

Standard requirements for bike paths, is it worth?

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Kiwa KOAC B.V.

Trust
Quality
Progress



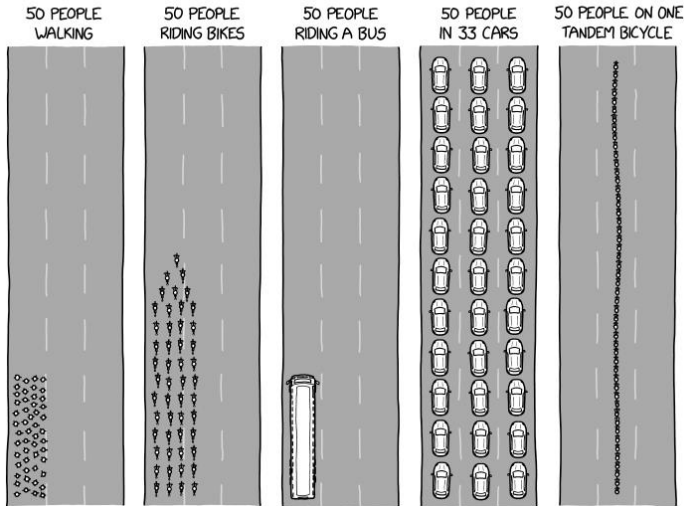
Summary

- The importance of cycling
- Overview on the current situation
- Do we need bike paths quality standards?
 - Focus on friction
- Conclusions



The importance of cycling

ROAD SPACE COMPARISON



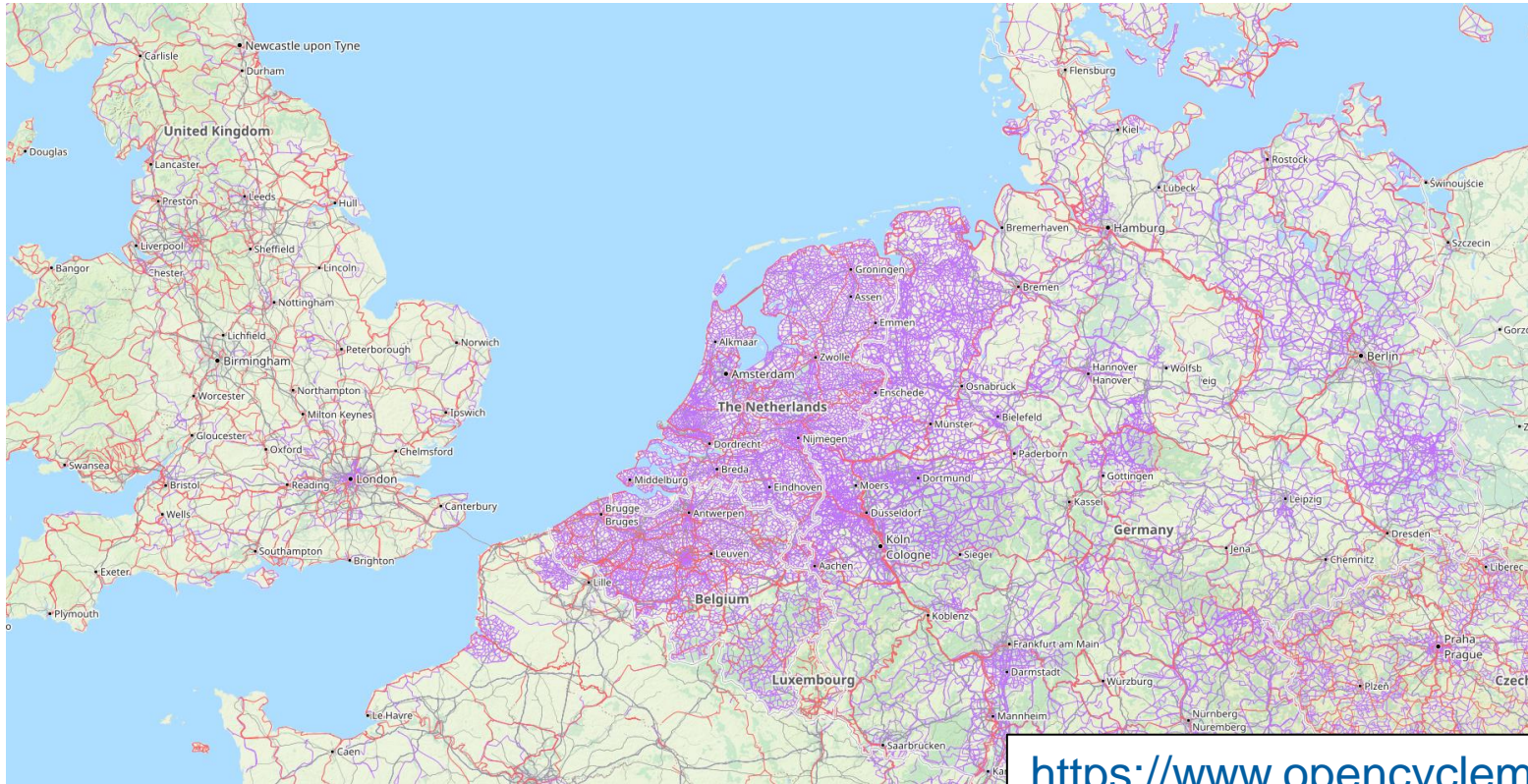
Benefit	Estimated Value (billion euros)
CO2 emissions savings	0.6 - 5.6
Reduction of air pollution	0.435
Reduction of noise pollution	0.3
Fuel savings	4.0
Longer and healthier lives	73
Less sickness absence at the workplace	5
Bicycle market	13,2
Cycle tourism	44
Easing of road congestion	6,8
Saving on construction and maintenance costs for road infrastructure for motorised vehicles	2,9
Total annual benefits	150 - 155 bn euros

