Hrvatsko asfaltersko društvo

Croatian asphalt association

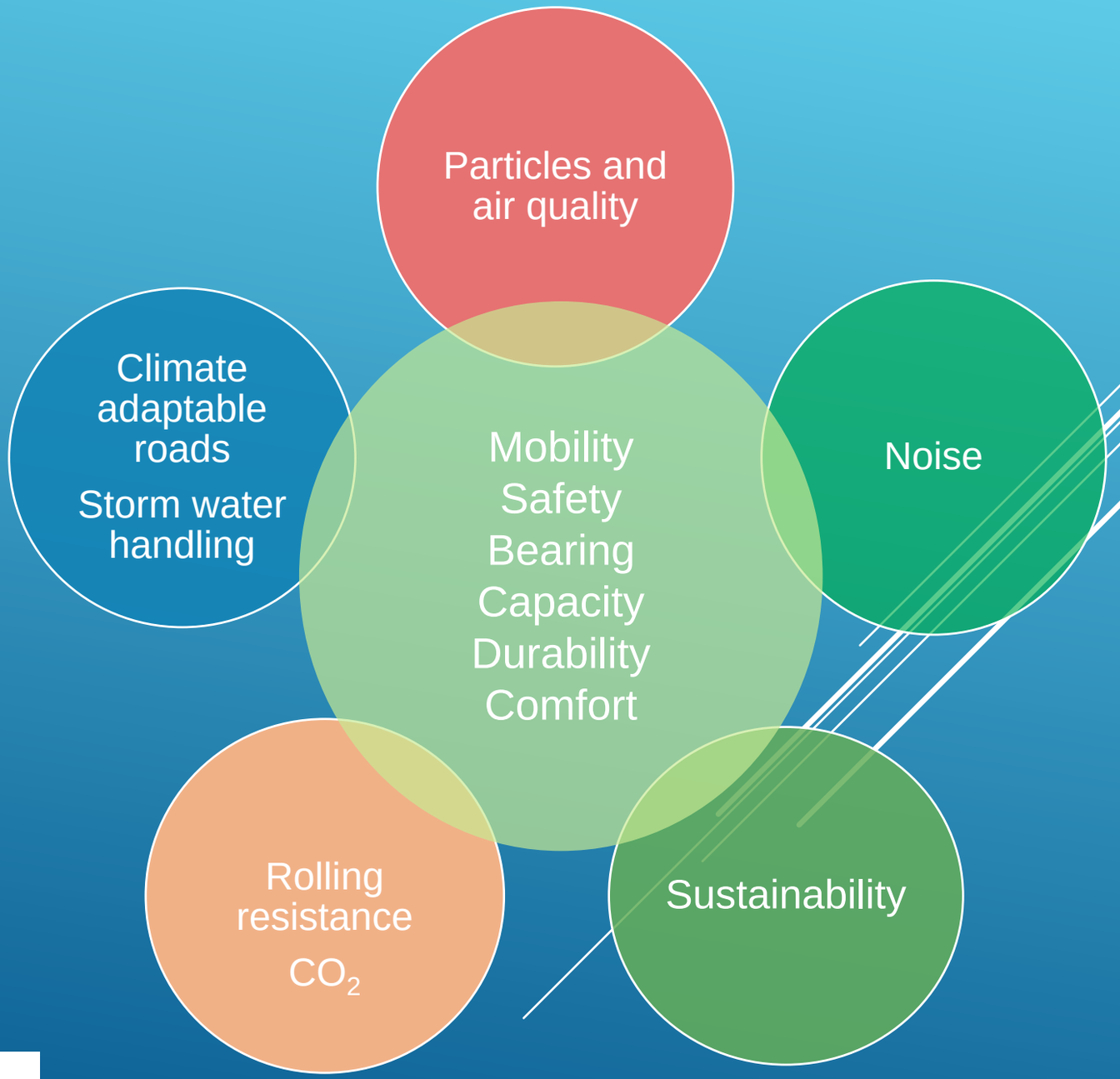
Korištenje asfaltnih kolnika koji smanjuju emisiju CO_2

