



Smart Transportation Alliance

IMPACT OF FUTURE MOBILITY ON ROADS

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Future mobility

- Is anyone thinking about the road?



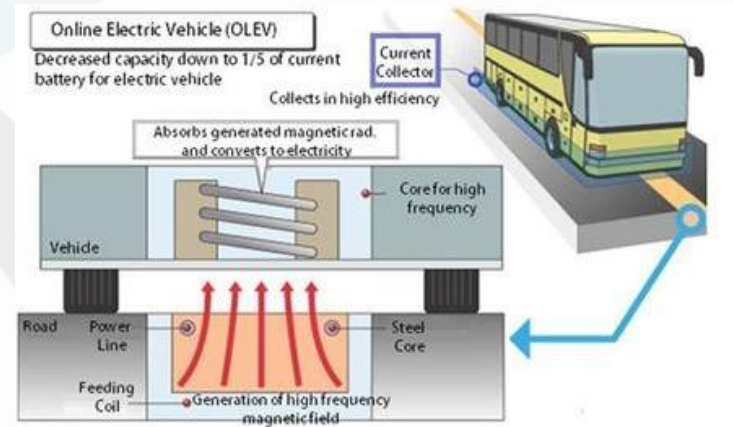
Electric vehicle



Autonomous vehicle

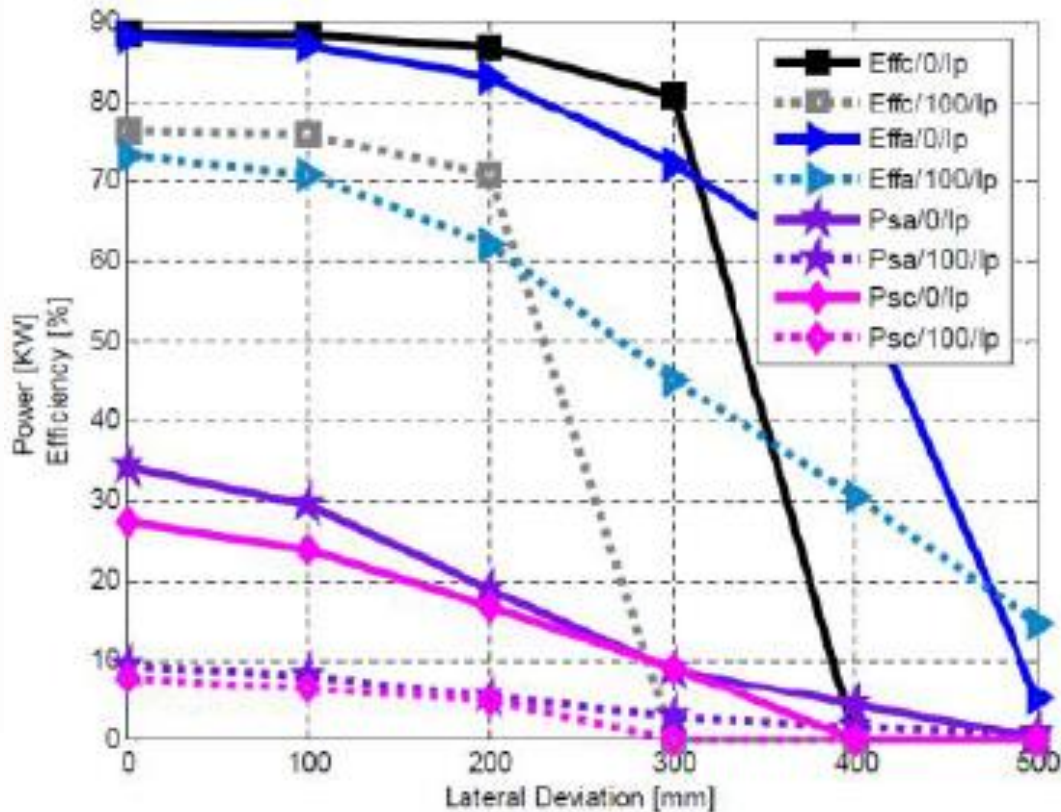
Dynamic charging

- What about heavy vehicles?



Dynamic charging

- Dynamic charging requires autonomous vehicles.