Source: Steenberghen T. et al. 2017. Support study on data collection and analysis of active modes use and infrastructure in Europe

Space efficiency:

- 7 times more bikes than cars can cross a 3.5m-wide space
- 1 car park can fit 15 bikes

The importance of cycling



The importance of cycling

Many countries in Europe are trying to remove cars from the city areas.

- Infrastructures
- Bike sharing
- P+R

Company incentives to promote commuting by bike

Increased due to COVID-19

will_ita Following

Le strade per le auto vengono trasformate in *piste ciclabili*

Credits foto: @cars.destroyed.our.cities

Per ora la città di Parigi ha speso 250 milioni per creare nuove piste ciclabili e punta a raggiungerne un totale di 1.400 km entro il 2050



Nel 2021 aumentano del **7,4%** i km di piste ciclabili nei comuni capoluogo



fieradelcicloturismo

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DOMENICHE

CALENDARIO 2023



CICLABILI

ALLA RISCOPERTA DELLA LENTEZZA, DELLA SOSTENIBILITÀ, DEL TERRITORIO...SU STRADE CHIUSE AL TRAFFICO!

7 MAGGIO
VAL DI ZENA BIKE DAY
15 KM.

11 GIUGNO
ANELLO DI PIANURA
40 KM.

9 LUGLIO
GIRO DEI TRE LAGHI
BRASIMONE, SUVIANA,
SANTA MARIA,
60 KM.

24 SETTEMBRE
CIRCUITO MONDIALE
E AUTODROMO
DI IMOLA, 28 KM.

DOMENICHE CICLABILI



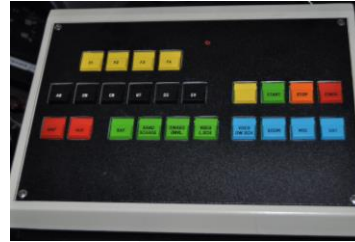
Current situation

Fietscomfortmetingen (NL):

- Comfort + Visual inspection
- Based on longitudinal profiles
- Vertical acceleration suffered from the user riding a bike

We saw many other examples;
Each country is developing their own standards

Comfort $\stackrel{?}{=}$ Safety?



Current situation

Different vehicles = different feelings,
different comfort!

Comfort $\stackrel{?}{=}$ Safety?



Speed pedelec



Speed pedelecs

A speed pedelec (or high-speed e-bike) is an electric bicycle with a maximum speed of 45 km/h. Due to the speeds they can reach, speed pedelecs are subject to the same regulations as mopeds. This means that a speed pedelec must be fitted with a moped registration plate in order to be able to use public roads, and the rider must have a moped driving licence.







