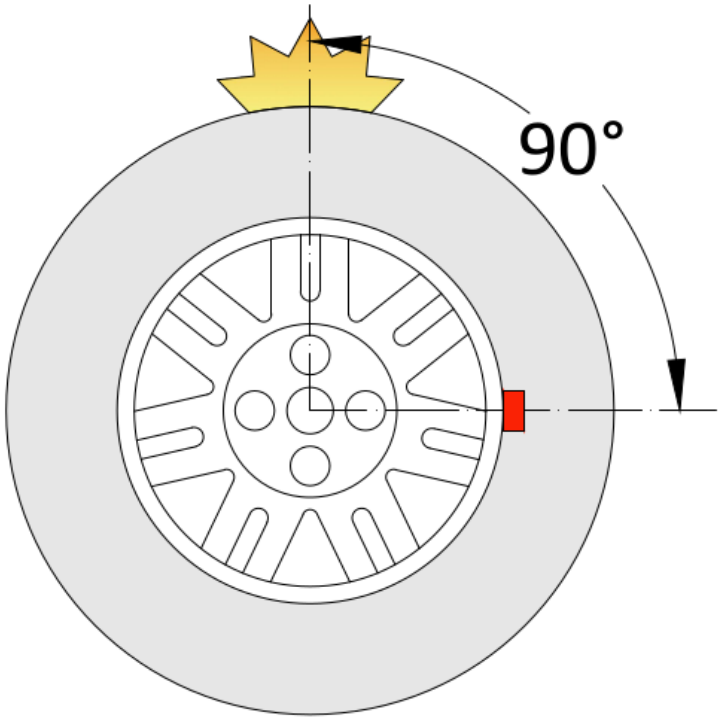

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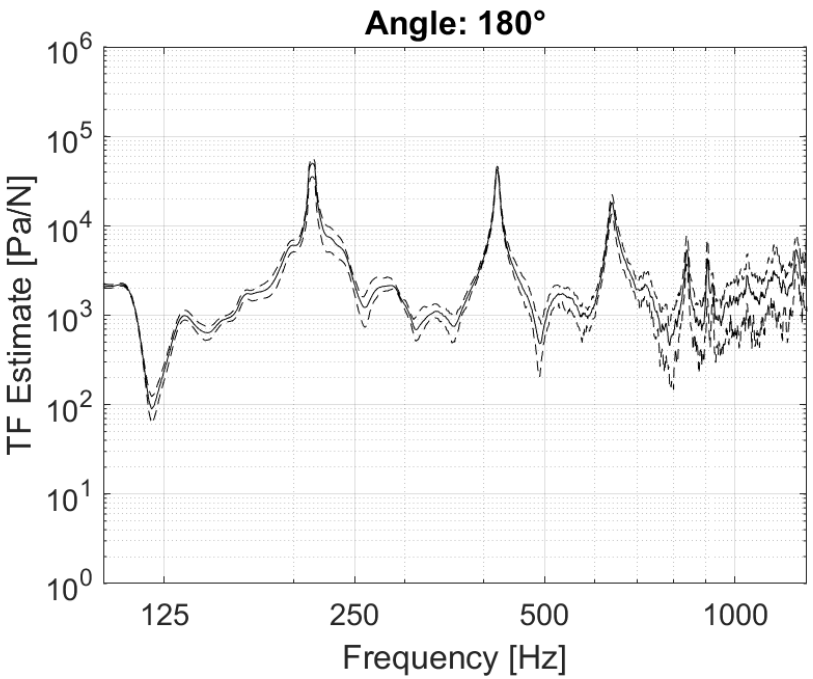

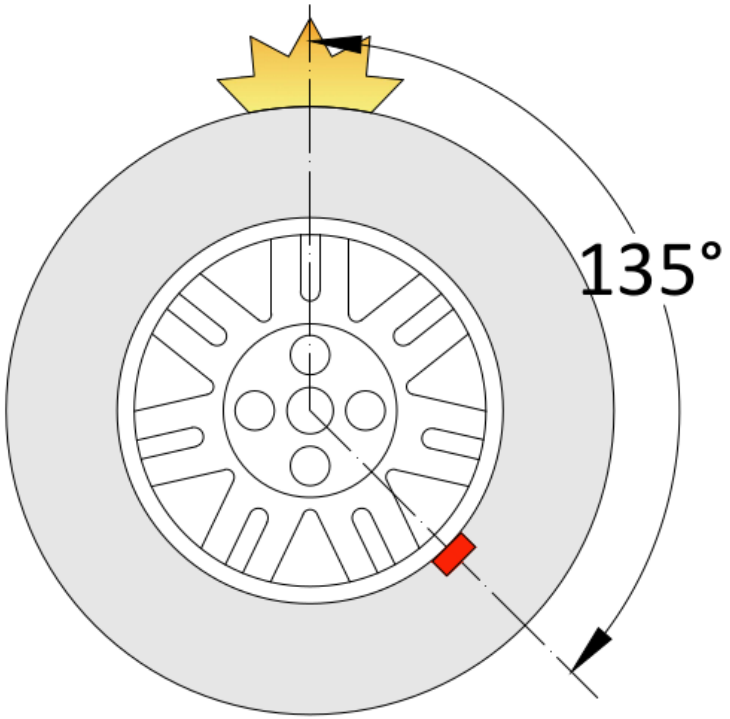

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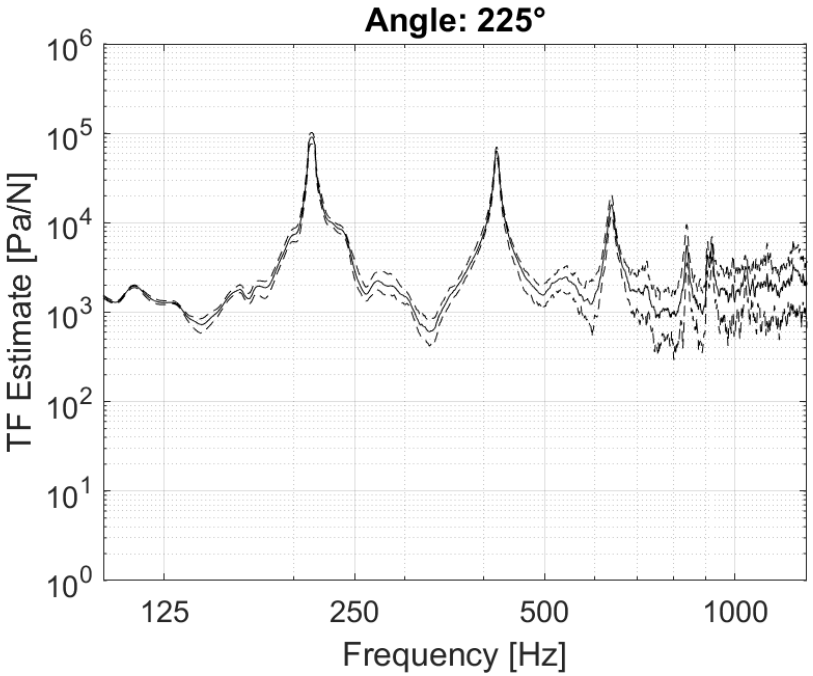

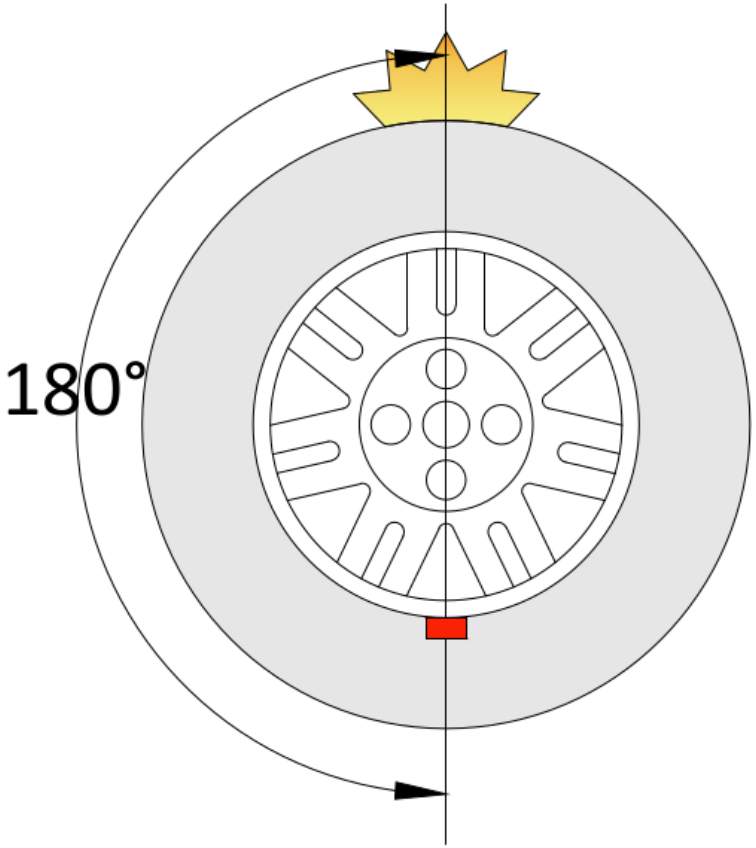

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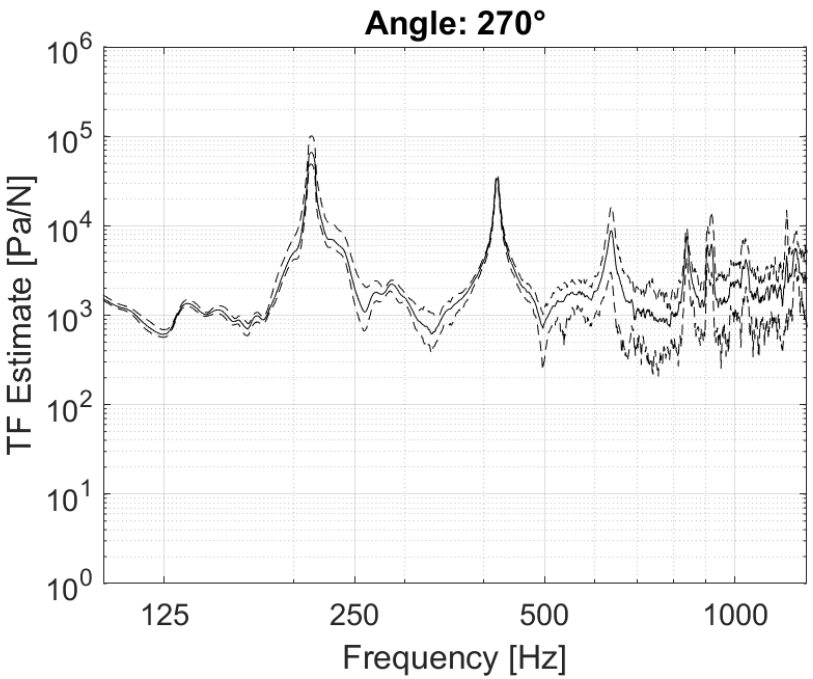
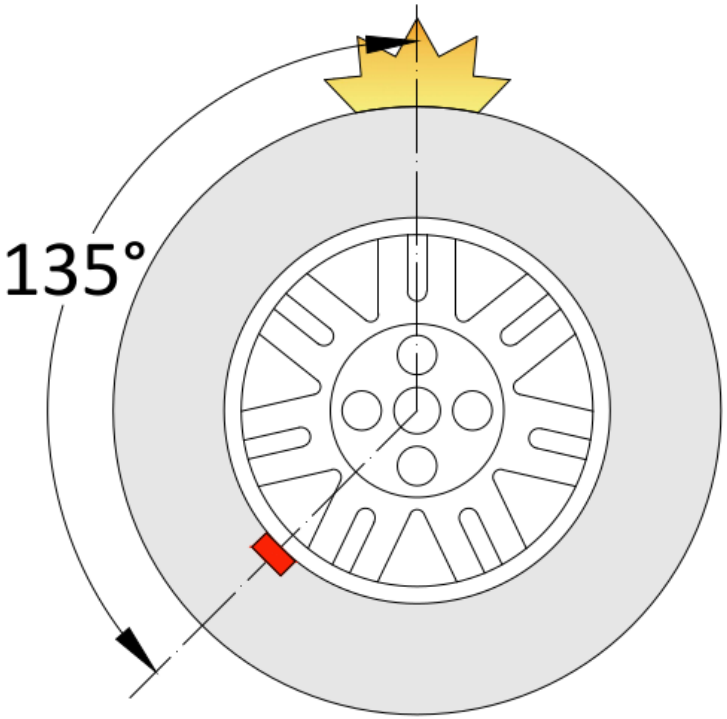
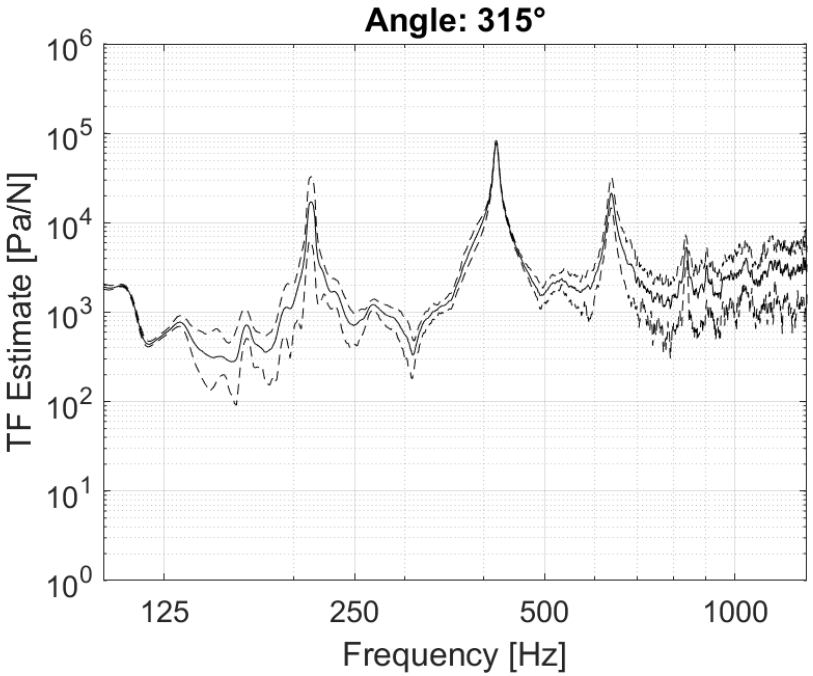
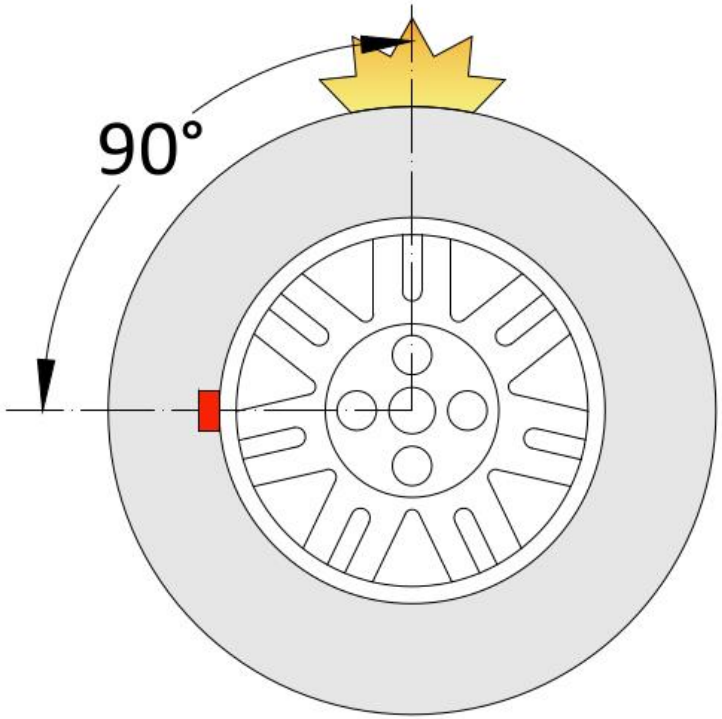




EXPERIMENTAL MEASUREMENTS TIRE FUNCTION TRANSFER





Set up and mounting of 4 acquired SRTT tyres.