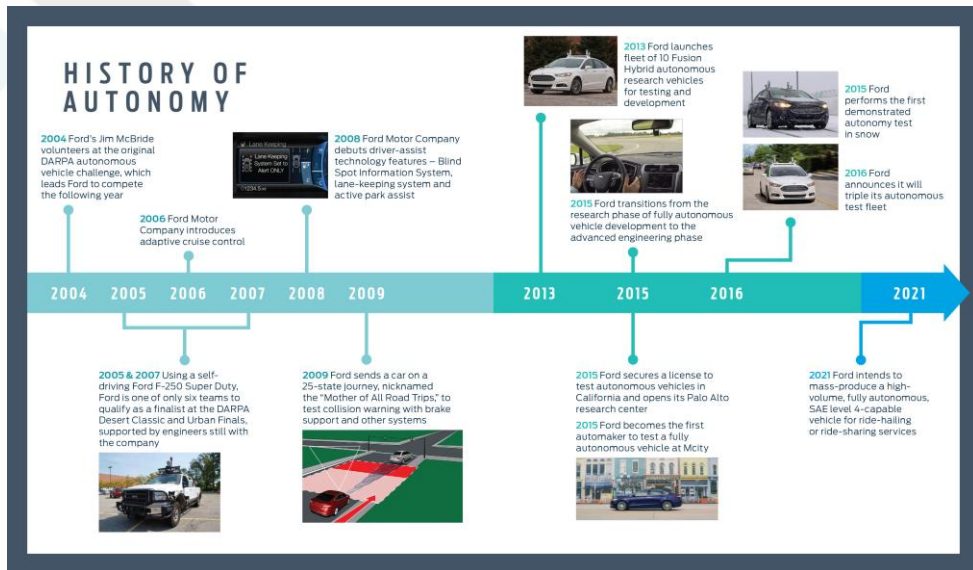
Autonomous mobility

- Full autonomous vehicle will (not) be ready before 2050.



SAE J3016™ LEVELS OF DRIVING AUTOMATION

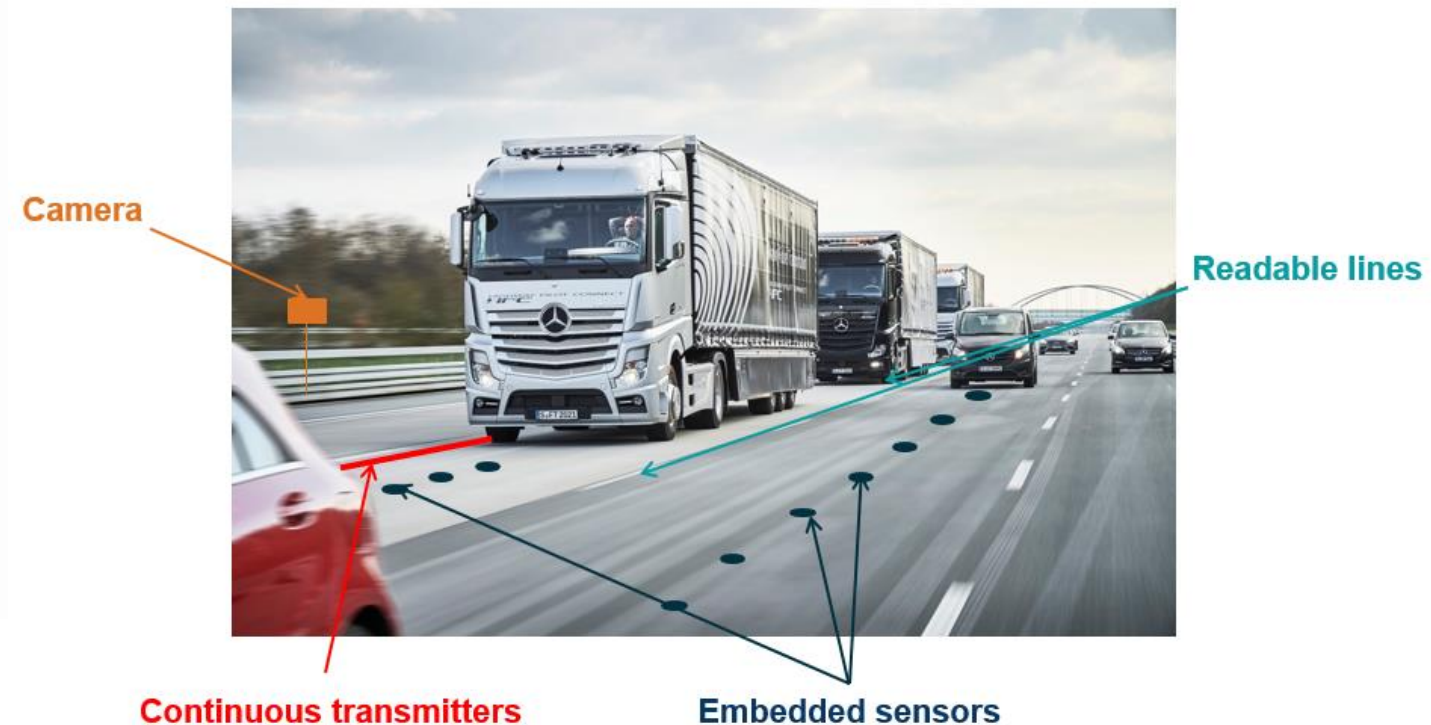
	SAE LEVEL 0	SAE LEVEL 1	SAE LEVEL 2	SAE LEVEL 3	SAE LEVEL 4	SAE LEVEL 5
What does the human in the driver's seat have to do?	You are driving whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering			You are not driving when these automated driving features are engaged – even if you are seated in "the driver's seat"		
	You must constantly supervise these support features; you must steer, brake or accelerate as needed to maintain safety			When the feature requests, you must drive	These automated driving features will not require you to take over driving	
	These are driver support features			These are automated driving features		
What do these features do?	These features are limited to providing warnings and momentary assistance	These features provide steering OR brake/acceleration support to the driver	These features provide steering AND brake/acceleration support to the driver	These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met	This feature can drive the vehicle under all conditions	
Example Features	<ul style="list-style-type: none"> • automatic emergency braking • blind spot warning • lane departure warning 	<ul style="list-style-type: none"> • lane centering OR • adaptive cruise control 	<ul style="list-style-type: none"> • lane centering AND • adaptive cruise control at the same time 	<ul style="list-style-type: none"> • traffic jam chauffeur 	<ul style="list-style-type: none"> • local driverless taxi • pedals/steering wheel may or may not be installed 	<ul style="list-style-type: none"> • same as level 4, but feature can drive everywhere in all conditions



