

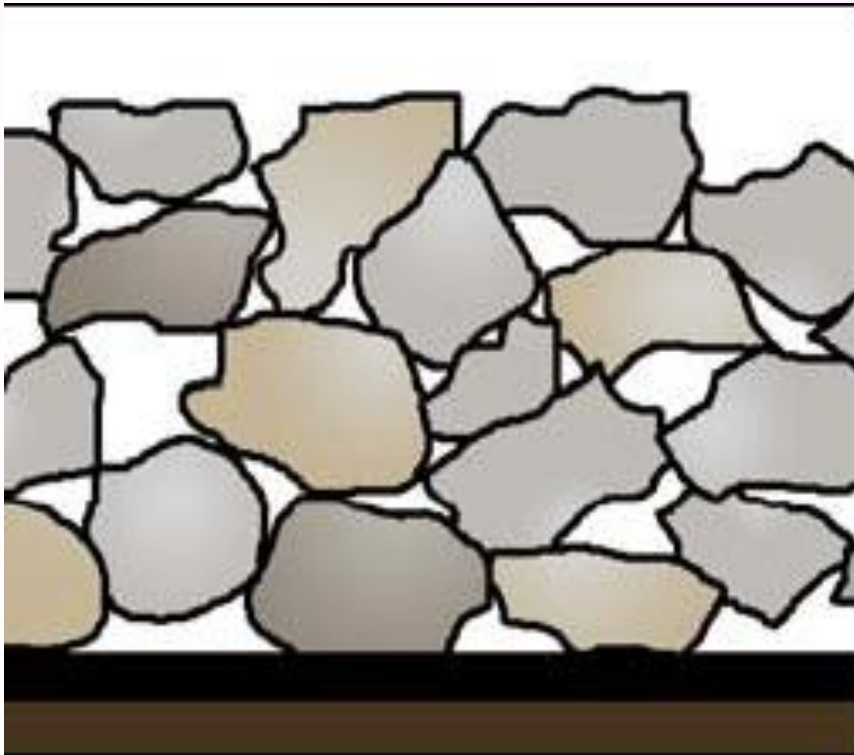
CITYHUSH

Low noise road surfaces in city cores

WP 3.3

Low noise pavements

Traditional solutions



Porous asphalt

One layer

Void content

> 20 %

Effect 4–6 dBA

(New pavement)

Low noise pavements

Traditional solutions



Porous asphalt

Two layers

Void content
> 20 %

Effect 7-9 dBA
(New pavement)

Low noise pavements

Traditional solutions

- These traditional solutions with high porosity (void content) are very efficient
- But there is one big disadvantage
- **Clogging from dust and particles**