Realisation of a portable wheel mounting rack to allow hardness and impulse response measurements.

Optimization of the multivariate analysis procedure aimed at evaluating the durability of the acoustic performances.

Preliminary multivariate analysis taking into account the following variables:

- Traffic data (total traffic data (TT), heavy traffic data (HT));
- Pavement data (age of pavements in months, pavement type);
- Climatic data (total precipitations in mm, number of freeze-thaw cycles (F-T), number of ice days);
- CPX measurement data (air temperature, pavement temperature during the CPX measurement in °C; hardness of the tyre rubber in Shore A).

$$\alpha_i = \alpha_{pav} * \alpha_{met} * AHT_i$$

$$L_{CPXi} = Y_{0i} + \alpha_{pav} * \alpha_{met} * AHT_i * ln\left(\frac{1+A}{A_0}\right) + \alpha_T \Delta T + \alpha_H \Delta H$$

refers to the **pavement type**

refers to the **climatic parameters**

annual heavy traffic rate on the pavement as millions of passages per year

LIFE E-VIA Consortium Meeting
Videoconference – 23rd October 2020

Technical progress of action B2
Tyre-pavement coupling study

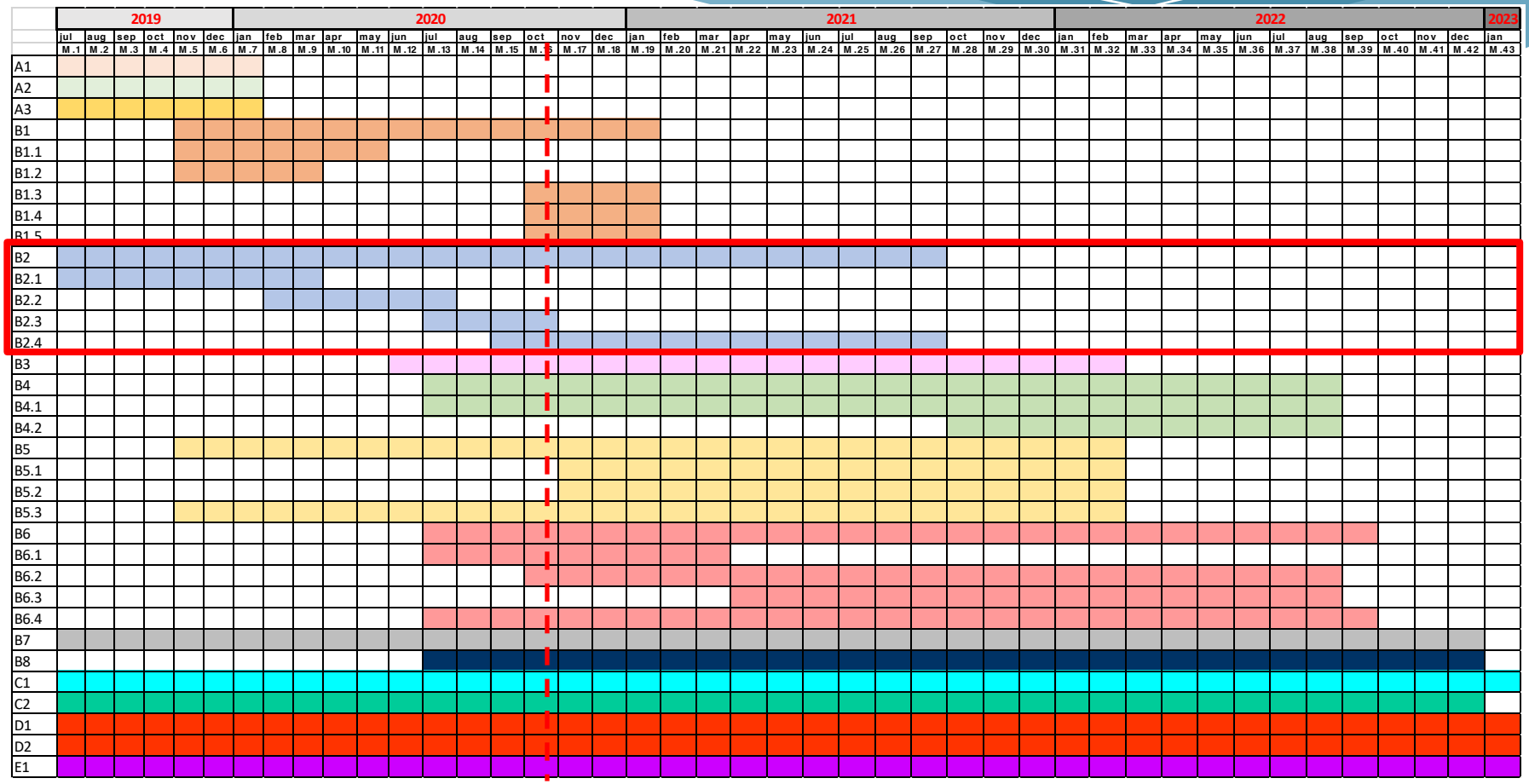
Julien CESBRON, Marie-Agnès PALLAS, Simon BIANCHETTI

Université Gustave Eiffel (UNI EIFFEL)
Joint Research Unit in Environmental Acoustics (UMRAE)

Action B2 – Tyre-pavement coupling study

- Implementation action divided in 4 sub-actions:
  - B21: Acoustical characterization of EVs on existing tracks (UNI EIFFEL)
    - Months 1 to 9 – done
  - B22: Construction of a B1-based test track prototype (UNI EIFFEL, UNIRC)
    - Months 8 to 13 – done
  - B23: Characterization of the B1-based prototypal test section (UNI EIFFEL, IPOOL)
    - Months 13 to 16 – on-going
  - B24: Selection of optimized EV tyres (CRD, UNI EIFFEL)
    - Months 15 to 27 – on-going
- Contributing partners: UNI EIFFEL, UNIRC, IPOOL, CRD

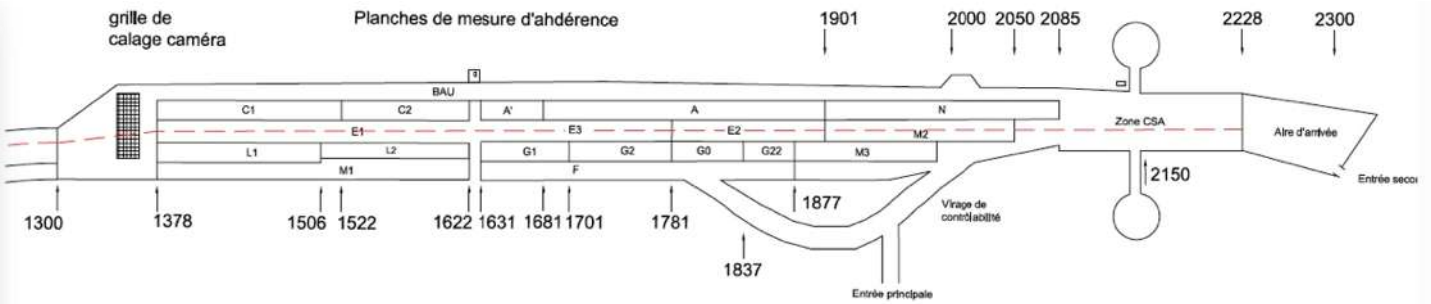
Action B2 – Tyre-pavement coupling study



- Milestone: B2 Tyre-pavement coupling study – Prototype realization – 30/09/2021
- Deliverable: B2 Report on prototype implementation and tyre/road noise performances – 30/11/2021

Action B21 - Acoustical characterization of EVs

- Measurement campaign performed on UNI EIFFEL reference test track



3 impervious road surfaces

N – ISO 10844

E1 – DAC 0/10

E3 – SMA 0/10

3 absorbing road surfaces

A – PA 0/6

M2 - VTAC 0/6

M3 - VTAC 0/4

Action B21 - Acoustical characterization of EVs

- Types of pass-by measurements
  - Standard Controlled Pass-By (CPB) on all road surfaces (E1, E3, N, A, M2, M3)
  - Microphone array pass-by measurements (only on N road surface - ISO 10844)
- Pass-by conditions :
  - Constant speed : from 20 to 110 km/h in 5 km/h steps
  - Full acceleration for start speeds from 0 to 50/90 km/h initial speed
  - Deceleration with friction brake from 50 to 70 km/h initial speed (August 2019)
  - Regenerative deceleration from 40 to 90 km/h initial speed (July 2020)

Action B21 - Acoustical characterization of EVs

- 3 vehicles tested in August 2019

Renault Kangoo ZE and Diesel

Renault Zoe #1

- 5 vehicles tested in July 2020

Nissan Leaf #1

BMW i3

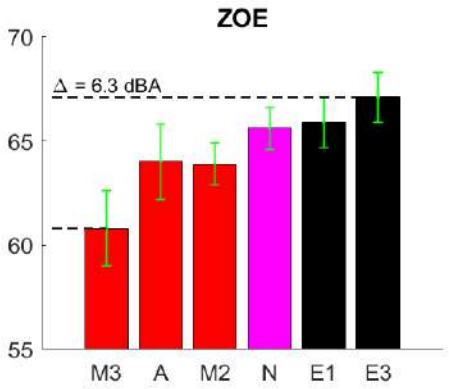
Peugeot e-208

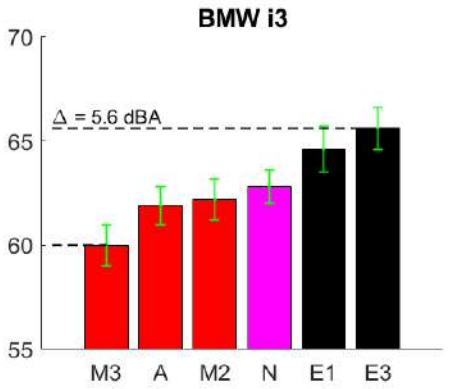
Tesla Model 3

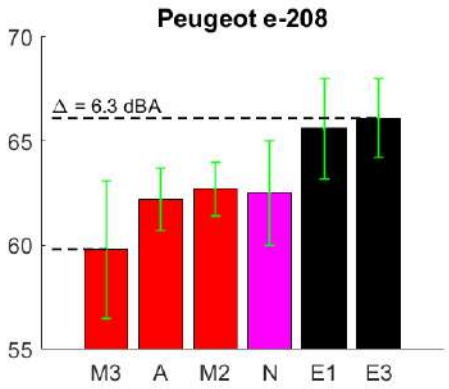
+ Renault Zoe #2

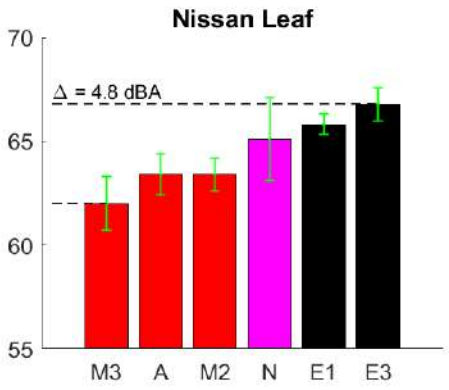
Action B21 - Acoustical characterization of EVs

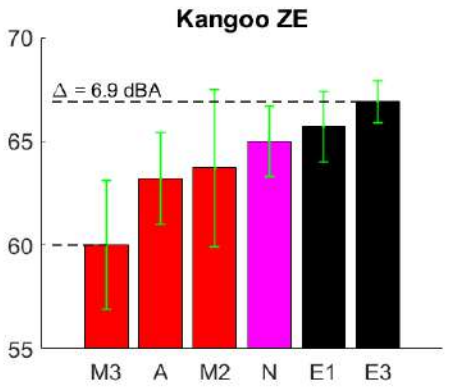
Histogram CPB noise levels at 50 km/h
(regressed, corrected at 20°C, including all vehicle noise sources)

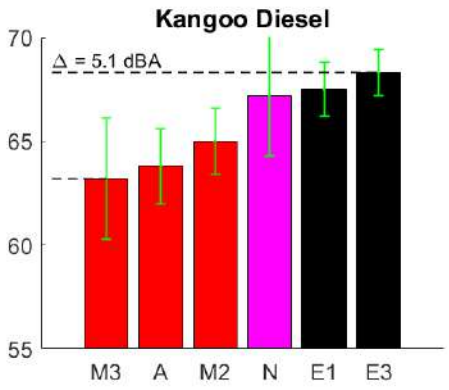










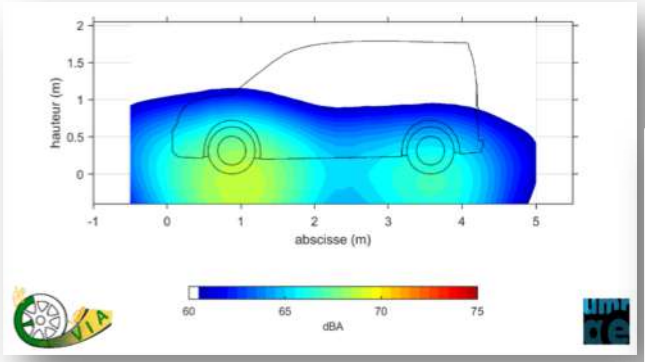


Action B21 - Acoustical characterization of EVs

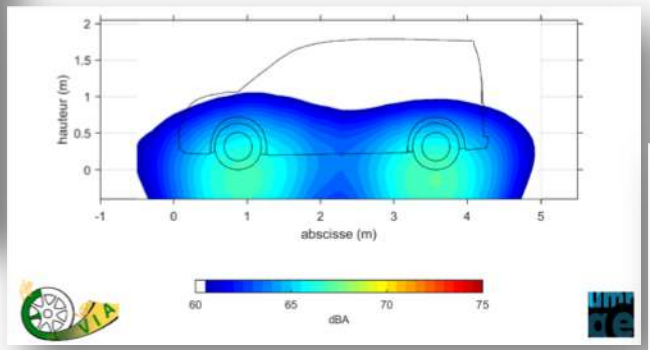
Road surface N (ISO 10844) **Constant speed 50 km/h**

Global noise levels at a distance of 2.7 m

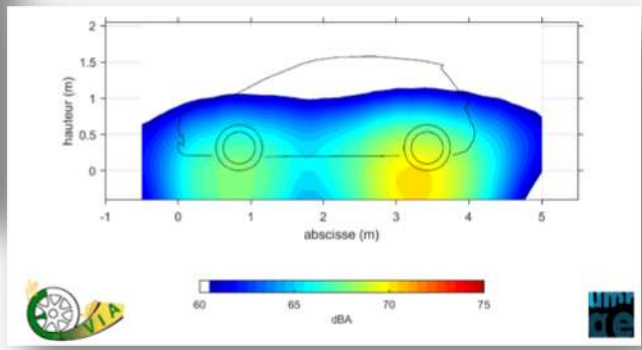
KANGOO D

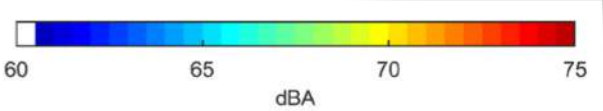


KANGOO ZE



ZOE #1





Action B22 – Prototype construction

- Call for tender published in June 2020, 4 companies consulted
- Only one company applied for building the prototype
- Based on UNIRC recommendation from results of action B1, two different mixes of VTAC 0/6 have been laid (with or without crumb rubber)
- Thickness of the compacted mixture: 0.025m
- Underlayer: Dense-Graded Asphalt Concrete 0/10 + as dug gravel