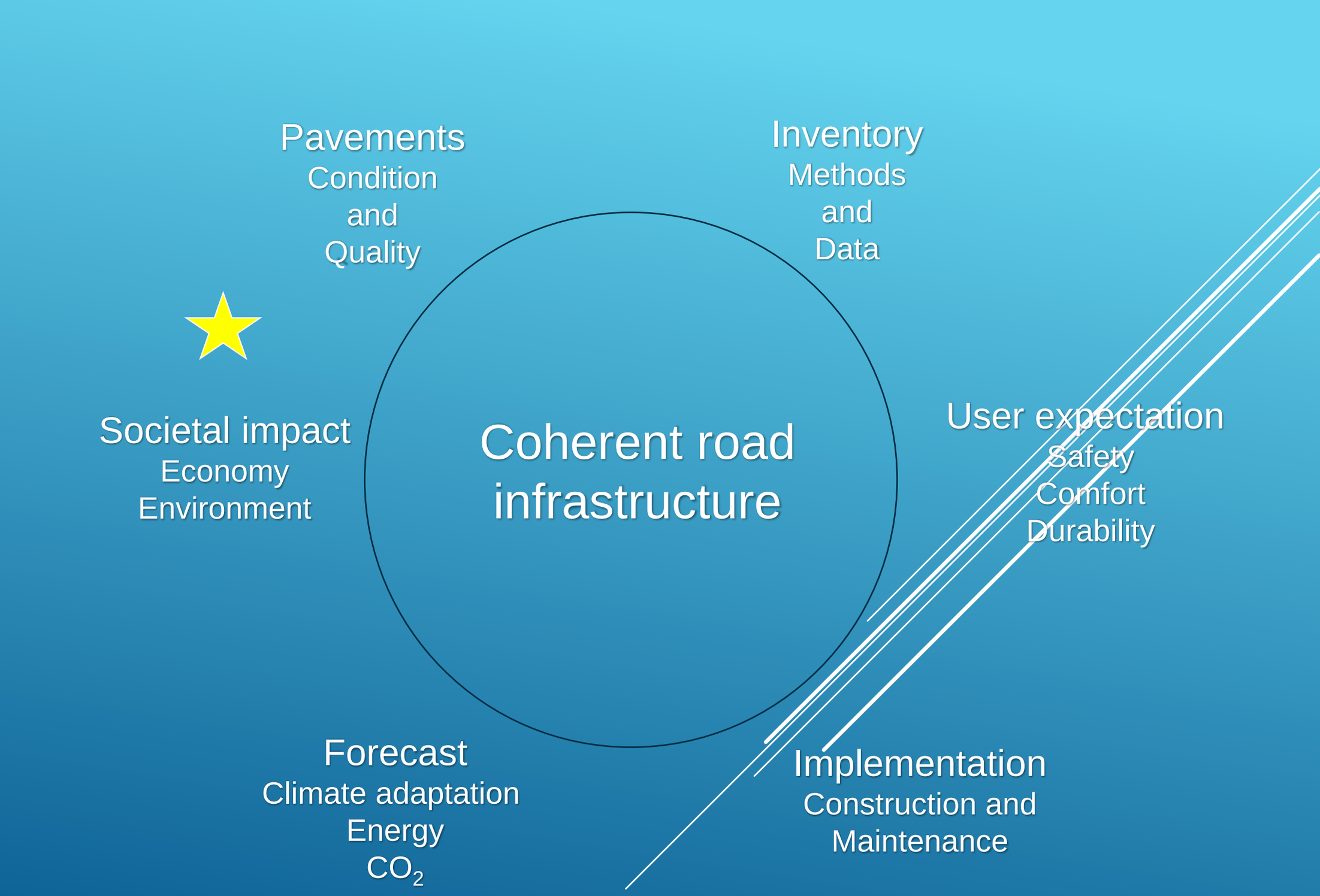
Providing a road infrastructure that reduces CO_2 emission

Bjarne Schmidt – Danish technological Institute

Međunarodni seminar ASFALTNI KOLNICI 2019
International seminar ASPHALT PAVEMENTS 2019
Opatija, 04.–05. 04. 2019.