Current situation

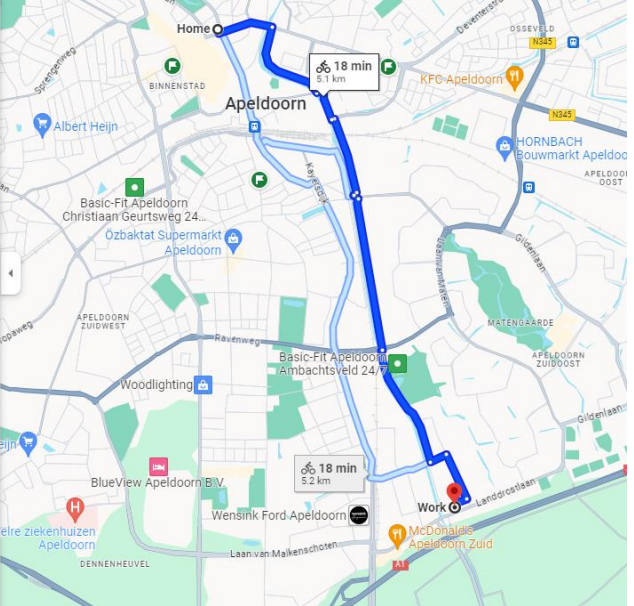
Different user perception and choice for the path:

- Mixed or separate
- Width
- Lighting
- Number of intersections
- Priority
- Cars nearby
- Directness
- Delays
- ...

Many choices withing the same time/distance!

Options	
 Send directions to your phone	
 via Deventerstraat	18 min 5.1 km
Details	
 via Stationsstraat	17 min 5.0 km
 via Kayersdijk	18 min 5.2 km
All routes are mostly flat	

Which one do I use?



The map shows three cycling routes from 'Home' to 'Work' in Apeldoorn. The routes are: 1) via Deventerstraat (18 min, 5.1 km), 2) via Stationsstraat (17 min, 5.0 km), and 3) via Kayersdijk (18 min, 5.2 km). The routes are highlighted in blue on the map. Landmarks like 'Basic-Fit Apeldoorn' and 'McDonalds Apeldoorn Zuid' are visible.

Do we need bike paths quality standards?

Do bike paths look like roads?

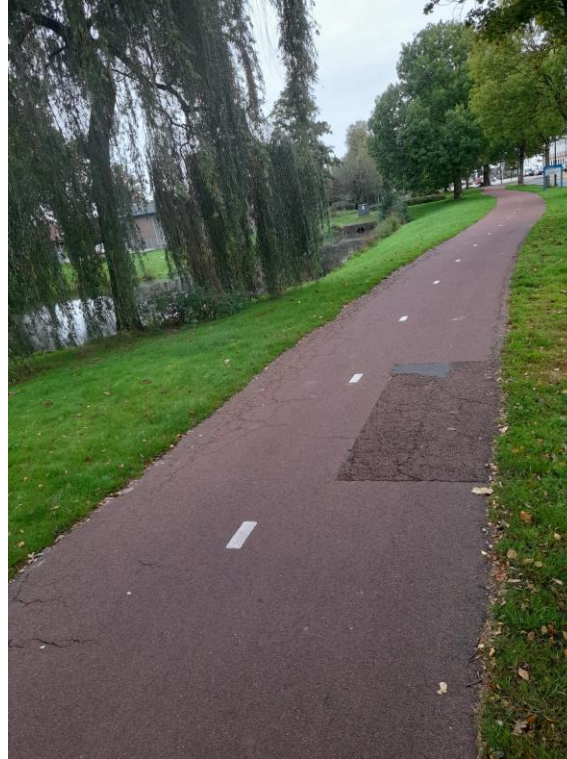
They share similar distresses:

- Cracks;
- Raveling;
- Patching;
- Roughness;
- Rutting?

“Random” wheel paths

How about friction?

Friction is connected to safety!



Do we need friction?

YES

- It allows us to move/stop
- Directly connected to safety

1. In January you find yourself standing in the middle of a frozen lake. The surface of the lake is a perfectly frictionless icy surface. Use your knowledge of physics to explain how you are able to reach shore of the lake and make it home for a steaming cup of hot chocolate.