Action B22 – Prototype construction

- Prototype construction from 7th to 10th September 2020


1-Planing of the old test section

2-Laying of DAC0/10 underlayer


3-Laying of the prototypal test section with crumb rubber

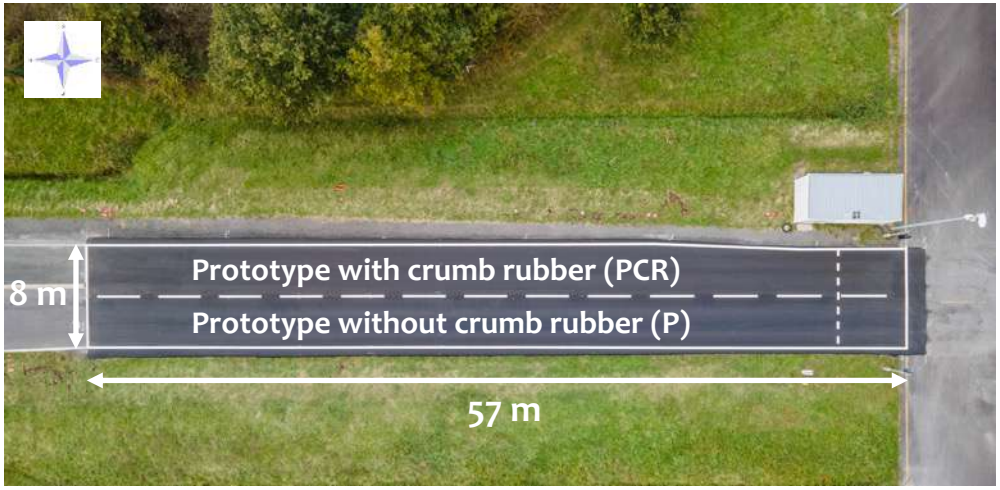

4-Laying of the prototypal test section without crumb rubber


5-Prototype after laying


6-Final prototype after markings

Action B22 – Prototype construction

- Final prototype



PCR

P

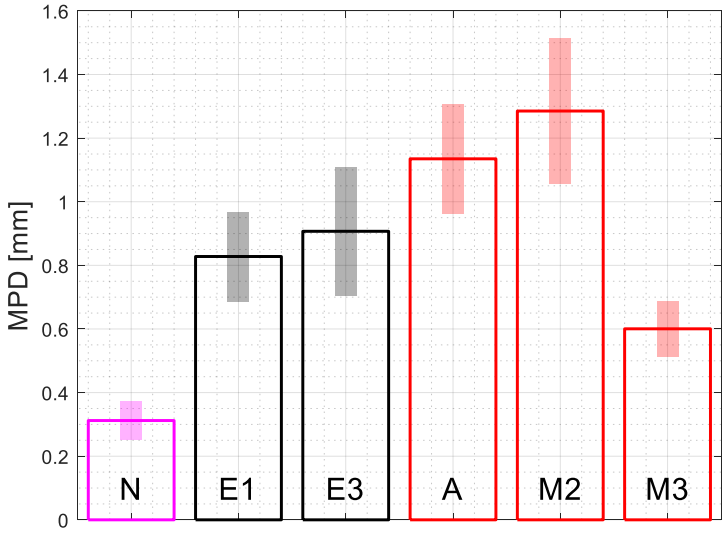
Action B23 – Prototype characterization

- Measurement campaign planned in Sep/Nov 2020 and spring 2021
- **CPB and microphone array measurements for a selection of EVs**
- **CPX measurements** (**UGE** and IPOOL)
- Measurement of road surface properties influencing tyre/road noise
  - 3D surface texture
  - **Sound absorption** (impedance tube and **extended surface method**)
  - Mechanical impedance
- Other road surface properties
  - **SRT pendula friction tests**
  - **MPD measurements**
  - Dynamical wet friction test
  - Wehner and Schulze tests (assessment of friction durability from surface samples)

Action B23 – Prototype characterization

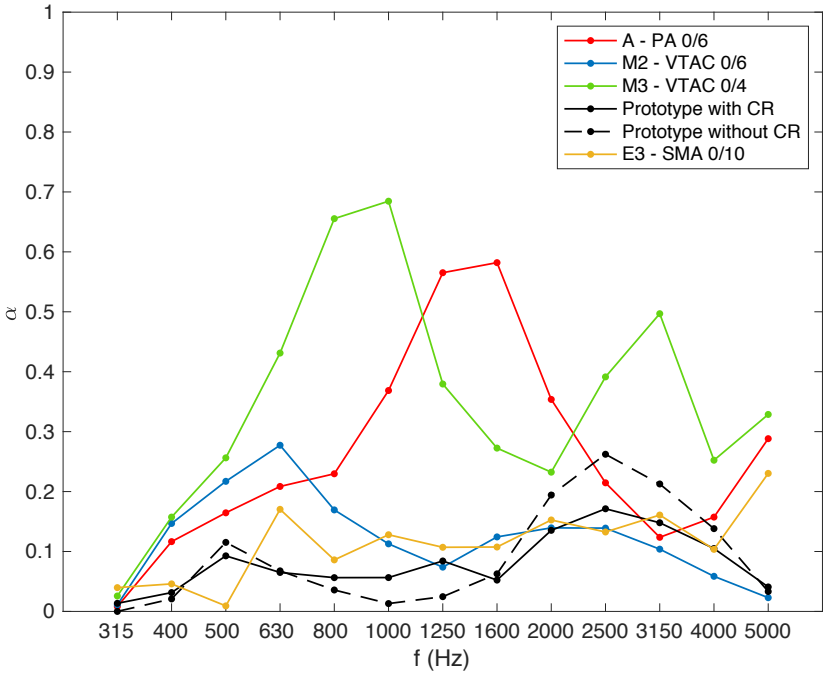
- MTD tests

	Mix without crumb rubber		Mix with crumb rubber	
Location	Left track	Right track	Left track	Right track
MTD (mm)	0.53	0.53	0.43	0.43



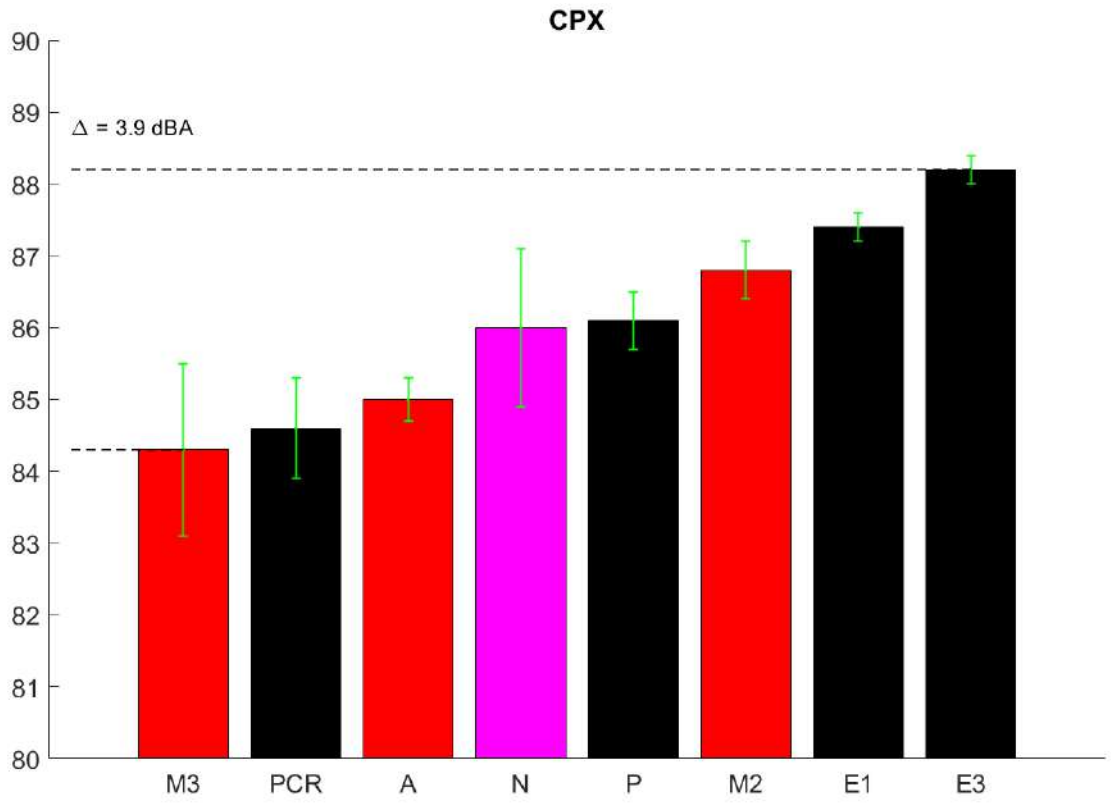
Action B23 – Prototype characterization

- Sound absorption measurement by ISO 13472-1 method on 28/09/2020



Action B23 – Prototype characterization

Histogram CPX noise levels at 50 km/h (regressed, corrected at 20°C)



Renault Megane Scenic 2L

Michelin Energy Saver E3A 195/60 R15

Action B24 – Selection of optimized EV tyres

- Carved prototype tyres delivered by CRD to UNI EIFFEL for testing on the prototypal test surface between autumn 2020 and autumn 2021:
  - **Reference tyres: standard European summer replacement market at the time of testing (e.g. Continental EcoContact 6)**
  - Other tyres: variations of tread pattern. construction and/or compound of the reference
  - Aim: optimizing the balance of exterior noise performance and other tyre performances (e.g. rolling resistance, grip) for EV vehicles

- Tests to be performed by UNI EIFFEL:
  - Constant speed and accelerated pass-by noise measurements
  - CPX measurements on the prototypal test section and further standard road surfaces
  - Pass-by measurements will be performed using EV and ICE test vehicles representative of the respective markets

Thank you for your attention

- Contact:
  - julien.cesbron@univ-eiffel.fr
  - marie-agnes.pallas@univ-eiffel.fr
  - simon.bianchetti@univ-eiffel.fr

- Link:
  - http://www.umrae.fr/

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The **Joint Research Unit in Environmental Acoustics** (UMRAE) is a research laboratory common to Ifsttar and Cerema

LIFE E-VIA Internal Project Meeting

23 October 2020

LIFE18 ENV/IT/000201

Start : July 1st, 2019

End: March 31st, 2023

ACTIONS IN PROGRESS

Università degli Studi
Mediterranea
di Reggio Calabria

LIFE18 ENV/IT/000201

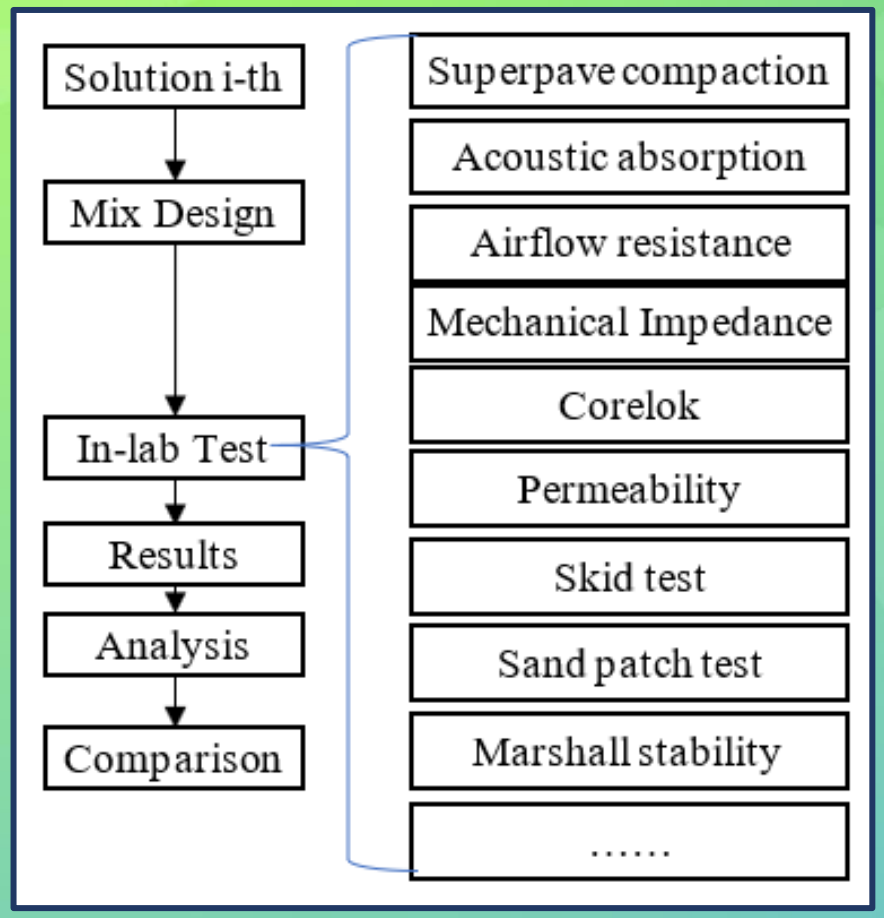
Actions in progress in which UNIRC is involved

- ❑ **B.1** Tracks design [UNIRC]
- ❑ **B.2** Tyre-pavement coupling study and prototype implementation [IFSTTAR-U.G.E.]
- ❑ **B.3** Pilot area: Implementation [FI]
- ❑ **C.1** Monitoring of the impact of the project actions [FI]
- ❑ **C.2** Life cycle analysis (LCA) and life cycle costing (LCC) [UNIRC]
- ❑ **D.1** Information and awareness raising activities [VIENROSE]
- ❑ **D.2** Technical dissemination activities to stakeholders [VIENROSE]
- ❑ **E.1** Coordination, Monitoring and Project management [FI]

Action B.1

Tracks design [UNIRC]

- **B.1 Tracks design [UNIRC]:** B1 aims at selecting mixtures (volumetrics, materials, and surface texture), for the tracks to be constructed in France and Italy, in order to minimize noise from EV, taking into account the synergy with actions B2. Two types of mixtures were designed and validated through a plane of experiments.