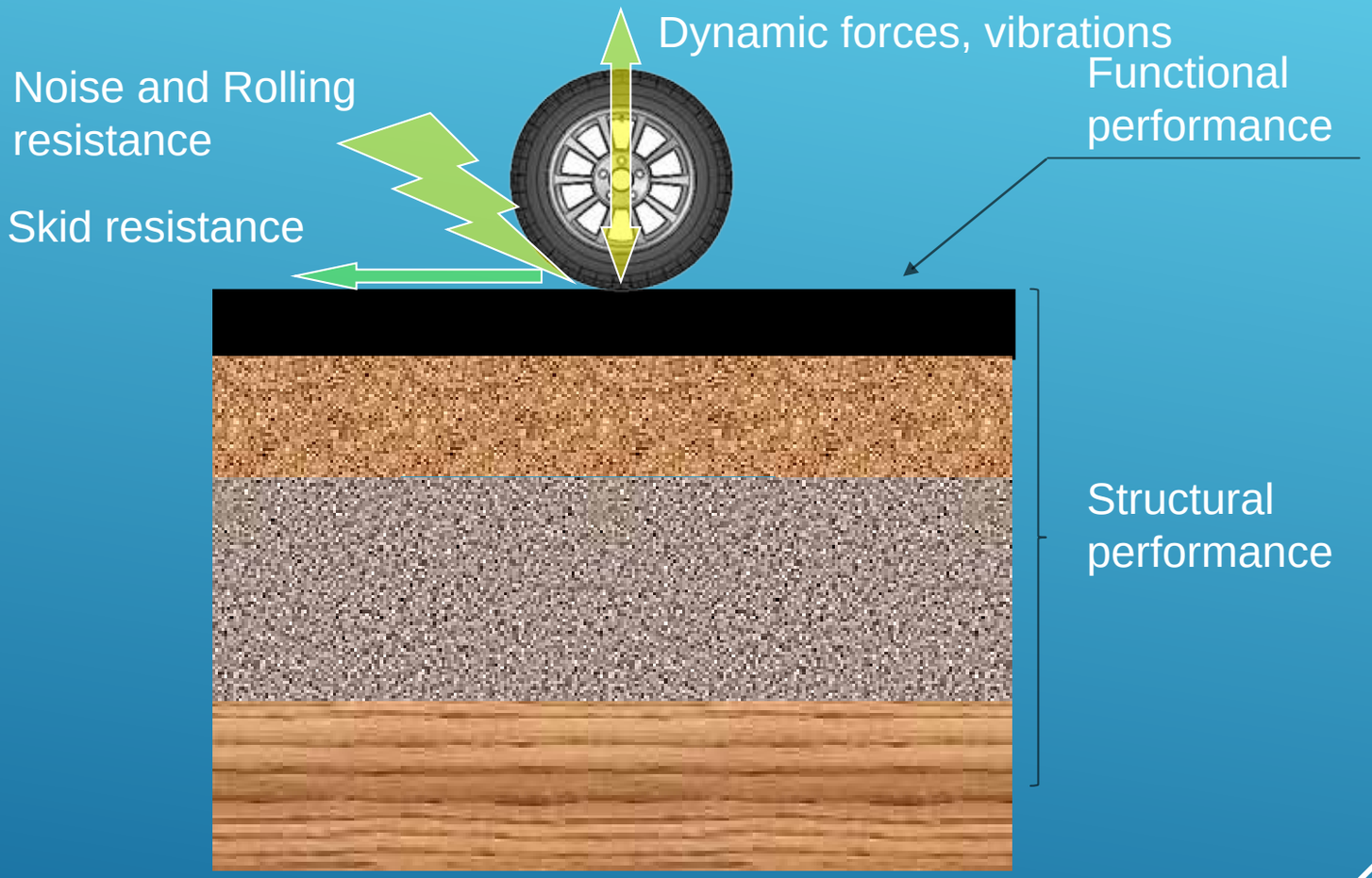
ROAD INFRASTRUCTURE FOR THE FUTURE – SECURING MOBILITY AND SOCIETAL GROWTH



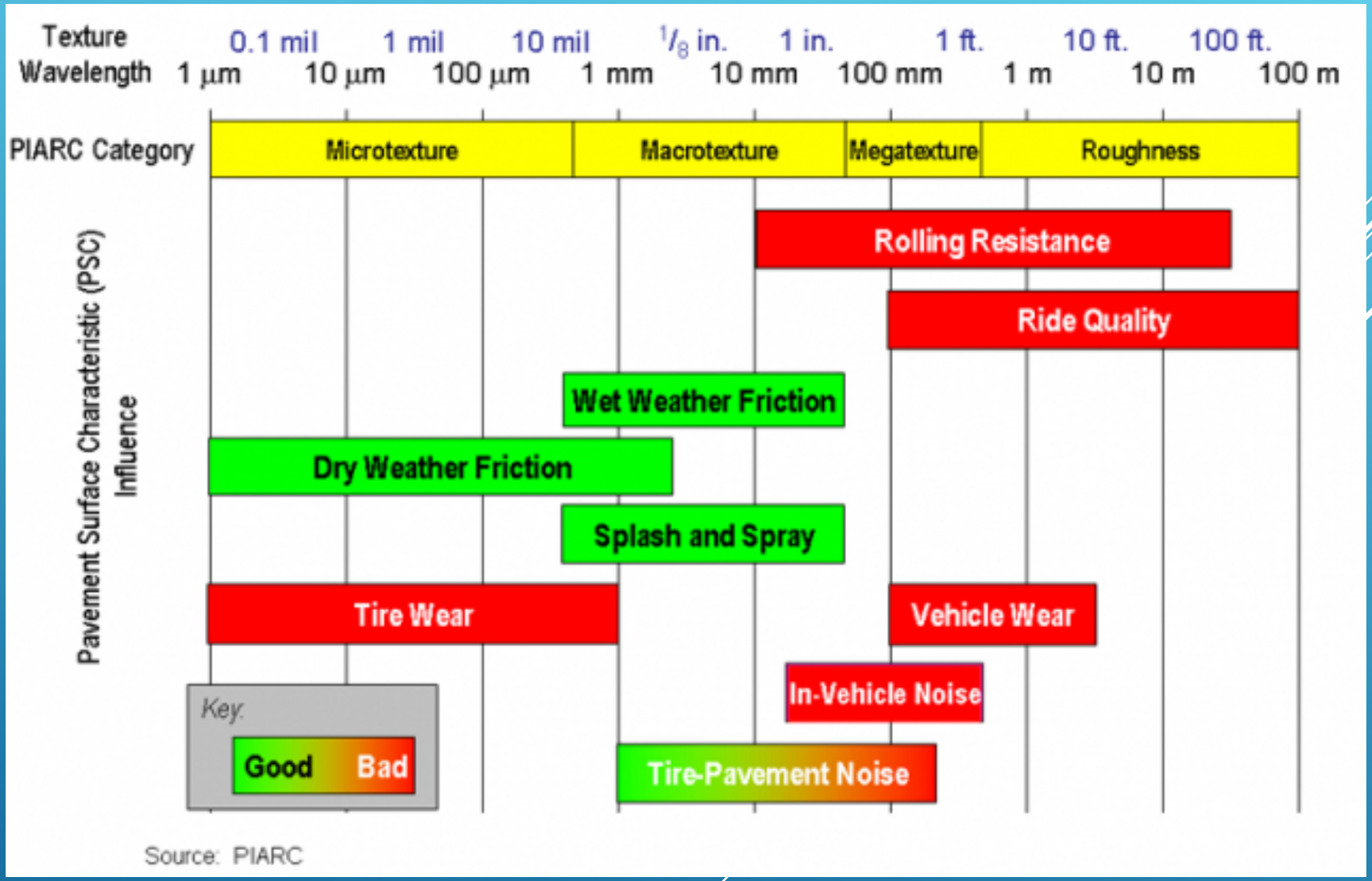

Pavements
Condition
and
Quality
Inventory
Methods
and
Data
Societal impact
Economy
Environment
Coherent road infrastructure
User expectation
Safety
Comfort
Durability
Forecast
Climate adaptation
Energy
CO_2
Implementation
Construction and
Maintenance