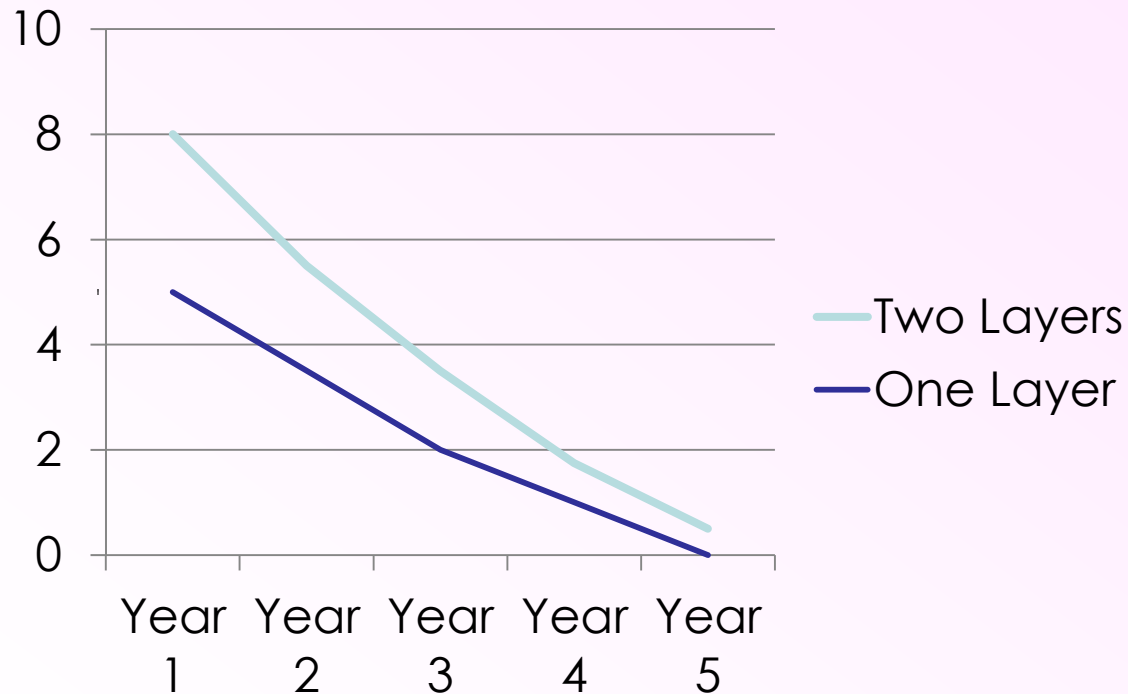
Low noise pavements

Traditional solutions

Effect of clogging

dBA reduction

Effect is especially serious on low-speed roads



Don't fix on the figures – this is just to show the principle

CityHush WP 3.3

Creating a low noise road surface for inner
city use

The Smooth dense road surface for the
inner city application.

A little less effect (as new)

but a longer effecient life

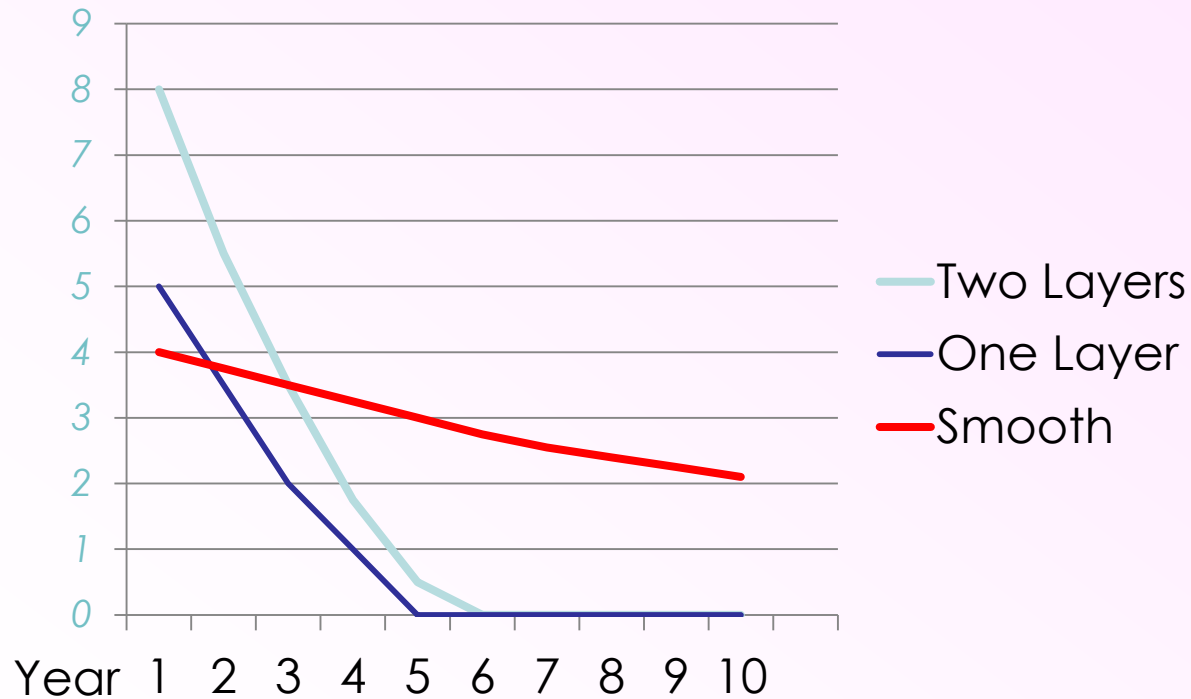
Low noise pavements

Smooth dense road surface

Effect of clogging

dBA reduction

Effect is especially serious on low-speed roads



Don't fix on the figures – this is just to show the principle

Low noise pavements

Smooth dense road surface


Thickness

- Two layers porous asphalt 90 - 100 mm
- One layer porous asphalt 40 - 50 mm
- Smooth dense asphalt 20 - 25 mm