B.1 Tracks design [UNIRC]

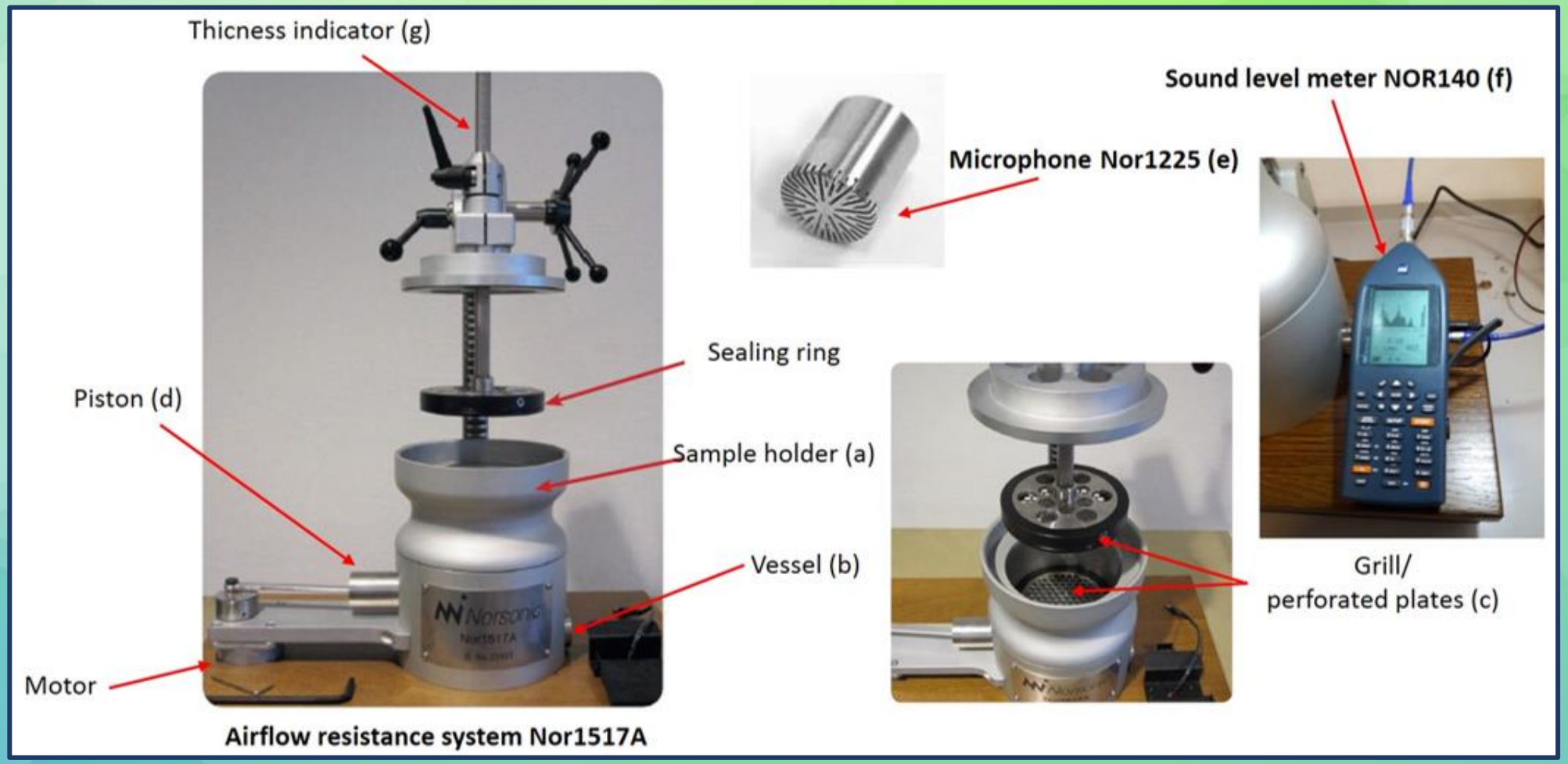
It is noted that through this project a device (see figure) was bought to carry out airflow resistance measurements. The airflow resistance is the resistance of an air particle passing through a material. It can be expressed as the ratio of the pressure gradient in a material to the airflow linear velocity (L. Peng).

The airflow resistance was measured using the apparatus Norsonic Nor1517A, by applying the alternating airflow method (Method B) in accordance to UNI EN ISO 9053-1:2019.

A validation phase involved a series of tests performed on twelve cylindrical cores of two types of bituminous mixtures.

Airflow resistance system Nor1517A

❑ B.1 Tracks design [UNIRC]



Airflow resistance system components

B.1 Tracks design [UNIRC]

Airflow resistance test

Sieve	% passing	Range
mm	%	±
8	100	0
5.6	92	3
4	80	5
2	58	5
1	35	5
0.5	24	5
0.25	18	3
0.063	10	2

B1

Fraction	Granulats	Formule étudiée	Formule contrôlée
4/6,3	Vairé	7,0%	7,0%
2/4	Vairé	33,0%	34,0%
0/2	Rouans	52,0%	52,6%
Fines d'apport		1,6%	retour filler : 7%
Bitume d'apport	COLFLEX		
Bitume total		6,40%	6,40%

Fraction	Granulats	Formule étudiée	Formule contrôlée
4/6,3	Vairé	7,0%	7,0%
2/4	Vairé	33,0%	33,0%
0/2	Rouans	51,0%	51,0%
0/1	RARX	1,9%	1,9%
Fines d'apport		1,0%	retour filler : 6,5%
Bitume d'apport	50/70	6,10%	6,10%
Bitume total		6,40%	6,40%

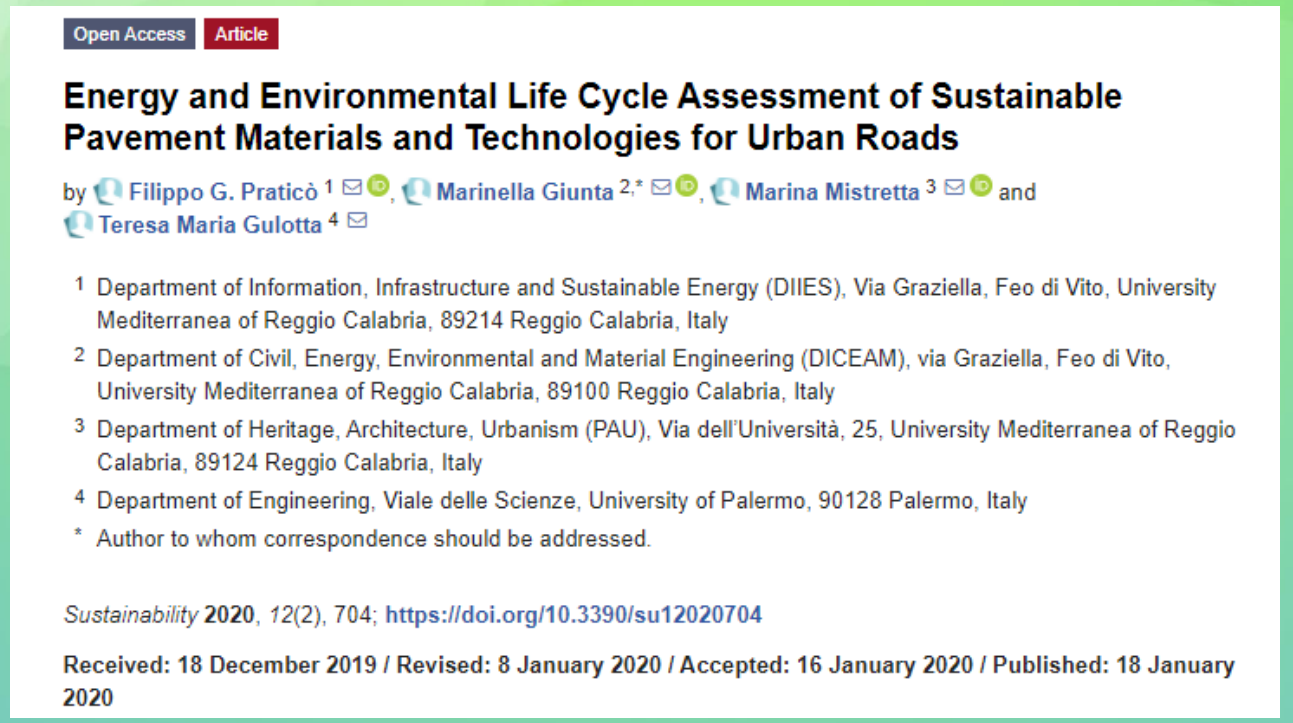
B2

B3

COMUNE DI FIRENZE

For actions still in progress

- **C.2 Life cycle analysis (LCA) and life cycle costing (LCC) [UNIRC]:** these analyses will evaluate tracks efficiency from a comprehensive point of view, including soundscape components (B5), thus achieving obj.6 of demonstrating the durability and effectiveness through LCA. Data gathering was carried by UNIRC (paper writing in progress, abstracts /papers submitted, cf. https://life-evia.eu/documents/).



Open Access Article

Energy and Environmental Life Cycle Assessment of Sustainable Pavement Materials and Technologies for Urban Roads

by Filippo G. Praticò [1], Marinella Giunta [2,*], Marina Mistretta [3] and Teresa Maria Gulotta [4]

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(Image taken from the publication)

For actions still in progress

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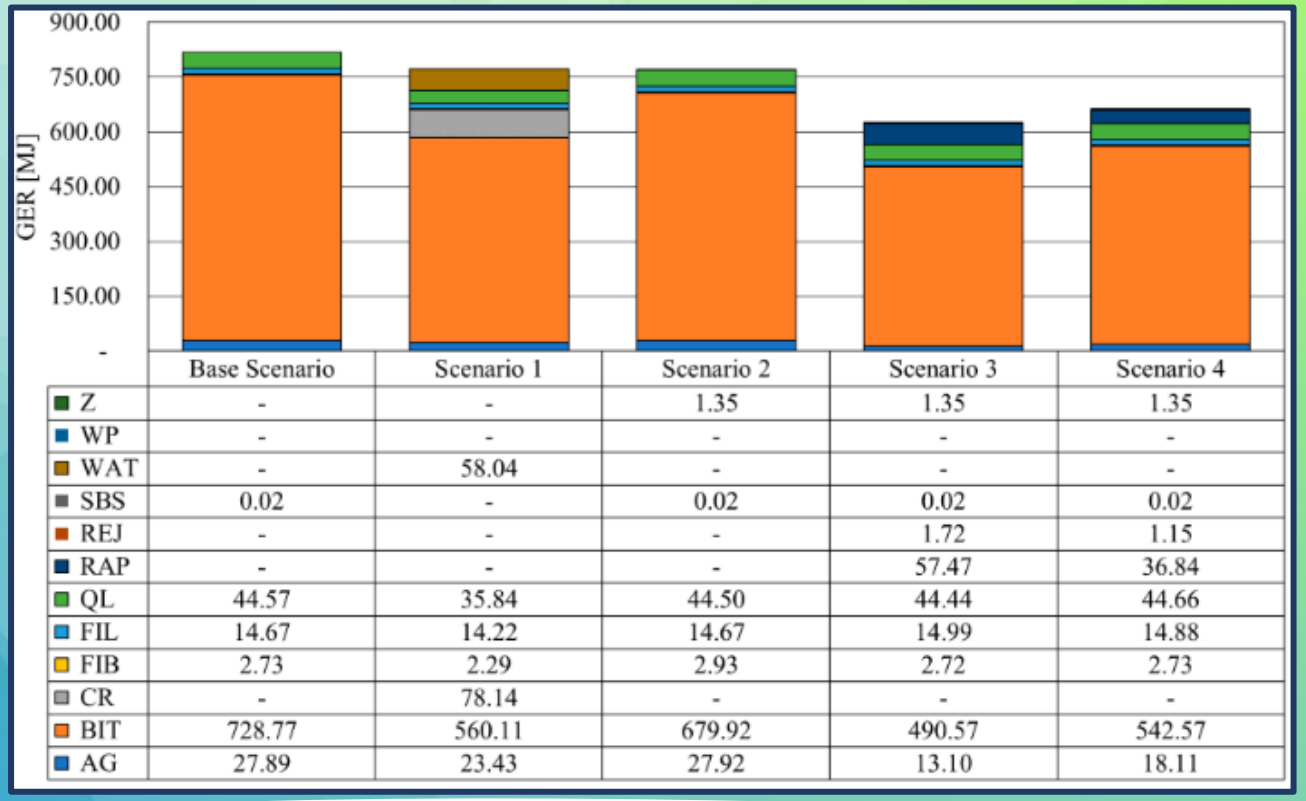


	Base Scenario	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Z	-	-	1.35	1.35	1.35
WP	-	-	-	-	-
WAT	-	58.04	-	-	-
SBS	0.02	-	0.02	0.02	0.02
REJ	-	-	-	1.72	1.15
RAP	-	-	-	57.47	36.84
QL	44.57	35.84	44.50	44.44	44.66
FIL	14.67	14.22	14.67	14.99	14.88
FIB	2.73	2.29	2.93	2.72	2.73
CR	-	78.14	-	-	-
BIT	728.77	560.11	679.92	490.57	542.57
AG	27.89	23.43	27.92	13.10	18.11

Energy and Environmental Life Cycle Assessment of Sustainable Pavement Materials and Technologies for Urban Roads

by Filippo G. Praticò [1], Marinella Giunta [2,*], Marina Mistretta [3] and Teresa Maria Gulotta [4]

LIFE E-VIA Internal Project Meeting
23 October 2020

LIFE18 ENV/IT/000201

Start : July 1st, 2019

End: March 31st, 2023

Thank you for your attention

Università degli Studi
Mediterranea
di Reggio Calabria

LIFE18 ENV/IT/000201

LIFE E-VIA

Electric **V**ehicle no**I**se control by **A**ssessment and optimisation of tyre/ road interaction

www.life-evia.eu

LIFE E-VIA PROJECT - INTERNAL PROJECT MEETING
23 October 2020

Raffaella Bellomini, Chiara Bartalucci, Sara Delle Macchie, Gianfrancesco Colucci, Lucia Busa, Francesco Borchi, Sergio Luzzi

Vie en.ro.se Ingegneria,
responsible for Actions B5, D1 and D2

With the contribution of the LIFE programme of the European Union

LIFE18 ENV/IT/000201

Action B5

Three different templates in Italian language have been drafted, they will be optimized as soon as interviews will be exactly planned:

B5.1 Soundwalks and interview during the EV festival

B5.2 Interview in the pilot road on an electric taxi

B5.3 Interview on EV concerning different road pavements

LIFE E-VIA

"Electric Vehicle noIse control by Assessment and optimisation of tyre/road interaction"

LIFE18 ENV/IT/000201

Deliverable	Report on Action B5
Content	Three questionnaire formats
Action/Sub-action	B5.1/B5.2/B5.3
Status - date	30-09-2020

Authors	Raffaella Bellomini, Sergio Luzzi, Francesco Borchi, Lucia Busa, Sara Delle Macchie, Gianfrancesco Colucci
Beneficiary	VIENROSE
Contact person	Raffaella Bellomini
E-mail	raffaella.bellomini@vienrose.it
Project Website	https://life-evia.eu/

LIFE E-VIA PROJECT - INTERNAL PROJECT MEETING
23 October 2020
Vie en.ro.se Ingegneria

B5.1 Soundwalks and interview during the EV festival

TEMPLATE OF THE QUESTIONNAIRE RELATED TO SUB-ACTION B5.1

Florence, *date*

Soundwalk organised as a part of the EV Festival
managed by Vie en.ro.se Ingegneria s.r.l.

Maps of listening points to be added

This questionnaire has been designed and it will be distributed by Vie en.ro.se Ingegneria s.r.l as a part of the LIFE E-VIA (LIFE18 ENV/IT/000201) European project co-funded by the European Union LIFE Program.

The goal of this questionnaire is to collect data on the perception of the sounds which characterise the different listening points and the noise due to the passing through of vehicles on different types of asphalt, including one optimised for the rolling noise generated by electric vehicles. In particular, it will be assessed how noise is perceived both outside and inside the vehicle (making people listening to audio recordings).

Please answer all questions in order, following the instructions provided.

Your personal data will be treated as strictly confidential and the publication of the survey results will ensure the non-recognition of the responses.

Personal data

Age: ☐ < 20 ☐ 20-35 ☐ 36-50 ☐ 51-65 ☐ 66-80 ☐ >80

Gender: ☐ Female ☐ Male

City of residence .....

Qualification: ☐ middle school diploma ☐ high school diploma ☐ degree ☐ PhD ☐ master

Employment: .....

LISTENING POINT N. _____ (for each listening point)

Question n. 1: Type and intensity of sounds heard at this listening point

(make an X mark for each type of sound in the box that best matches your opinion)

	Very low	Low	Fair	High	Very high
Traffic					
Nature sounds					
Anthropic sounds					
Mechanical/electrical sounds					

Question n. 2: How do you assess the quality of the soundscape around you?

(make an X mark in the box that most closely matches your opinion)

Bad	Poor	Fair	Good	Excellent

Question n. 3: Do you think the soundscape around you is appropriate for this place?