User expectation

Tire - Pavement interaction

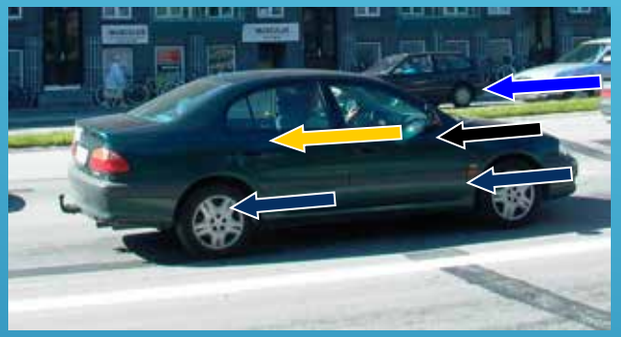


KEY ELEMENTS TO BE OPTIMISED FOR OBTAINING A REDUCTION IN CO_2 EMISSION



Energy Reduction through Improved Road Pavement Characteristics

Possibilities for reducing rolling resistance:



Rolling Resistance

Internal friction

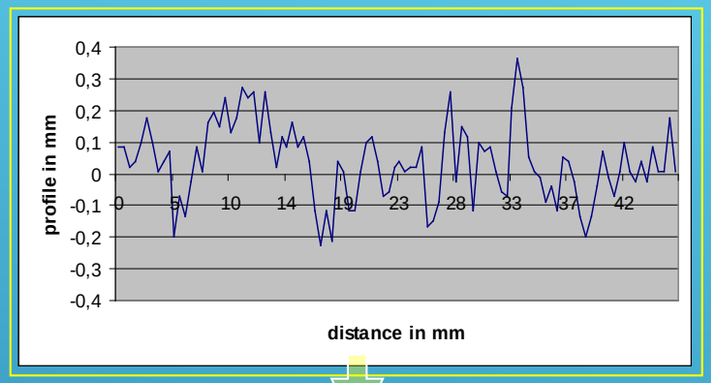
Vehicle inertia

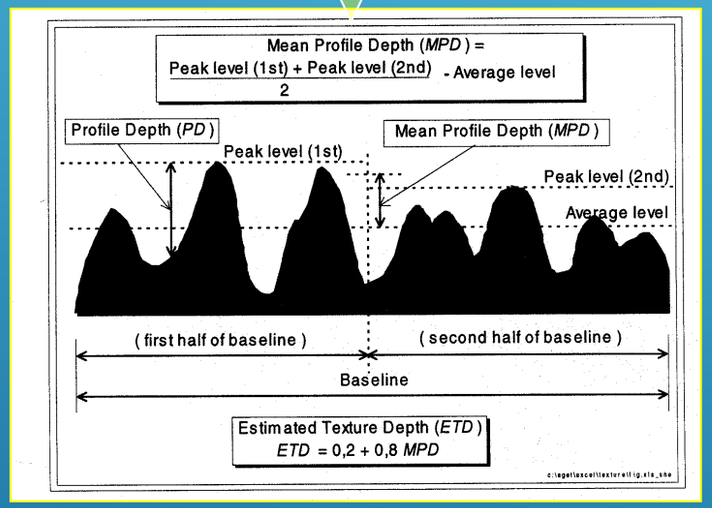
Aerodynamic drag

Tyre	Vehicle related	Road Pavement
Geometry	Speed	Texture
Materials	Wheel load	Stiffness
Design	Wheel configuration	Temperature
Tyre pressure	Temperature	Evenness
Temperature	Wind	

WHAT DO WE MEET IN THE REAL WORLD

TEXTURE PROFILE MEASUREMENTS





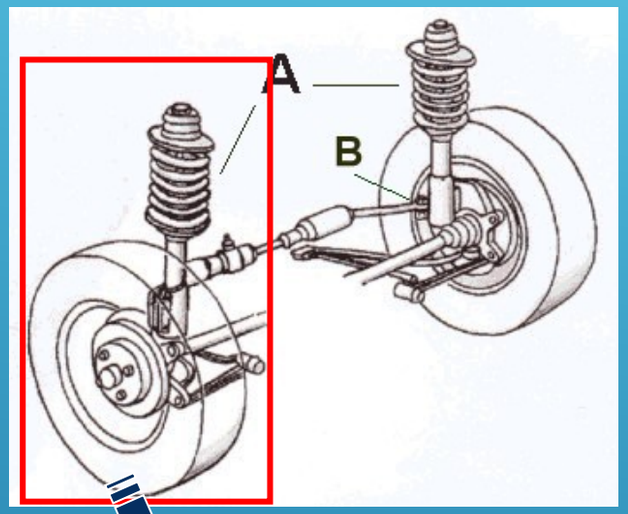
Calculation of Mean Profile Depth, MPD and Estimated Texture Depth, ETD

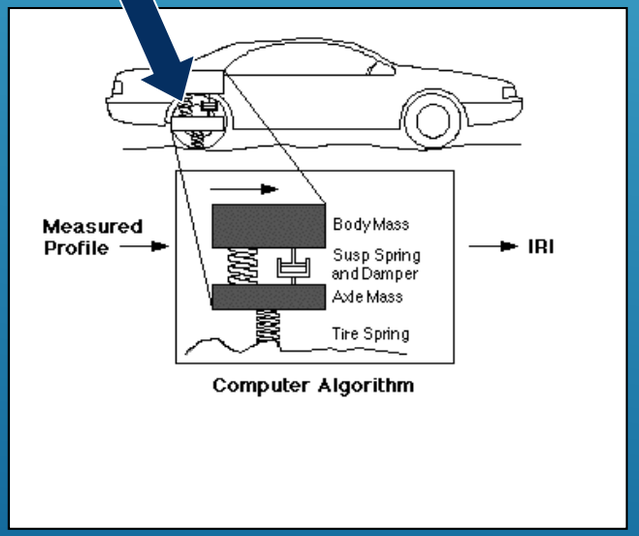
ISO 13473-2

EN ISO 13473-1

ASTM E 1845-01

INTERNATIONAL ROUGHNESS INDEX - CONFIGURATION OF THE VEHICLE





We have:

A: A damper system – with specific constants

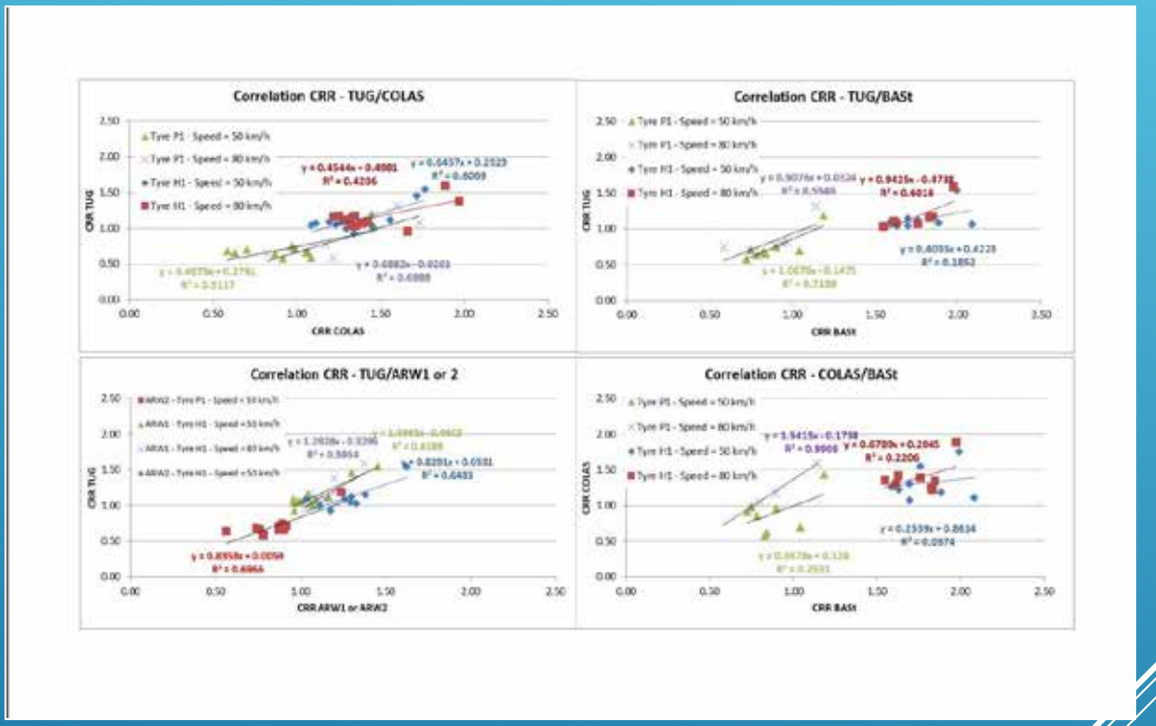
B: Tyre and axel size and mass.

We get:

Amplitude and frequency of the sprung and un-sprung mass resulting in vehicle movements combined vertically and horizontally.