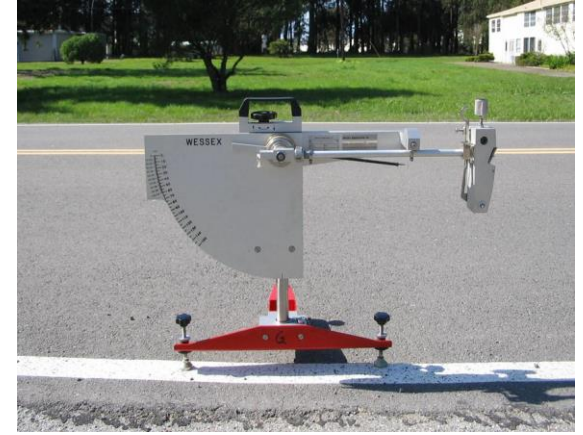
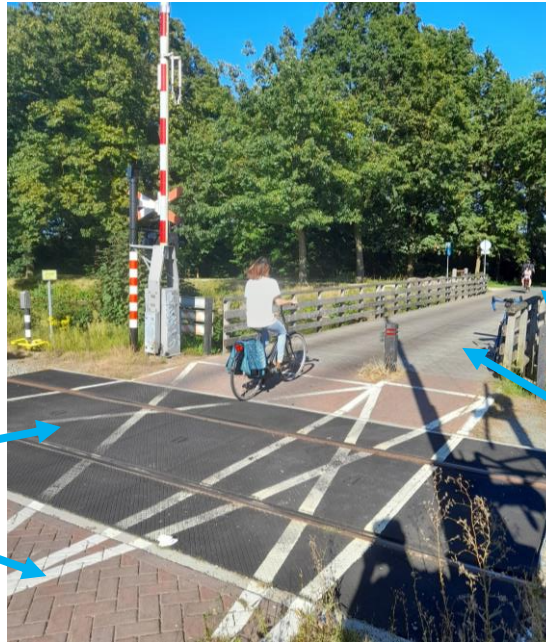


Do we need friction?

YES, but..

- Hard to measure
- A lot of different pavements
 - Single threshold for all surfaces?

Railroad crossing
Bricks



Asphalt
Wooden bridge

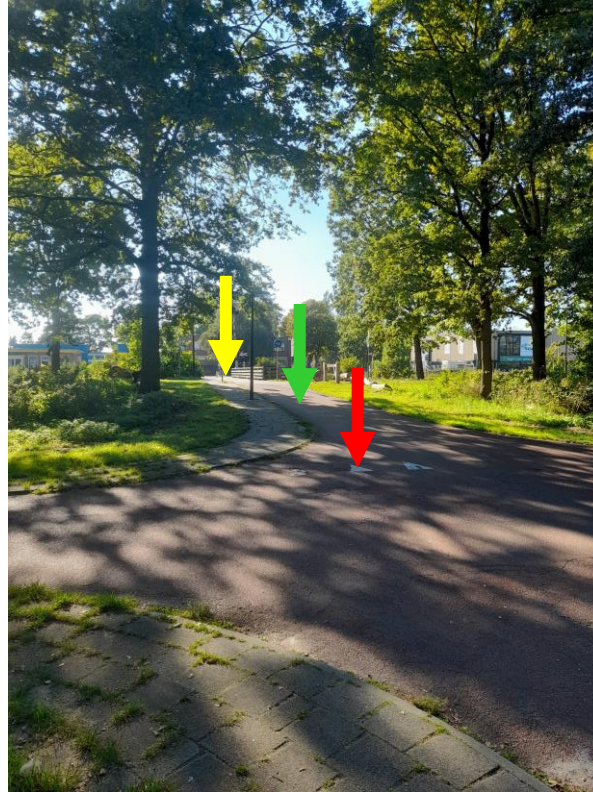
Do we need friction?

YES, but..

Worst spot on my bike path to the office:

- Wet wooden bridge
- Moisture (canal)
- Shadow
- Opposite slope

A little poor section is enough to cause a cyclist to fall!



Where do we measure friction?

Very hard to replicate real conditions, either with lab or on field testing

Do we need friction?

We only discussed about one of the two main components of friction;

What happens if we have a look on the other side?

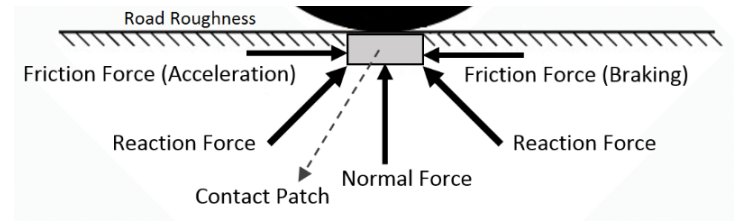
Tire properties:

- Minimum tread?
- Age?
- Pressure?

Breaking system efficiency?



Annual check for bikes?



Conclusions

It is indeed nice that we're investing a lot in bike infrastructures, both inside and outside urban areas;

Many benefits (environment, health, space and mobility..)

We want to ensure quality and safety, this task comes with some consequences:

- Which parameter?
 - Comfort? Friction?
- Where/how do we measure it?
- One threshold for all surfaces?
- How about tires?

Perhaps it is better to focus on different parameters such as roughness or similar





Thank you!