(make an X mark in the box that most closely matches your opinion)

Absolutely inappropriate	Slightly appropriate	Neutral	Appropriate	Absolutely appropriate

Question n. 4: How do you assess the visual quality of this place?

(make an X mark in the box that most closely matches your opinion)

Bad	Poor	Fair	Good	Excellent

Questions after the listening of the recordings

Question n. 5: Imagine being in an Electric Vehicle and listening to the noise produced inside it. How do you assess the quality of the soundscape?

(make an X mark in the box that most closely matches your opinion)

Bad	Poor	Fair	Good	Excellent

Question n. 6: Imagine being in an Internal Combustion Engine Vehicle and listening to the noise produced inside it. How do you assess the quality of the soundscape?

(make an X mark in the box that most closely matches your opinion)

Bad	Poor	Fair	Good	Excellent

B5.2 Interview in the pilot road on an electric taxi

TEMPLATE OF QUESTIONNAIRE RELATED TO SUB-ACTION B5.2

Florence, *date*

Interview about "LIFE E-VIA taxi"
managed by Vie en.ro.se Ingegneria s.r.l.

This questionnaire has been designed and it will be distributed by Vie en.ro.se Ingegneria s.r.l as a part of the LIFE E-VIA (LIFE18 ENV/IT/000201) European project co-funded by the European Union LIFE Program.

The goal of this questionnaire is to collect data on the perception of comfort and soundscape inside the electric taxi, particularly, after its passing through three different types of asphalt. Furthermore, it will show how noise is perceived both outside and inside the vehicle (making people listening to audio recordings).

Please answer all questions in order, following the instructions provided.

Your personal data will be treated as strictly confidential and the publication of the survey results will ensure the non-recognition of the responses.

Personal data

Age: ☐ < 20 ☐ 20-35 ☐ 36-50 ☐ 51-65 ☐ 66-80 ☐ >80

Gender: ☐ Female ☐ Male

City of residence .....

Qualification: ☐ middle school diploma ☐ high school diploma ☐ degree ☐ PhD ☐ master

Employment: .....

Question n. 1: How do you assess the intensity of noise produced by the vehicle passing through asphalt n.1?

(make an X mark in the box that most closely matches your opinion)

Very low	Low	Fair	High	Very high

Question n. 2: In your opinion, how annoying is the noise produced by the vehicle passing through asphalt n.1?

(make an X mark in the box that most closely matches your opinion)

Not at all	Only a little	To some extent	Rather much	Very much

Question n. 3: How do you assess the intensity of noise produced by the vehicle passing through asphalt n.2?

(make an X mark in the box that most closely matches your opinion)

Very low	Low	Fair	High	Very high

Question n. 4: In your opinion, how annoying is the noise produced by the vehicle passing through asphalt n.2?

(make an X mark in the box that most closely matches your opinion)

Not at all	Only a little	To some extent	Rather much	Very much

Question n. 5: How do you assess the intensity of noise produced by the vehicle passing through asphalt n.3?

(make an X mark in the box that most closely matches your opinion)

Very low	Low	Fair	High	Very high

Question n. 6: In your opinion, how annoying is the noise produced by the vehicle passing through asphalt n.3?

(make an X mark in the box that most closely matches your opinion)

Not at all	Only a little	To some extent	Rather much	Very much

Question n. 7: Listen to the recording made in open field condition along this road and related to the noise produced by an Electric Vehicle. How do you assess the quality of the soundscape?

(make an X mark in the box that most closely matches your opinion)

Bad	Poor	Fair	Good	Excellent

Question n. 8: Listen to the recording made in open field condition along this road and related to the noise produced by an Internal Combustion Engine Vehicle. How do you assess the quality of the soundscape?

(make an X mark in the box that most closely matches your opinion)

Bad	Poor	Fair	Good	Excellent

B5.3 Interview on EV concerning different road pavements

TEMPLATE OF QUESTIONNAIRE RELATED TO SUB-ACTION B5.3

Florence, *data*

Interview about electric buses
managed by Vie en.ro.se Ingegneria s.r.l.

This questionnaire has been designed and it will be distributed by Vie en.ro.se Ingegneria s.r.l as a part of the LIFE E-VIA (LIFE18 ENV/IT/000201) European project co-funded by the European Union LIFE Program.

The goal of this questionnaire is to collect data on the perception of comfort and soundscape inside electric buses, particularly, after their passing through three different types of asphalt.

Please answer all questions in order, following the instructions provided.

Your personal data will be treated as strictly confidential and the publication of the survey results will ensure the non-recognition of the responses.

Personal data

Age: ☐ < 20 ☐ 20-35 ☐ 36-50 ☐ 51-65 ☐ 66-80 ☐ >80

Gender: ☐ Female ☐ Male

City of residence .....

Qualification: ☐ middle school diploma ☐ high school diploma ☐ degree ☐ PhD ☐ master

Employment: .....

Question n. 1: How do you assess the intensity of noise produced by the bus passing through asphalt n.1?

(make an X mark in the box that most closely matches your opinion)

Very low	Low	Fair	High	Very high

Question n. 2: In your opinion, how annoying is the noise produced by the bus passing through asphalt n.1?

(make an X mark in the box that most closely matches your opinion)

Not at all	Only a little	To some extent	Rather much	Very much

Question n. 3: How do you assess the intensity of noise produced by the bus passing through asphalt n.2?

(make an X mark in the box that most closely matches your opinion)

Very low	Low	Fair	High	Very high

Question n. 4: In your opinion, how annoying is the noise produced by the bus passing through asphalt n.2?

(make an X mark in the box that most closely matches your opinion)

Not at all	Only a little	To some extent	Rather much	Very much

Question n. 5: How do you assess the intensity of noise produced by the bus passing through asphalt n.3?

(make an X mark in the box that most closely matches your opinion)

Very low	Low	Fair	High	Very high

Question n. 6: In your opinion, how annoying is the noise produced by the bus passing through asphalt n.3?

(make an X mark in the box that most closely matches your opinion)

Not at all	Slight	Fair	High	Very high

Action C1

Report on statistics on Website visits

On a trimester basis a Report on website design and statistics on visits is updated according to data provided by Google Analytics

LIFE E-VIA

"Electric Vehicle nolse control by Assessment and optimisation of tyre/road interaction"

LIFE18 ENV/IT/000201

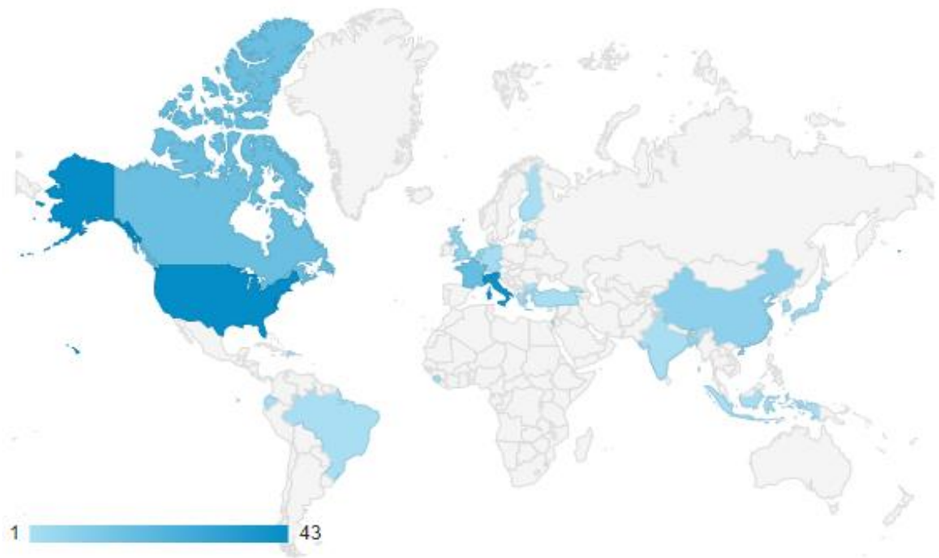
Content	Report on website design and statistics on visits
Action/Sub-action	C1
Status - date	Final Version- 02-10-2020

Authors	Raffaella Bellomini, Chiara Bartalucci, Gianfrancesco Colucci, Sergio Luzzi (Vie en.ro.se)
Beneficiary	Municipality of Florence
Contact person	Arnaldo Melloni
E-mail	arnaldo.melloni@comune.fi.it
Project Website	https://life-evia.eu/

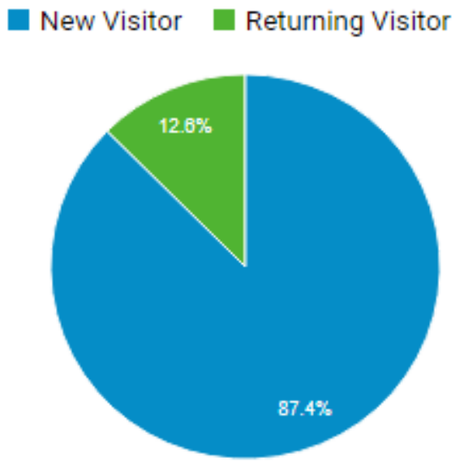
Table of contents

https://life-evia.eu/deliverables/additional-report-1_-report-on-website-design-and-statistics-on-visits/

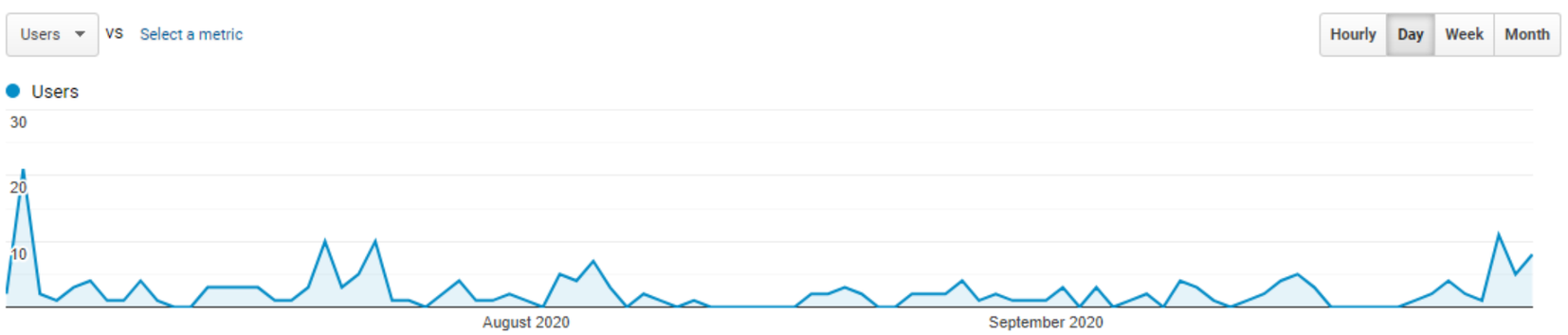
Report on statistics on Website visits



Map of Countries of origin of the connected devices – Google Analytics.



Percentage of New visitor vs Returning visitor – Google Analytics.

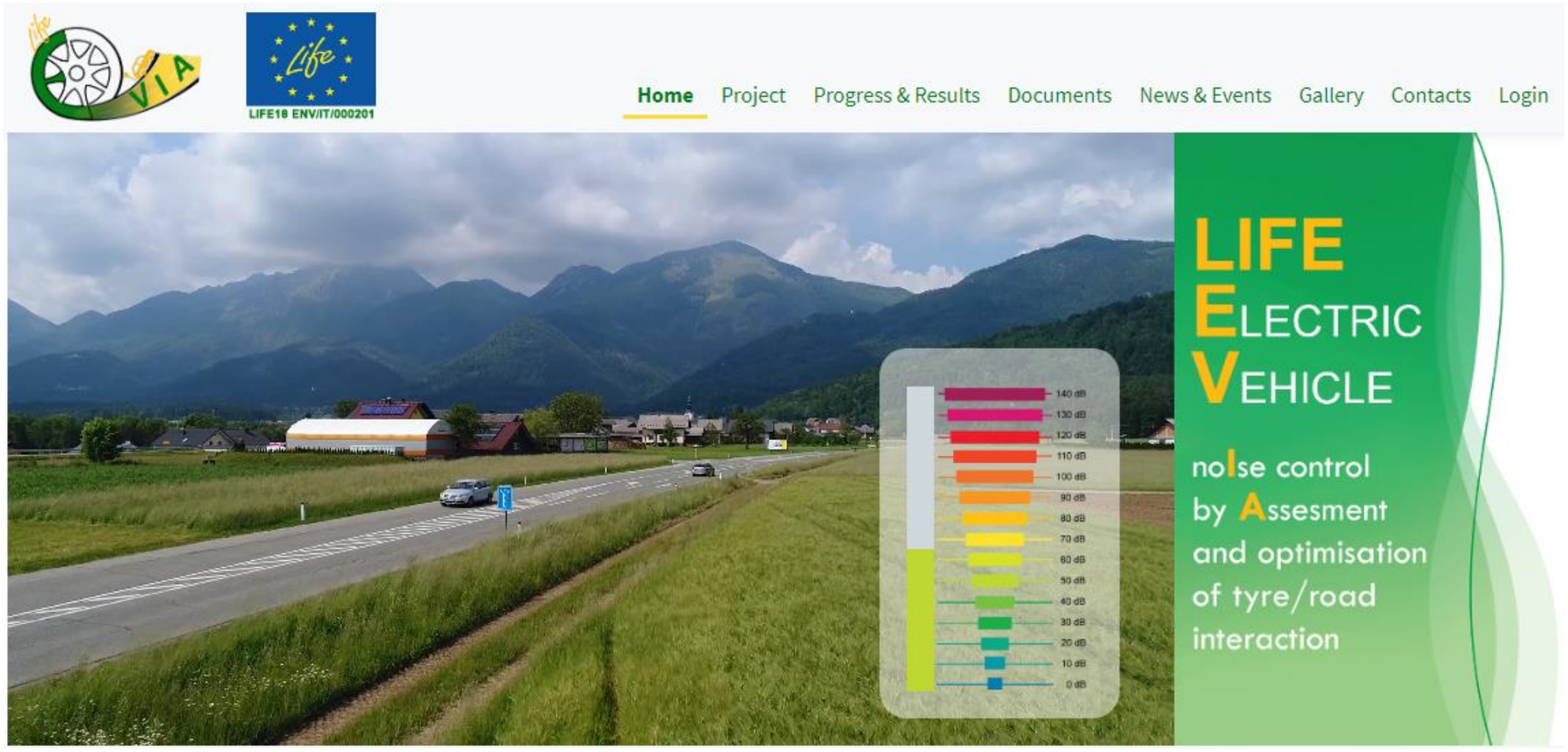


Trend of website visits – Google Analytics.