Autonomous mobility

- Sensoring the road (also collaborative mobility)

Sensorized, redundant and surrounding



Autonomous mobility

- Autonomous mobility increases the probability of permanent deformation in pavements.

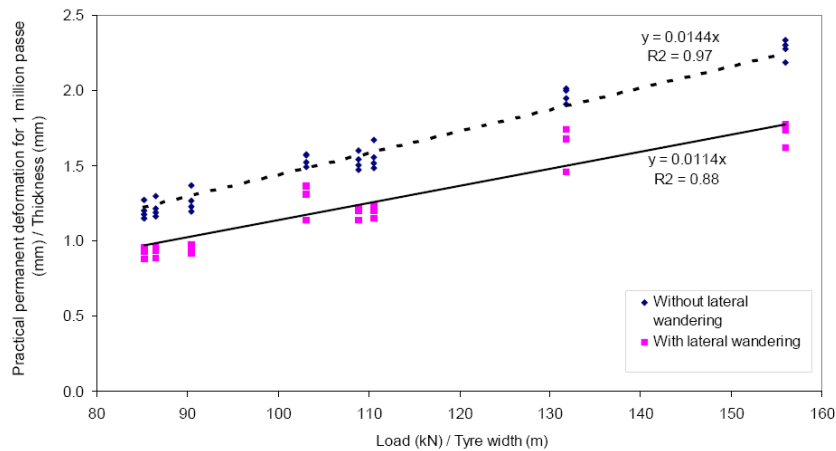


Figure 4.56 - Relation between practical permanent deformation rate, thickness of visco-elastic layers and load configuration for different tyres and structures.



Conclusions

- Dynamic charging of vehicles demands autonomous mobility.
- Autonomous vehicles increase the risk of rutting and permanent deformations of pavements.
- Collaborative mobility demands sensors embedded in the pavement (and road).
- This new paradigm demands durable roads to embed and protect technology and pavements of high stiffness to avoid rutting.



Smart Transportation Alliance

**THANK YOU
FOR YOUR
ATTENTION**

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