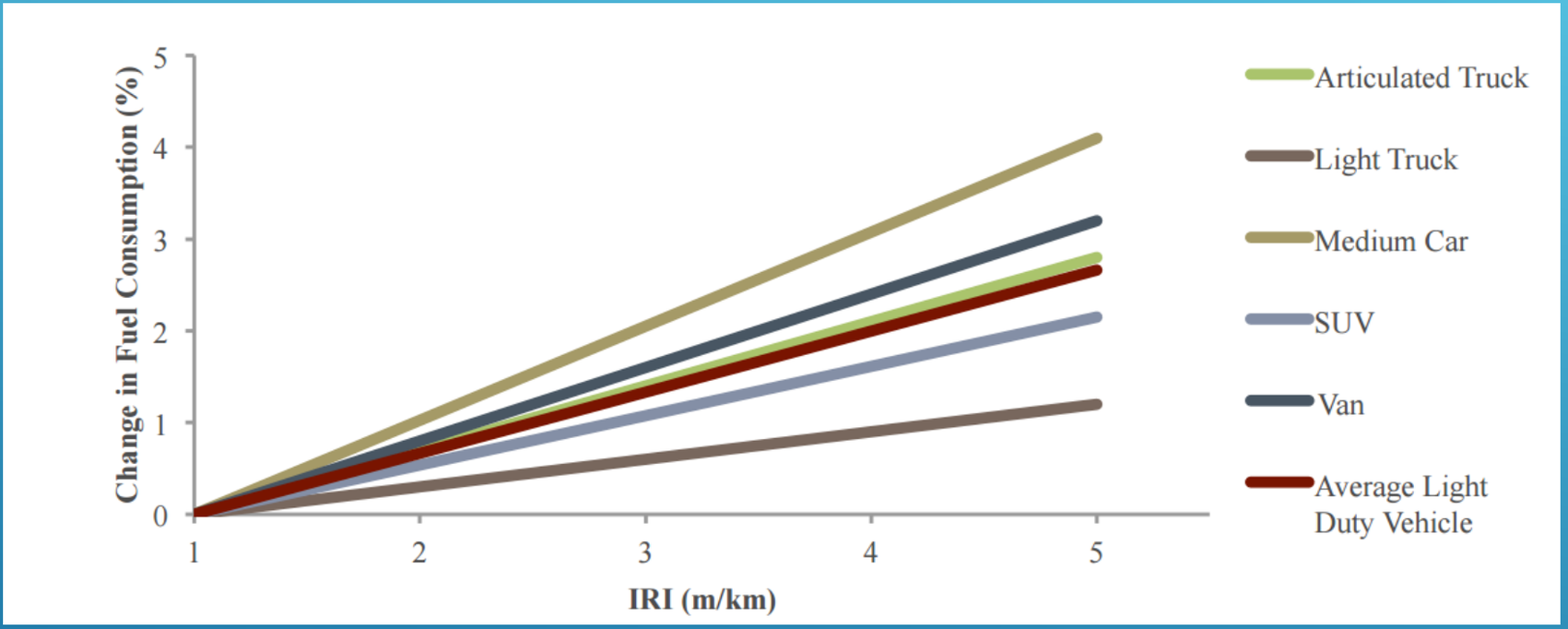
THE CHALLENGE OF MEASURING THE VALUE OF LOW ROLLING RESISTANCE PAVEMENTs

The need for standardisation on a European level in CEN



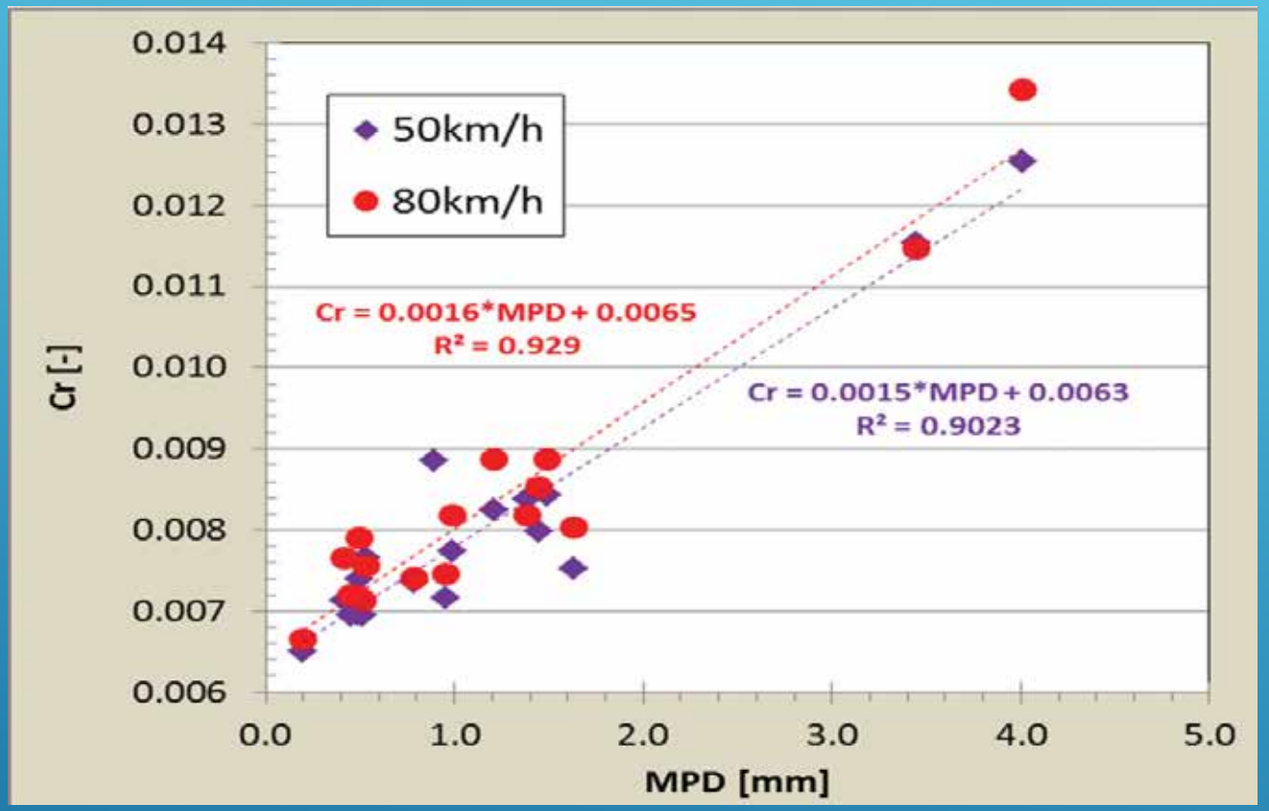
ROSANNE Deliverable D3.6: Experimental validation of the rolling resistance measurement method including updated draft standard

EFFECT OF PAVEMENT EVENNESS ON FUEL CONSUMPTION



Ref: Zaabar and Chatti (2010)