Action D1

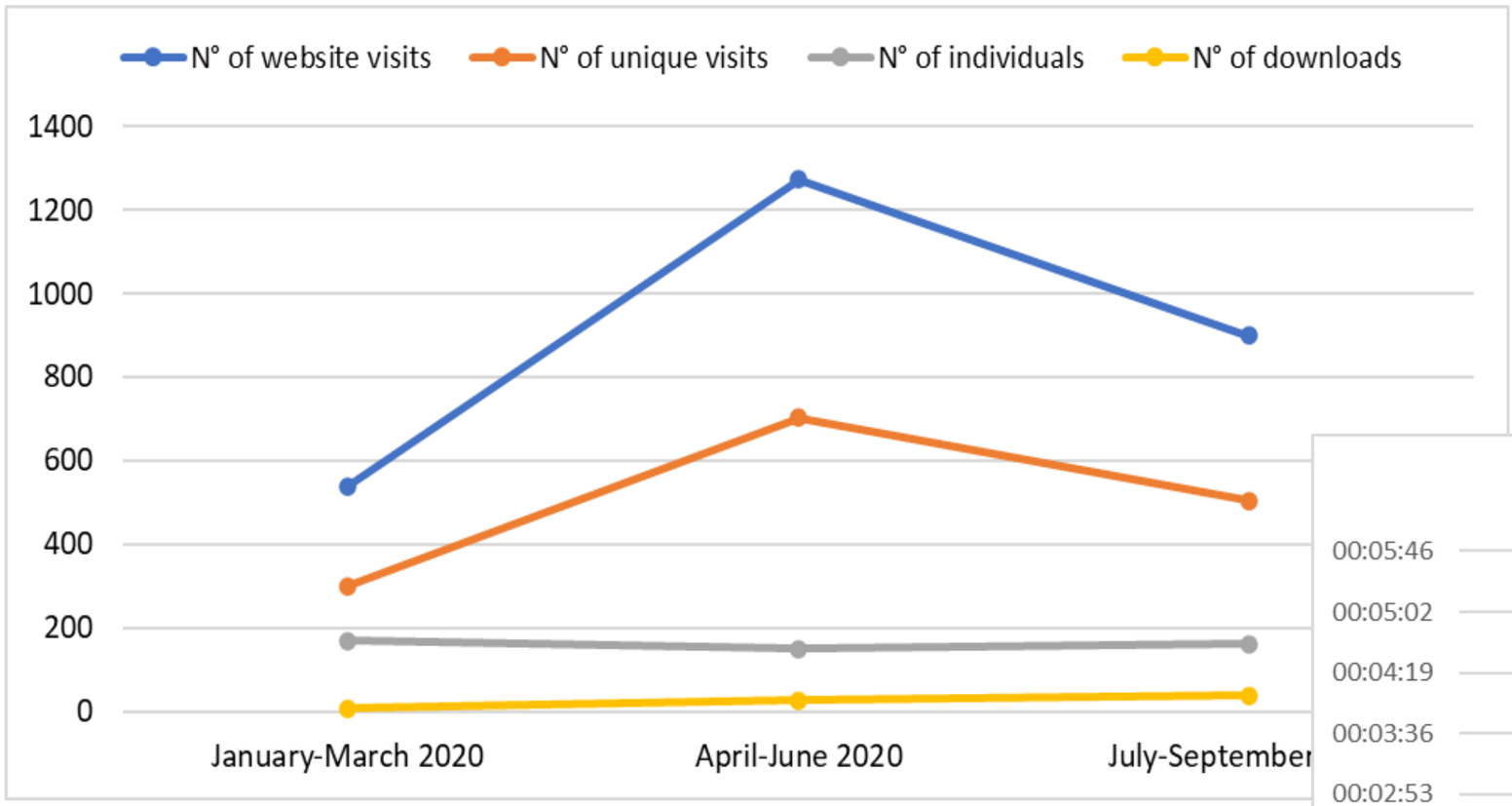
Website

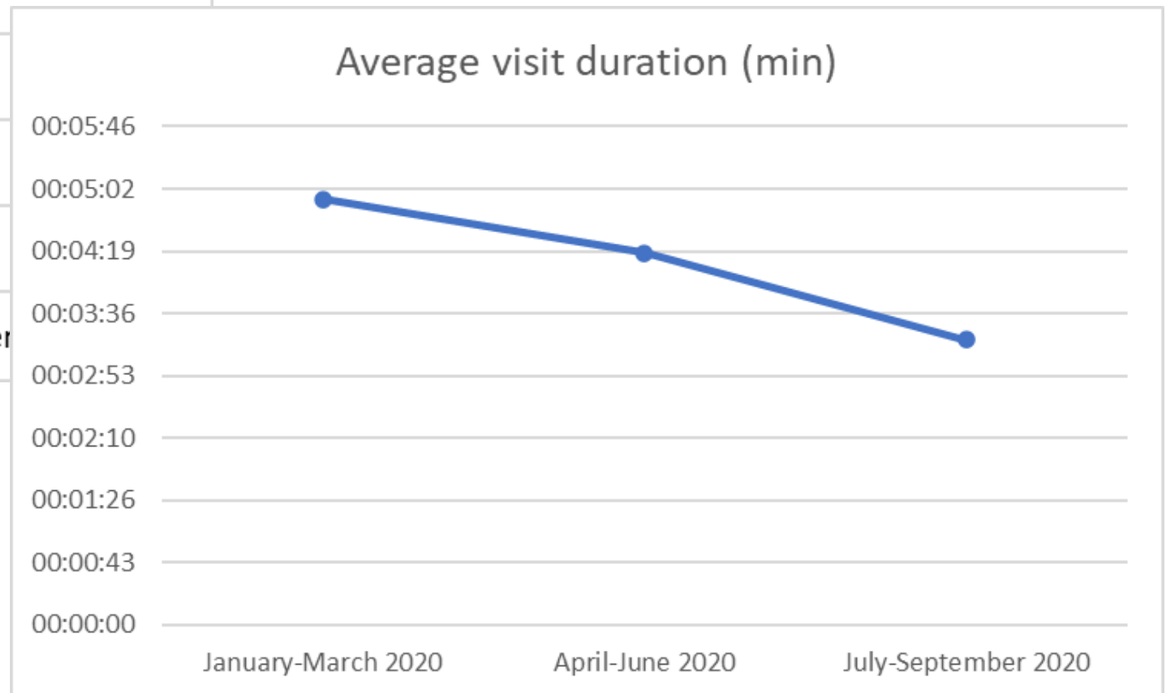
http://life-evia.eu/



Website

How is it going?





Further information in the report presented under Action C1…

LIFE E-VIA PROJECT - INTERNAL PROJECT MEETING

23 October 2020

Vie en.ro.se Ingegneria

Website

The management

LIFE E-VIA Website: news of September

S sara.dellemacchie@vienrose.it

Rispondi | Rispondi a tutti | Inoltra | ...

A carsten.hoever@conti.de; 'Achillefs tsotras'; 'fabienne molinari'; julien.cesbron@univ-eiffel.fr; 'Philippe Klein'; 'marie-agnes pallas'; 'arnaldo melloni'; 'Gessica Pecchioni'; 'Maria Giulia Brunacci'; 'Francesco Bianco'; 'filippo'; 'Colicchio'; 'Gia Pellicano'; 'Rosario Fedele'

lunedì 28/09/2020 12:21

Cc 'Raffaella Bellomini'; 'Chiara'

Dear all,

the website and social network o
Nantes (https://life-evia.eu/news

Let me know if you also have oth

Thanks for your cooperation,
All my best regards.

Sara

LIFE E-VIA Website: news of April/May

S sara.dellemacchie@vienrose.it

Rispondi | Rispondi a tutti | Inoltra | ...

A carsten.hoever@conti.de; Achillefs.tsotras@conti.de; fabienne.molinari@ifsttar.fr; julien.cesbron@ifsttar.fr; philippe.klein@ifsttar.fr; marie-agnes.pallas@univ-eiffel.fr; filippo.pratico@unirc.it; arnaldo.melloni@comune.firenze.it; gessica.pecchioni@comune.fi.it; **+2 persone**

giovedì 23/04/2020 10:42

Cc raffaella.bellomini@vienrose.it; chiara.bartalucci@vienrose.it

Dear all,

I hope this finds you all in good health.

We're working on the contents of the Faq and Stakeholders sections of the website, that will be uploaded as soon as possible.

In the meantime, I ask you if
also more general news linke

Thank you very much.

My best regards,

Sara

LIFE E-VIA Website: news of May/June

S sara.dellemacchie@vienrose.it

Rispondi | Rispondi a tutti | Inoltra | ...

A > <carsten.hoever@conti.de>; 'Achillefs tsotras'; 'fabienne molinari'; 'julien cesbron'; 'Philippe Klein'; 'marie-agnes pallas'; 'arnaldo melloni'; 'Gessica Pecchioni'; 'Maria Giulia Brunacci'; 'Francesco Bianco'; 'filippo'

martedì 26/05/2020 12:43

Cc 'Raffaella Bellomini'; 'Chiara'

Dear all,

I hope things go well.

Regarding the website of our project, you can find the new sections of Faq and Stakeholders online: https://life-evia.eu/faq/; https://life-evia.eu/stakeholders/. If you have any suggestions or content that you think would be useful to add, please let us know.

As usual, I ask you if you have some news about our project to be published on the site: written papers for the next conferences, relevant results on current project activities, but also more general news linked to our project that we can spread through the site and social channels.

Thank you very much.

My best regards,

Updating are always welcome!

Dissemination Plan

The structure

TYPE OF ACTION	DELIVERABLES	CODE
Dissemination products	Dissemination Plan	DP
	Life E-VIA Website	DP_W
	Noticeboard in English language	DP_NE
	Noticeboard in Italian language	DP_NI
	Noticeboard in French language	DP_NF
	Noticeboard in German language	DP_NG
	Scientific papers	DP_SP
	Articles for journal and magazine	DP_PA
	Report on yearly participation in INAD	DP_RI
	Layman's report	DP_RL
Promotion activities	Press conferences	PA_C
	Radio campaign	PA_RC
	Video of the prototype construction	PA_VP
	EV FESTIVAL video	PA_EV
Events	Final event	E_F
	Workshop	E_W
	Six-monthly meetings of the EUROCITIES	M_E

LIFE E-VIA PROJECT - INTERNAL PROJECT MEETING

23 October 2020

Vie en.ro.se Ingegneria

TYPE OF ACTION	DELIVERABLES	CODE	2019				2020												2021											
			9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Dissemination products	Dissemination Plan	1	1																											
	Life E-VIA Website	3				3																								
	Noticeboard in English language	18						18_1; 18_2																						
	Noticeboard in French language	21																												
	Noticeboard in German language	22																												
	Noticeboard in Italian language	23																												
	Scientific papers	36				36_1			36_2		36_3; 36_4	36_5																		
	Article published in open access top ranked journal	15																												
	Article for local magazines about EV Festival	16																												
	Articles for peer-reviewed open access journal	20					20_1																							
	Open Source Articles on peer-reviewed international journal	19																												
	Report on yearly participation in INAD	25																												
	Layman's report	35																												
Promotion activities	Press conferences	11																												
	Radio campaign	17																												
	Video of the prototype construction	8																												
	Promotional video about EV FESTIVAL	26																												
Events	Final event in Florence	37																												
	Workshop in Reggio Calabria	24																												
	Workshop in Brussels	E_1																												
	Electric vehicles festival	E_2																												
	Six-monthly meetings of the EUROCITIES	M		M_1																										

TYPE OF ACTION	DELIVERABLES	CODE	2022												2023		
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
Dissemination products	Dissemination Plan	1															
	Life E-VIA Website	3															
	Noticeboard in English language	18															
	Noticeboard in French language	21															
	Noticeboard in German language	22															
	Noticeboard in Italian language	23															
	Scientific papers	36															
	Article published in open access top ranked journal	15															
	Article for local magazines about EV Festival	16															
	Articles for peer-reviewed open access journal	20															
	Open Source Articles on peer-reviewed international journal	19															
	Report on yearly participation in INAD	25															
	Layman's report	35															
Promotion activities	Press conferences	11															
	Radio campaign	17															
	Video of the prototype construction	8															
	Promotional video about EV FESTIVAL	26															
Events	Final event in Florence	37															
	Workshop in Reggio Calabria	24															
	Workshop in Brussels	E_1															
	Electric vehicles festival	E_2															
	Six-monthly meetings of the EUROCITIES	M															

Dissemination Plan

Detailed activities 1/4

Dissemination Plan Ref.n.	Deadline	Code	Issued on	Description
1	01/09/2019			Dissemination plan
		1	September 2019	Start of dissemination activities
2	01/12/2019			Life E-VIA Website
		3	December 2019	Development and launch of LIFE E-VIA website www.life-evia.eu
3	01/12/2021			Video of the prototype construction
		8		
4	01/07/2022			Press conferences
		11_a		
		11_b		
		11_c		
5	31/12/2022			1 Article published in an open access top ranked journal
		15		
6	31/12/2022			1 Article for local magazines about EV Festival
		16		
7	31/12/2022			1 Radio campaign
		17		
8	31/12/2022			Noticeboard in English language printed in almost 100/300 copies each
		18_1	February 2020	LIFE E-VIA: objectives and actions
		18_2	February 2020	LIFE E-VIA: Roll-up
		18_3		
		18_4		
		18_5		
		18_6		
		18_7		
		18_8		
		18_9		
		18_10		
		18_11		
		18_12		
		18_13		
		18_14		
		18_15		

Dissemination Plan

Detailed activities 2/4

9	31/12/2022			2 Open Source Articles on peer-reviewed international journal for dissemination of the obtained results
		19_1		
		19_2		
10	31/12/2022			3 Articles for peer-reviewed open access journal (e.g., Materials, MDPI and Applied Acoustics)
		20_1	January 2020	Paper published on Open Access Sustainability 2020 about the sustainable pavement materials for the
		20_2		
		20_3		
11	31/12/2022			Noticeboard in French language printed in almost 100/300 copies each
		21_1		
		21_2		
		21_3		
		21_4		
		21_5		
12	31/12/2022			Noticeboard in German language printed in almost 100/300 copies each
		22_1		
		22_2		
		22_3		
		22_4		
		22_5		
13	31/12/2022			Noticeboard in Italian language printed in almost 100/300 copies each
		23_1		
		23_2		
		23_3		
		23_4		
		23_5		

Dissemination Plan

Detailed activities 3/4

14	31/12/2022			Proceedings of workshop in Reggio Calabria and students' contest awording (USB Keys) - 50 copies
	Workshop in Reggio Calabria	24		
15	31/12/2022			Report on yearly participation in INAD (3 reports 2020,2021,2022)
		25_1		
		25_2		
		25_3		
16	31/01/2023			1 promotional video about EV FESTIVAL
		26		
17	31/01/2023			Layman's report
		35		
18	31/03/2023			Scientific papers to be presented in national/international congresses
		36_1	December 2019	Scientific contribution about the project in the EAI SmartCity 360° 2019 International Summit.
		36_2	March 2020	JTAV 2020: (ille-France) "LIFE E-VIA: noise control of electric vehicles by optimizing tire-road interaction"
		36_3	May 2020	Paper submitted to: 11th International Conference “Environmental Engineering” (ENVIRO)
		36_4	May 2020	Paper submitted to: 4th International Symposium "NEW METROPOLITAN PERSPECTIVES”
		36_5	June 2020	Paper submitted to the international conference: 20th IEEE Mediterranean Elettronical Conference (MELECON)
		36_6		
		36_7	December 2020	Forum acusticum: Abstract send by Comune di Firenze
		36_8		
		36_9		
		36_10		
		36_11		
		36_12	June 2021	Praticò F.G., Briante P.G., Colicchio G., Fedele R. Asphalt concretes for electric vehicles. Abstract submitted to: 11th Intern
		36_13		
		36_14		
		36_15		
		36_16		
		36_17		
19	31/03/2023			Proceedings of Final Event in Florence (USB Keys) -400 copies
	International Congress in Florence	37		

Dissemination Plan

Detailed activities 4/4

OTHER DISSEMINATION ACTIVITIES				
20	31/12/2022			Events
		E_1		Workshop in Brussels (organizer CRD)
		E_2		Electric vehicles festival
21	31/12/2022			Six-monthly meetings of the EUROCITIES Environmental Working Groups
		M_1	October 2019	EUROCITIES- Meeting in Oslo during the Environment Forum
		M_2		
		M_3		
		M_4		
		M_5		
		M_6		

Other activities		
Meeting	September 2019	First meeting among partners
Project kick off meeting	November 2019	LIFE 18 ENV and GIE Welcome meeting in Brussels

Dissemination Plan

Communication and Dissemination strategy

LIFE E-VIA

"Electric Vehicle noIse control by Assessment and optimisation of tyre/road interaction"

LIFE18 ENV/IT/000201

Deliverable	1 – Dissemination Plan
Content	Communication and dissemination strategy
Action/Sub-action	D1.1 Public awareness and dissemination of results – Dissemination Plan
Status - date	Draft Version - 20-07-2020

Authors	Raffaella Bellomini, Francesco Borchi, Lucia Busa, Sara Delle Macchie, Sergio Luzzi
Beneficiary	VIENROSE
Contact person	Raffaella BELLOMINI
E-mail	Raffaella.bellomini@vienrose.it
Project Website	https://life-evia.eu/

Table of contents

Dissemination Plan

Communication and Dissemination strategy

The target audience will be addressed through communication and dissemination actions.
More specifically, dissemination includes the design of project's website, the production of promotional and informative material and various events for dissemination. In Table 1 dissemination materials of interest for each of the stakeholders category is reported.

Table 1: Target audience and dissemination

Stakeholders/Target audience	Press releases	Publications	Website	Events	Social media
General public			X		X
Local media	X	X	X	X	X
Local, regional, national authorities	X		X	X	
European Commission & relevant to the project EU communities		X	X	X	X
Scientific community		X	X	X	
Technicians (*Mechanical and Civil engineering, noise experts*)		X	X	X	X
Companies (*e.g. road laying sector, asphalt plant, recycling of scrap tyres, tyres construction and EV market*)		X	X	X	

Dissemination Plan

Communication and Dissemination strategy

3 Project identity

3.1 Logo and visual guide

The Project's logo is characterized by clarity, consistency, and minimality.
The primary colours are the following:
- Green, which recalls the environment and the urban landscape
- Yellow, which recalls electricity

Moreover, a tyre and an electric car, which are the main objects of the project, are present in the logo (Figure 2).

Figure 2: LIFE E-VIA logo

3.2 Communication material Templates

Templates are useful tools to ensure a consistent appearance of the project and to increase the recognition value of the project. Templates for different communication and dissemination purposes and hints for the application are provided following:
- Word document template
- Power point document template
- Leaflet template

All deliverables should be produced using these templates.

Dissemination Plan

Communication and Dissemination strategy

3.2.1 Word Document template

LIFE E-VIA

"Electric Vehicle noIse control by Assessment and optimisation of tyre/road interaction"

LIFE18 ENV/IT/000201

Deliverable	XXX
Content	
Action/Sub-action	XXX
Status - date	XX-XX-XXXX
Authors	
Beneficiary	
Contact person	
E-mail	
Project Website	https://life-evia.eu/

Figure 3: Screenshot of the Word template for documents generated by the project

WORD TEMPLATE

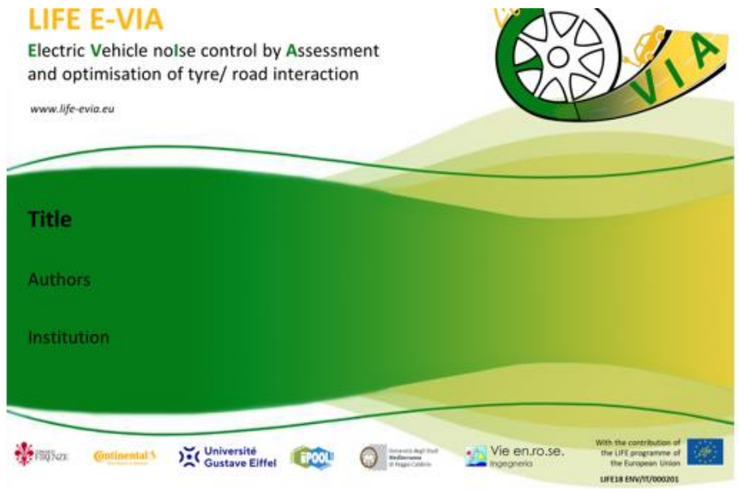


Figure 4: Screenshot of the PowerPoint title slide

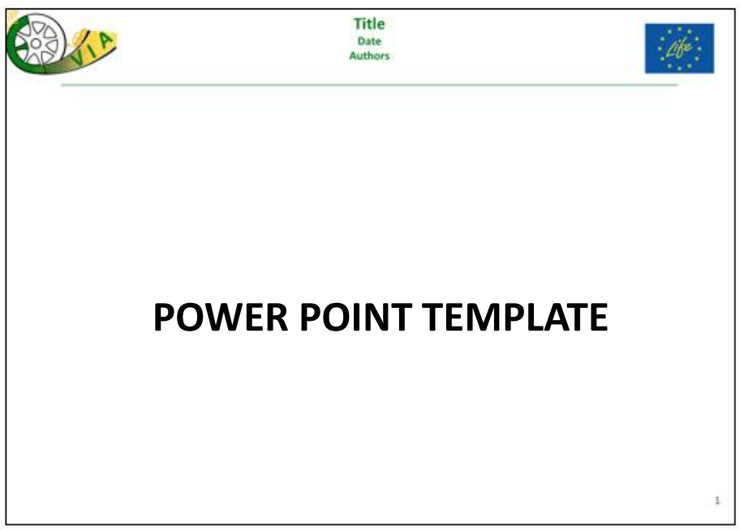


Figure 5: Screenshot of the PowerPoint body slide

POWER POINT TEMPLATE

Figure 8: Second page of the leaflet template

LEAFLET TEMPLATE

LIFE E-VIA

Electric **V**ehicle no**I**se control by **A**ssessment and optimisation of tyre/ road interaction

Dissemination and participation photo album

By Vie en.ro.se. Ingegneria

With the contribution of the LIFE programme of the European Union

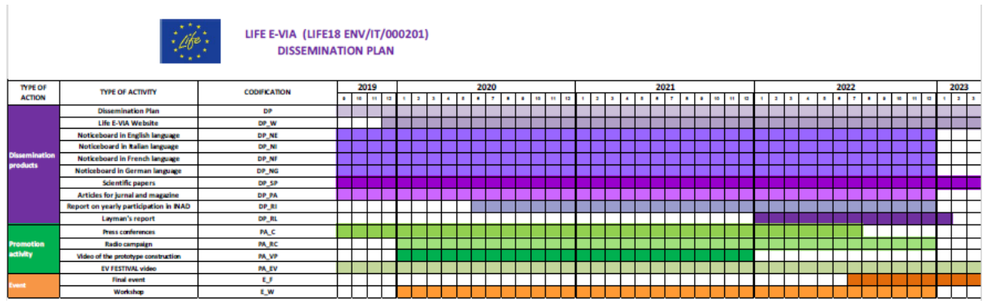
LIFE18 ENV/IT/000201

Kick off meeting of partners

Issued on: September 2019

By: All partners

MEETING



EUROCITIES- Meeting in Oslo during the Environment Forum

Issued on: October 2019

By: Comune di Firenze and Vie en.ro.se. Ingegneria

MEETINGS OF THE EUROCITIES

Code: M_E_1

« E-VIA » Electric Vehicle noise control by Assessment and optimisation of Tyre/road interaction

PROJECT LOCATION: Florence Italy

BUDGET INFO:

Total amount: 1.797,030 €

55% EC Co-funding: 933,295 €

DURATION: Start: 01/07/2019 - End: 31/01/2023

PROJECT'S IMPLEMENTORS:

Coordinating Beneficiary: Florence Municipality

Associated Beneficiary(ies):

Continental Reifen Deutschland
Ifsttar
Ipool S.r.l.
University of Reggio Calabria
Vie en.ro.se Ingegneria S.r.l

Eurocities Environment Forum
Oslo 23-25 Ottobre 2019

Arnaldo Melloni
Project Manager

LIFE 18 ENV and GIE Welcome meeting in Brussels

Issued on: November 2019

By: Comune di Firenze

MEETING

« E-VIA » Electric Vehicle noise control by Assessment and optimisation of Tyre/road interaction

PROJECT LOCATION: Florence Italy

BUDGET INFO:

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University of Reggio Calabria
Vie en.ro.se Ingegneria S.r.l

LIFE18 ENV and GIE Welcome Meeting, Brussels, 7-8 November 2019

Arnaldo Melloni
Project Manager

Development and launch of LIFE E-VIA website

Issued on: December 2019

By: Vie en.ro.se. Ingegneria

Deadline: 01/12/2019

LIFE E-VIA WEBSITE

Code: DP_W

https://life-evia.eu/

SC4Life- SmartCity 360°
Scientific Contribution

Issued on: December 2019

By: UNIRC

Deadline: 01/03/2023

SCIENTIFIC PAPERS
Code: DP_SP_1

SC4Life

EAI COMMUNITY THAT BUILDS YOUR CAREER
Collaborative research. Objective evaluation. Fair recognition.

http://sc4life.org/full-program/

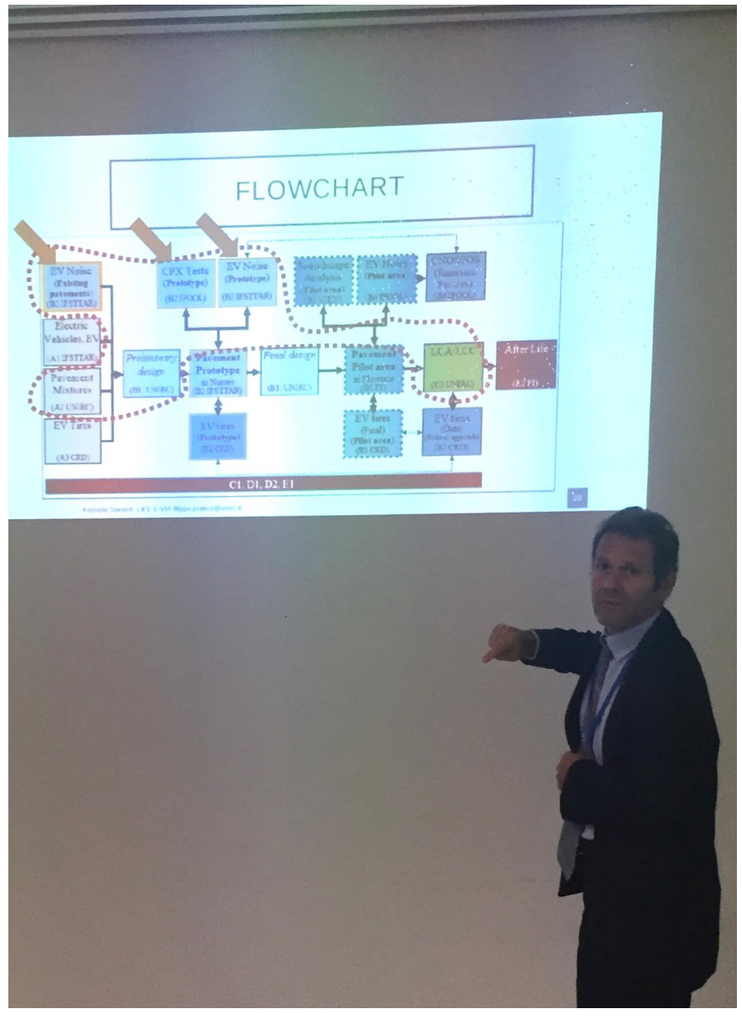
HOME REGISTRATION COMMITTEES PROGRAM FOR AUTHORS CALLS PRACTICAL INFO SPONSORSHIP SMARTCITY 360°

SESSION 1: Cities and Territory

Session Chair: Paulo Pereira

Keynote Speech: Fillipo Pràtico

Title: *LIFE E-VIA. Electric Vehicle noise control by assessment and optimisation of tyre/road interaction*



SC4Life conference will take place on the 5th December in the room #3
11:30 – 13:00 SESSION 1: Cities and Territory
Session Chair: Paulo Pereira

Keynote Speech
The LIFE E-VIA project

Electric Vehicle noise control by assessment and optimisation of tyre/road interaction
(LIFE18 ENV/IT/000201)

http://life-evia.eu http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=7210

Filippo Giammaria Praticò,
University Mediterranea of Reggio Calabria; Italy
filippo.pratico@unirc.it

SC4Life SmartCity360° THE GATEWAY TO INNOVATION UM CITIES

Paper published on Sustainability 2020 about the sustainable pavement materials for the urban roads.

Issued on: January 2020

By: UNIRC

Deadline: 01/12/2022

ARTICLES FOR OPEN ACCESS JOURNAL

Code: DP_PA_1

https://www.mdpi.com/2071-1050/12/2/704/htm/

sustainability

MDPI

Article

Energy and Environmental Life Cycle Assessment of Sustainable Pavement Materials and Technologies for Urban Roads

Filippo G. Praticò [1], Marinella Giunta [2,*], Marina Mistretta [3] and Teresa Maria Gulotta [4]

1 Department of Information, Infrastructure and Sustainable Energy (DIIES), Via Graziella, Feo di Vito, University Mediterranea of Reggio Calabria, 89214 Reggio Calabria, Italy; filippo.pratico@unirc.it

2 Department of Civil, Energy, Environmental and Material Engineering (DICEAM), via Graziella, Feo di Vito, University Mediterranea of Reggio Calabria, 89100 Reggio Calabria, Italy

3 Department of Heritage, Architecture, Urbanism (PAU), Via dell'Università, 25, University Mediterranea of Reggio Calabria, 89124 Reggio Calabria, Italy; marina.mistretta@unirc.it

4 Department of Engineering, Viale delle Scienze, University of Palermo, 90128 Palermo, Italy; teresa.gulotta@deim.unipa.it

* Correspondence: marinella.giunta@unirc.it; Tel.: +39-0965-169-2471

Received: 18 December 2019; Accepted: 16 January 2020; Published: 18 January 2020

check for updates

Abstract: Recycled and low-temperature materials are promising solutions to reduce the environmental burden deriving from hot mix asphalts. Despite this, there is lack of studies focusing on the assessment of the life-cycle impacts of these promising technologies. Consequently, this study deals with the life cycle assessment (LCA) of different classes of pavement technologies, based on the use of bituminous mixes (hot mix asphalt and warm mix asphalt) with recycled materials (reclaimed asphalt pavements, crumb rubber, and waste plastics), in the pursuit of assessing energy and environmental impacts. Analysis is developed based on the ISO 14040 series. Different scenarios of pavement production, construction, and maintenance are assessed and compared to a reference case involving the use of common paving materials. For all the considered scenarios, the influence of each life-cycle phase on the overall impacts is assessed to the purpose of identifying the phases and processes which produce the greatest impacts. Results show that material production involves the highest contribution (about 60–70%) in all the examined impact categories. Further, the combined use of warm mix asphalts and recycled materials in bituminous mixtures entails lower energy consumption and environmental impacts due to a reduction of virgin bitumen and aggregate consumption, which involves a decrease in the consumption of primary energy and raw materials, and reduced impacts for disposal. LCA results demonstrate that this methodology is able to help set up strategies for eco-design in the pavement sector.

all the scenarios. In detail, it accounts for more than 60% of the majority of environmental indicators, with the exception of EF_w, HT-ce, HT-nce, and ME.

The negative values of Ftox and HT-ce in Scenario 1 (addition of waste plastics in the bituminous mixture) are essentially due to the avoided impacts of virgin plastics.