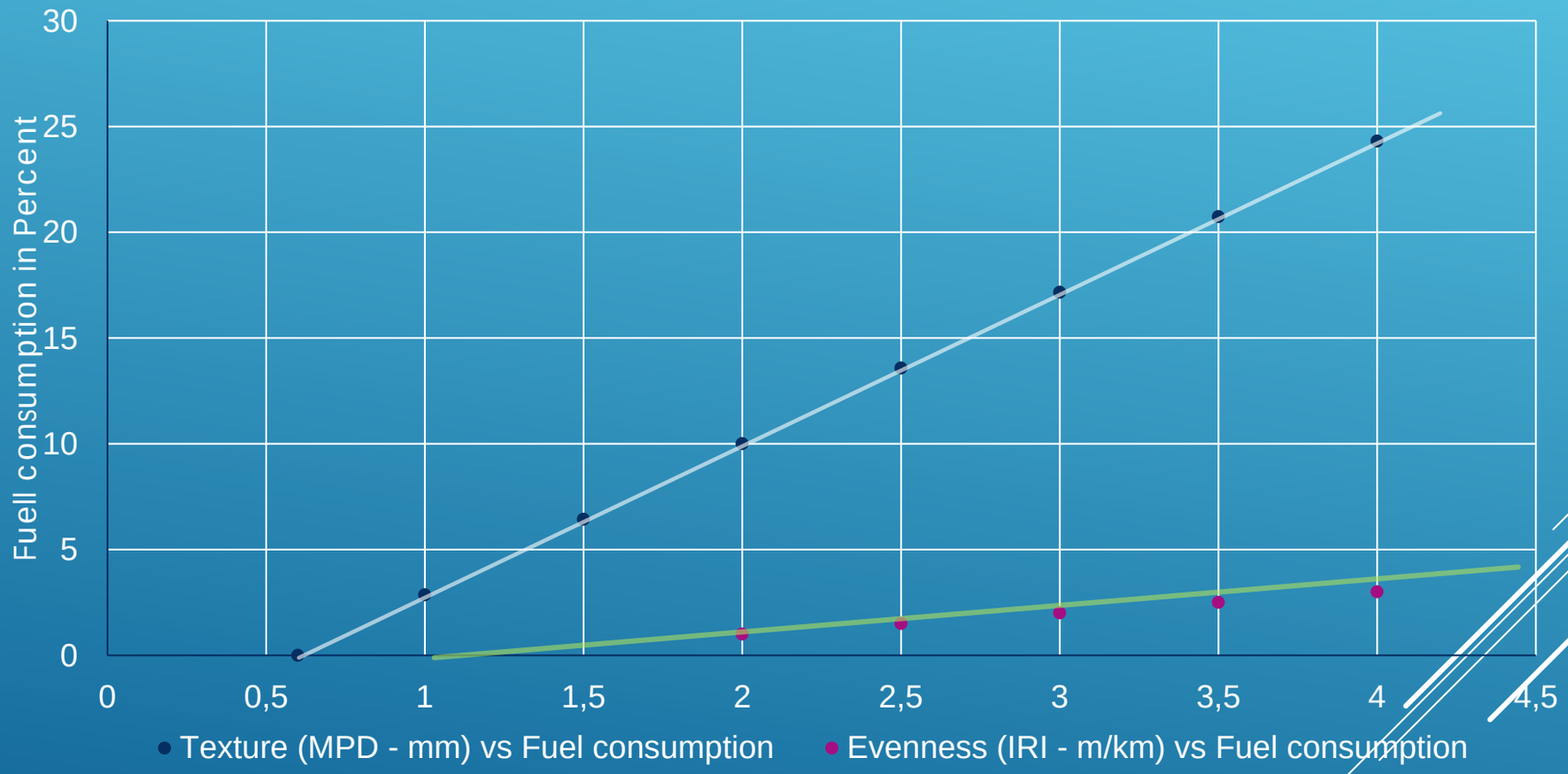
EFFECT OF PAVEMENT TEXTURE ON ROLLING RESISTANCE



Results of rolling resistance measurements on IFSTTAR track for all tested pavements

Jerzy A. Ejsmont, Grzegorz Ronowski, Beata Świeczko-Żurek & Sławomir Sommer (2016):
Road texture influence on tyre rolling resistance, Road Materials and Pavement Design,
DOI: 10.1080/14680629.2016.1160835

CHANGE IN FUEL CONSUMPTION IN RELATION TO ROAD CONDITION (TEXTURE AND EVENNESS)



MPD reference 0,6 mm; IRI reference 0,9 m/km

THE VALUE OF INTRODUCING PAVEMENT TYPES, DESIGNED AND CONSTRUCTED WITH:

- THE AIM OF REDUCING ROLLING RESISTANCE
- TIMELY AND CORRECT MAINTENANCE STRATEGY

- Ø Road maintenance in general improves the surface characteristics of the road and lead to a reduction in vehicle CO_2 emissions.
- Ø By applying new surface layers developed and constructed with the aim of lowering rolling resistance, an even greater CO_2 reduction will be achieved- compared to traditional used asphalt pavements

Ref: https://www.theverge.com/2017/5/4/15544156/potholes-self-healing-materials-infrastructure-transportation

A WELL MAINTAINED ROAD INFRASTRUCTURE CONTRIBUTES TO A REDUCTION IN CO2 EMISSION, FOR A COMPETITIVE PRICE

Socioeconomic calculations performed by the Danish Road Directorate shows that the cost for obtaining the CO_2 reduction,
by using low rolling resistance pavements, are competitive in relation to other CO_2 reducing actions like renewable energy.

Vital focus points are safety and noise:

- Road safety can not be jeopardised as a trade-off for CO_2 emission
- Tire/road noise seems to go hand in hand with rolling resistance.

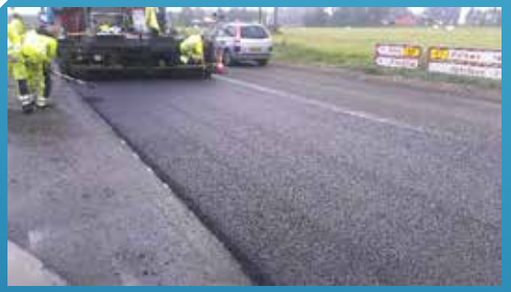
Silence on route

BUT !