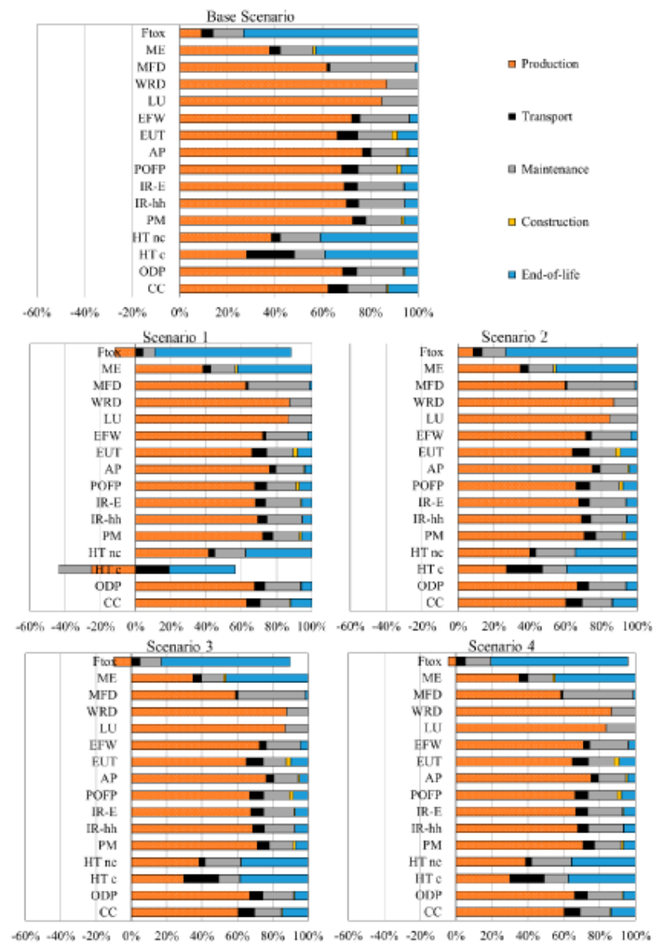


Figure 2. Contribution analysis of life-cycle environmental impacts.

LIFE E-VIA: objectives and actions

Issued on: February 2020

By: : Vie en.ro.se. Ingegneria

Deadline: 01/12/2022

NOTICEBOARD IN ENGLISH LANGUAGE

Code: DP_NE_1

LIFE E-VIA

Electric Vehicle noise control by Assessment and optimisation of tyre/road interaction

LIFE16 ENV/IT/000251

With the contribution of the LIFE programme of the European Union

COMUNE DI FIRENZE · Continental · Université Gustave Eiffel · iPOOL · Vie en.ro.se. Ingegneria

Background

Exposure data from the European Environment Agency (EEA) demonstrate that more than 100 million EU citizens are affected by high noise levels negatively impacting human health. Traffic noise alone is harmful to the health of almost every third person in the WHO (World Health Organization) European Region. 20% of Europeans are regularly exposed to night sound levels that could significantly damage health, especially in urban areas. As emerged in Noise in Europe Conference (April 2017) and in the WHO guidelines published in October 2018, the increased stringency of EU at source standards needs to be balanced against other effective measures such as road surface and/or tyre improvements and urban planning measures as well.
One of the solutions universally recognized as the best to reduce noise in urban areas, from both the point of view of noise and air quality, is the introduction of **electric mobility**. Thus, for the changed requirements of Electric Vehicles (EVs) there is a need for in-depth investigations of tyre/road interaction. Last but not least, even for the application of the Directive 2002/49/EC, the coefficients to apply the CNOSSOS model (Directive 996/2015/EC) to new traffic spectra and new vehicles are completely missing.

Objectives

1. To **reduce noise** for roads inside very populated urban areas through the implementation of a mitigation measure aimed at **optimizing road surfaces and tyres of EVs.** Two road surfaces, at least 5 different EV types, one reference ICE Vehicle (ICEV) and at least 3 types of tyres per vehicle type (including tyres specifically designed for EVs) will be tested
2. To **estimate the mitigation efficiency** and **potential** of **tyres, pavements** and **traffic** (traffic spectrum, speeds, handling conditions) at a higher and comprehensive level: a Life Cycle Analysis (LCA) and a Life Cycle Cost Analysis (LCCA) will be performed to demonstrate the individual and synergistic efficiency of pavement surfaces, tyres and vehicles (including the comparison between internal combustion vehicles, mixed traffic, and EV traffic)
3. To contribute to **EU legislation effective implementation** (EU Directives 2002/49/EC and 2015/996/EC), providing rolling noise coefficients within the Common Noise Assessment Method (**CNOSSOS-EU**), specifically tuned for EVs which are actually in need of data for practitioners, agencies, and departments aiming at developing future scenarios
4. To contribute to **national and Italian regional policies**, issuing **guidelines** about use and application of the methodology output of the project, which will be adopted, through the Regional Env. Agency (ARPAT), supporting the project, by Tuscany Region. Calabria Region and Città di Reggio Calabria also expressed their interest.
5. To **raise people's awareness** of noise pollution and health effects explaining the opportunities provided by EVs through specific dissemination and promotional events, also investigating people perception regarding noise in terms of soundscape methodology and involving them in noise data acquisition
6. To demonstrate and **promote sustainable road transport mobility (electric)**, reducing noise emission by 5 dB(A) at receivers' roadside and achieving also CO2 emissions reduction (21%), based on the Italian context (LPG, CNG, Hybrid, EV, petrol cars, diesel cars) and the concerned literature
7. To **encourage low-noise surfaces implementation in further EU and extra-EU scenarios**, demonstrating durability and sustainability, through in-depth LCA&LCCA

Actions

A. Preparatory actions
A1 Electric vehicles and their noise emission
A2 Quiet pavement technologies and their performance over time
A3 Tyre role in the new context of EV and ICEV

B. Implementation actions
B1 Tracks design
B2 Tyre-pavement coupling study and prototype implementation
B3 Pilot area: Implementation, Replication and transferability
B4 Track efficiency tests in the pilot area
B5 Soundscape analysis
B6 Evaluation of EV noise emissions
B7 Holistic performances of tyres

C. Monitoring of the impact of the project actions
C1 Monitoring of the impact of the project actions
C2 Life cycle analysis (LCA) and life cycle costing (LCC)

D. Public awareness and dissemination of results
D1 Information and awareness raising activities
D2 Technical dissemination activities to stakeholders

E. Project management

Stakeholders

Project website: https://life-evia.eu/

LIFE E-VIA

Electric Vehicle noise control by Assessment and optimisation of tyre/road interaction

Roll-up

Issued on: February 2020

By: : Vie en.ro.se. Ingegneria

Deadline: 01/12/2022

With the contribution of the LIFE programme of the European Union
LIFE18 ENV/IT/000201

NOTICEBOARD IN ENGLISH LANGUAGE

Code: DP_NE_2

LIFE E-VIA

Electric Vehicle noIse control by Assessment and optimisation of tyre/road interaction

Coordinating beneficiary

Partners

Journées Techniques Acoustique et Vibrations

"LIFE E-VIA: noise control of electric vehicles by optimizing tire-road interaction"

Issued on: March 2020

By: : Université Gustave Eiffel

Deadline: 01/03/2023

SCIENTIFIC PRESENTATION IN NATIONAL CONGRESS

Code: 36_2

umr ae

Journées Techniques
Acoustique et Vibrations
Lille – France – 11-12 mars 2020

jt av JOURNEES TECHNIQUES ACOUSTIQUE ET VIBRATIONS

LIFE E-VIA : contrôle du bruit des véhicules électriques par optimisation de l'interaction pneumatique-chaussée

Julien CESBRON, Marie-Agnès PALLAS, Philippe KLEIN,
Simon BIANCHETTI, Adrien LE BELLEC, Vincent GARY

Université Gustave Eiffel – UMRAE

Université Gustave Eiffel Cerema

Action B21 - Acoustical characterization of EVs

- Planned vehicles:
  - One ICE Vehicle (Renault Kangoo Diesel)
  - Several EVs (Renault Kangoo ZE, Renault Zoe, C-Zero, Nissan Leaf, BMW i3, Tesla Model 3)
- Already tested in August 2019:
  - Renault Kangoos (ICEV and EV) and Renault Zoe

Action B22 – Prototype construction

- Construction of a B1-based test track prototype:
  - Located on IFSTTAR reference test track in Nantes
  - Call for tender planned in April 2020 based on B1 recommendations
  - Construction planned in July 2020

Paper submitted to 11th International Conference
"Environmental Engineering" (ENVIRO), Vilnius, Lithuania.
Issued on: May 2020
By: UNIRC
Deadline: 01/03/2023

SCIENTIFIC PAPERS
Code: 36_3

PARTICULATE MATTER FROM NON-EXHAUST SOURCES

Abstract: Air pollution is an important issue worldwide. Solid components in air (particulate matter, PM) originate from a variety of natural or anthropogenic sources and have different morphological, physical, and chemical properties. Their presence in the air also depends on meteorological conditions, such as humidity, rainfall, and wind speed. PM pollution has adverse effects on environment and human health. Therefore, it is very important to address sources and processes involved in PM generation. Among the existing sources, a special attention must be paid to PM emissions from road traffic, i.e., exhaust sources (e.g., fuel combustion) and non-exhaust sources (e.g., road, tyre, brakes). These traffic-related sources contribute to PM concentrations in cities, and this calls for research into new possible systems and/or mitigation measures. In light of the facts above, the objectives of this study are 1) To evaluate the contribution to PM emission from traffic-related sources. 2) To evaluate existing mitigation measures and to identify new ones to reduce PM production. First results show that: 1) Non-exhaust sources have a different role in PM generation and they differently affect PM10, PM2.5, and PM0.1. 2) Even if emissions-related regulations have led to reductions in exhaust emissions from road traffic, other mitigation measures could reduce the non-exhaust part of emissions (e.g., brakes wear, road wear, and tyre wear). 3) New technologies could be developed to reduce PM from non-exhaust sources.

Keywords: Particulate matter, Non-exhaust sources, Tyre wear, Road wear, Brake wear, Mitigation measures.

Paper submitted to 4th International Symposium “NEW METROPOLITAN PERSPECTIVES”, Reggio Calabria, Italy.
Issued on: May 2020
By: UNIRC
Deadline: 01/03/2023

SCIENTIFIC PAPERS
Code: 36_4

SMART ROAD INFRASTRUCTURES THROUGH VIBRO-ACOUSTIC SIGNATURE ANALYSES

Fedele R.

Abstract. Smart cities need “intelligent” infrastructures designed or managed bearing in mind crucial characteristics, such as sustainability, efficiency, safety, and resiliency. Several solutions can be adopted, but the key factor for the suc-cess of the solution selected is its ability of improving the management process. The objective of the study described in this paper is to develop a solution that can be used to make smarter the road pavement monitoring and maintenance. In particular, a Non-Destructive Test (NDT)-based method is presented and applied aiming at extracting crucial information about the Structural Health Status (SHS) of the monitored road pavement. Results show that the method is able to recognize the presence and the growing of induced cracks using meaningful features extracted from the vibro-acoustic signatures (acoustic signals) of the road pavement loaded by a light vehicle. The abovementioned features can be used to build innovative P-F curves able to improve the road pavement management process.
Keywords: Smart Roads, Sustainability, Vibro-Acoustic Signature.

Paper submitted to the 20th IEEE Mediterranean Elettronical Conference (MELECON), Palermo, Italy.
Issued on: June 2020
By: UNIRC
Deadline: 01/03/2023

SCIENTIFIC PAPERS
Code: 36_5

ACOUSTIC IMPACT OF ELECTRIC VEHICLES

Praticò F.G., Briante P.G., Speranza G.

Abstract: Electric vehicles (EV) diffusion depends on many factors among which policies, people options, and economic factors. Their noise-related performance could appear favourable. This notwithstanding, despite partisan opinions, the analyses carried out suggest that research and industry will have to minimise the collateral issues posed by a quite probable EV diffusion. The objective of the study presented in this paper is to analyse the acoustic impact of electric vehicles (EV) and to set up an overall framework for an effective management of their diffusion. After the objectives, EV overall characteristics are analysed. EV acoustic performance are then analysed. In the final discussion, the main characteristics of the required holistic approach are highlighted. This can benefit both researchers and practitioners.

Action D2

Conferences

Event	Partner
Year 2020	
Forum Acusticum 2020 (20-24 April, Lyon) https://fa2020.universite-lyon.fr/	Comune di Firenze and Vie en.ro.se will participate (Abstract sent)
27 International Congress on Sound and Vibration – ICSV27 (11-15 July 2021, Prague) iiav.org	Comune di Firenze and Vie en.ro.se will participate (Abstract sent)

FA2020

Authors are asked to send a paper (max. 8 pages) or at least an extended abstract (2 pages) in English within **October 31st 2020**.

ABSTRACT SENT by Municipality of Florence,
PAPER in preparation

Possible publication

Call for papers for Noise Mapping Journal
Special Issue:

UNDERSTANDING THE IMPACT OF ELECTRIC AND AUTONOMOUS VEHICLES ON URBAN NOISE POLLUTION

Guest Editor: Sergio Maria Patella, Universitas Mercatorum - Piazza Mattei, 10, 00186 Rome, Italy; E-mail: sergiomaria.patella@unimercatorum.it

https://www.degruyter.com/view/journals/noise/noise-overview.xml

EXTENDED to the end of 2020!!!

UNDERSTANDING THE IMPACT OF ELECTRIC AND AUTONOMOUS VEHICLES ON URBAN NOISE POLLUTION

GUEST EDITOR

Sergio Maria Patella

DESCRIPTION

This special issue seeks innovative studies that establish novel links between noise mapping in urban areas and traffic simulation in the context of electric and automated mobility.

Electric vehicles (EVs) category includes a variety of technologies such as plug-in hybrid electric vehicles (PHEVs), battery electric vehicles (BEVs) and hybrid electric vehicles (HEVs). Furthermore, electric micro-mobility modes, such as e-scooters and e-bikes have gained rapid popularity in major cities around the world in the past few years. Electromobility, in addition to reducing the emission of pollutant, also impacts on the noise maps of the cities.

This special issue encourages submittal of papers regarding the evaluation of noise emissions at different scales: single mode level; lane level; road network level.

Autonomous Vehicles (AVs) represent a further topic of this special issue. AVs represent the biggest technological advance in the field of transportation and promise a fundamental revolution in mobility. Many studies have examined the impact of the introduction of AVs on urban mobility, infrastructure and land use, and the travel behavior. Findings indicate that AVs have the potential to reduce road network congestion, and indirectly air and noise pollution. Several prior simulation models have evaluated AVs' potential energy savings and pollutant emissions, but there is limited evidence of the influence of the introduction of AVs on urban noise pollution.

We expect the submissions to make a step forward in our understanding of the general implications that electric and autonomous vehicles will have for the acoustic environments of future cities. All types of experimental or methodological studies applying noise emissions evaluation in urban related contexts are welcome.

This call for paper is inter-disciplinary, and accepts works from fields of engineering, economics, planning, policy, business and management, as well as any other disciplines that contribute to the scientific understanding of the impact of electric and automated mobility on noise emission in urban areas.

HOW TO SUBMIT

Manuscripts should be submitted to the Editor of this journal via
http://www.editorialmanager.com/noise

Submissions are welcome starting from March 15th 2020 till September 15th 2020

LIFE E-VIA PROJECT - INTERNAL PROJECT MEETING
23 October 2020
Vie en.ro.se Ingegneria

Since October 2020 the Acoustic Society of Italy (AIA) has organized a cycle of Webinar having as protagonists mainly young researchers or professionals in acoustics and related subjects, waiting for the next annual conference to be held in 2021 (hopefully) in presence.

Proposal: Webinar on “**How electric vehicles sound**?” in Italian language
Period: November/December 2020

TO BE PROPOSED TO AIA

LIFE E-VIA

Electric **V**ehicle no**I**se control by **A**ssessment
and optimisation of tyre/ road interaction

www.life-evia.eu

Vie en.ro.se.
Ingegneria

Thanks for your attention

LIFE E-VIA PROJECT – INTERNAL PROJECT MEETING 23 October 2020

Vie en.ro.se. Ingegneria, responsible for Actions B5, D1 and D2

With the contribution of the LIFE programme of the European Union

LIFE18 ENV/IT/000201