A solid return on investment for the society, by using low rolling resistance pavements is obtained by a high degree of durability, giving a long pavement service life of 15+ years.

As pavement durability is conditioned by many factors, such as traffic and climate, the need for extensive knowledge on materials, their composition and their interaction in the mix, is vital to provide a low rolling resistance pavement that performs in 15+ years.

- And so are construction methods and quality !!



THE NEED FOR A LEGISLATE AND POLITICAL FOCUS

Europe's roads are in majority owned by public authorities

By using their purchasing power to choose environmentally friendly works, public authorities can make an important contribution to a sustainable construction and maintenance of the European road infrastructure –

This can be implemented through Green Public Procurement (GPP) or green purchasing.

European standardisation for road constructions and materials, targeted pavements for the future, are needed to guarantee:

- Ø High durability
- Ø High functionality and service levels for the road users
- Ø High reduction of environmental impacts as CO_2.

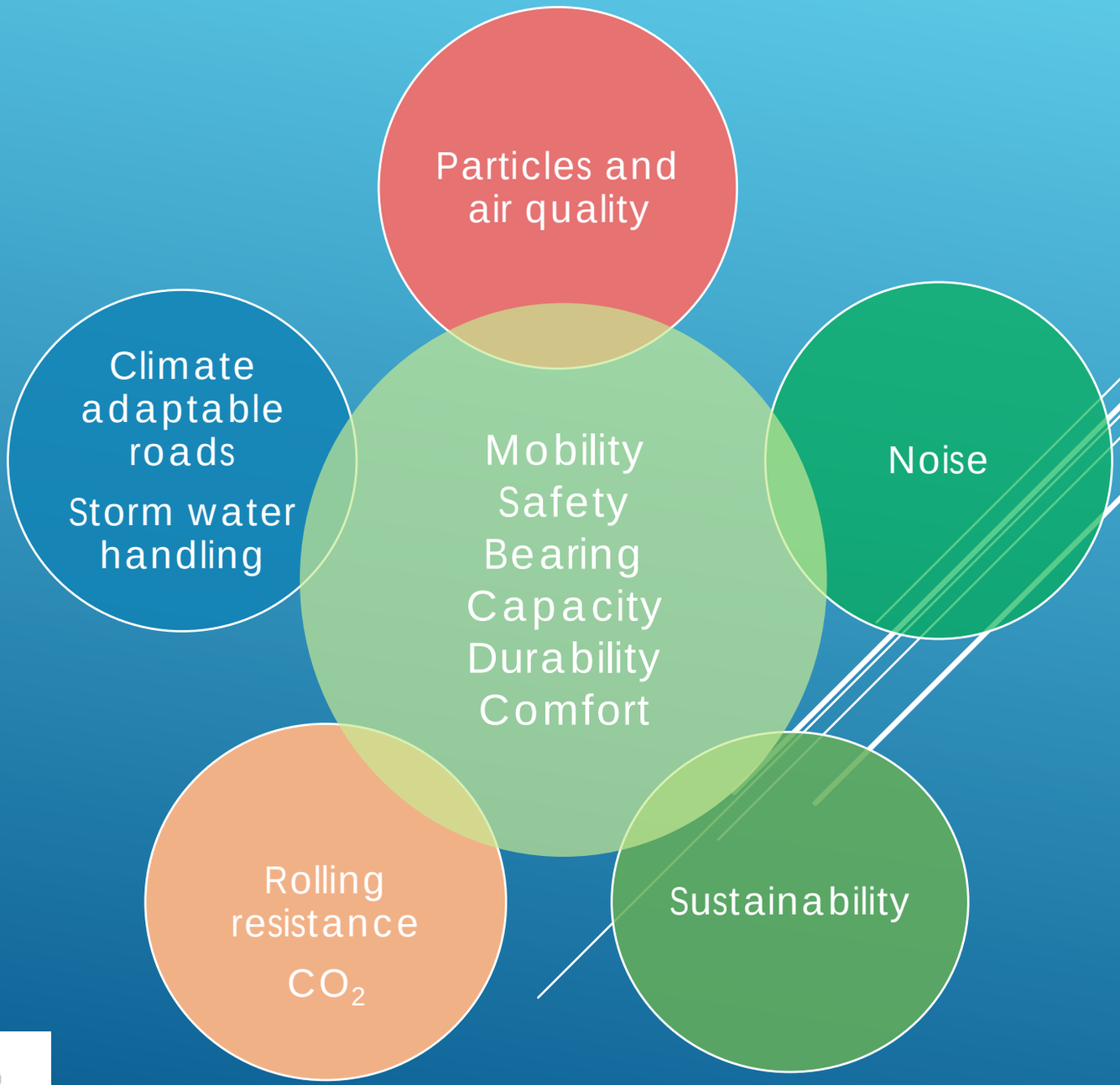
IT IS A SHARED RESPONSIBILITY BETWEEN:

- The political incentive and willingness of investing in Europe roads
- The public authorities to prioritise pavements types that contributes to a better environment
- The contracting community to provide the technology and knowhow of handling new pavement materials and providing the quality.

A common understanding and cooperation within the road sector will provide a European road network that contributes to the EU goal of a 39% reduction in CO_2 emission by 2030 for the NON-ETS sector

LET ME COME BACK TO THIS ---

ROAD INFRASTRUCTURE FOR THE FUTURE – SECURING MOBILITY AND SOCIETAL GROWTH



THANK YOU FOR YOUR ATTENTION