The “Smooth” dense road surface

- Smoothness = surface roughness (texture)
 - controlled by grading (incl maximum stone size) and mastic content in the asphalt mix

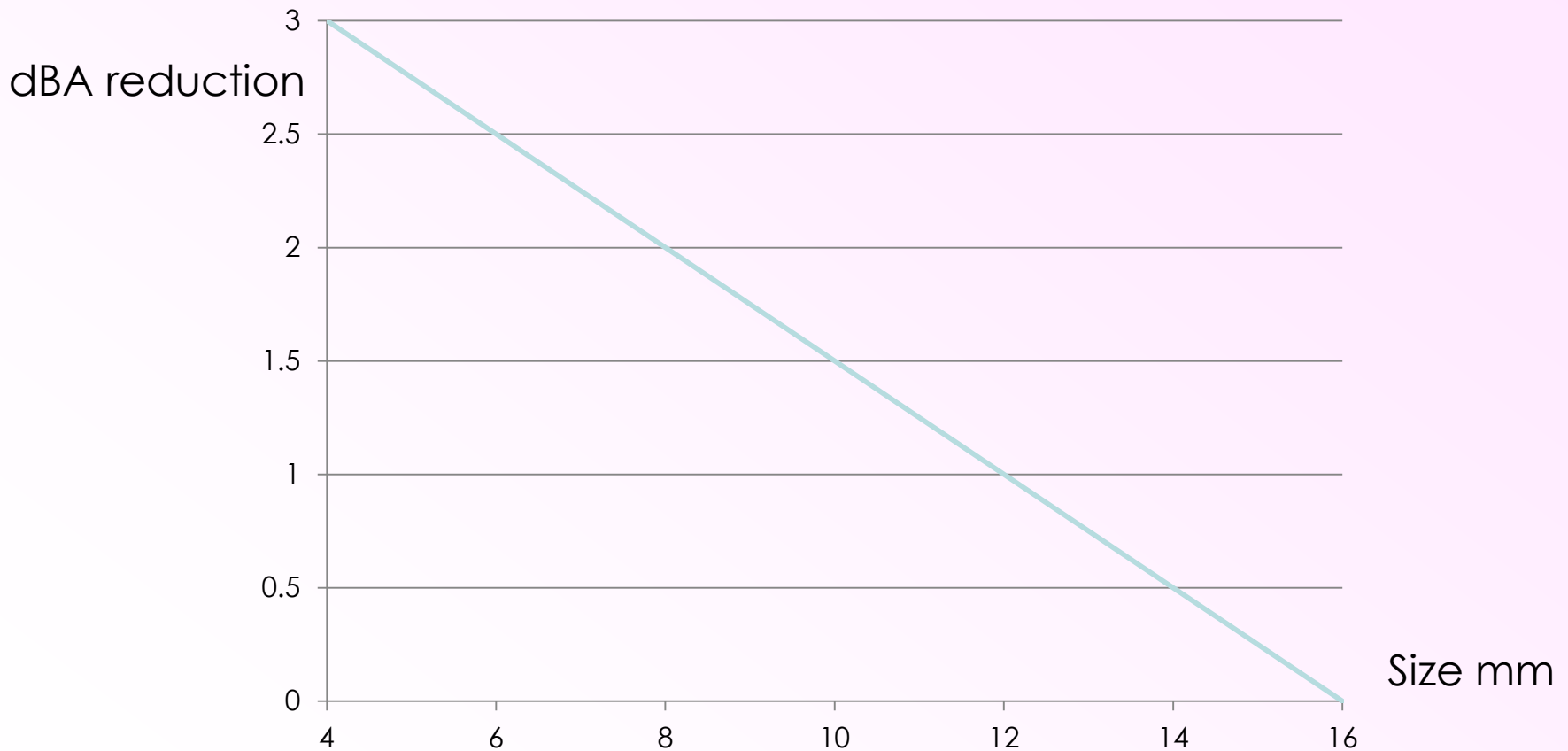
The “Smooth” dense road surface



What is the optimal surface roughness
(texture)?

And how do we describe (define) it?

Aggregate maximum size Influence on noise



Surface roughness

Traditional measurement methods

- Sand-patch
 - Texture depth
- MPD
 - Mean Profile Depth

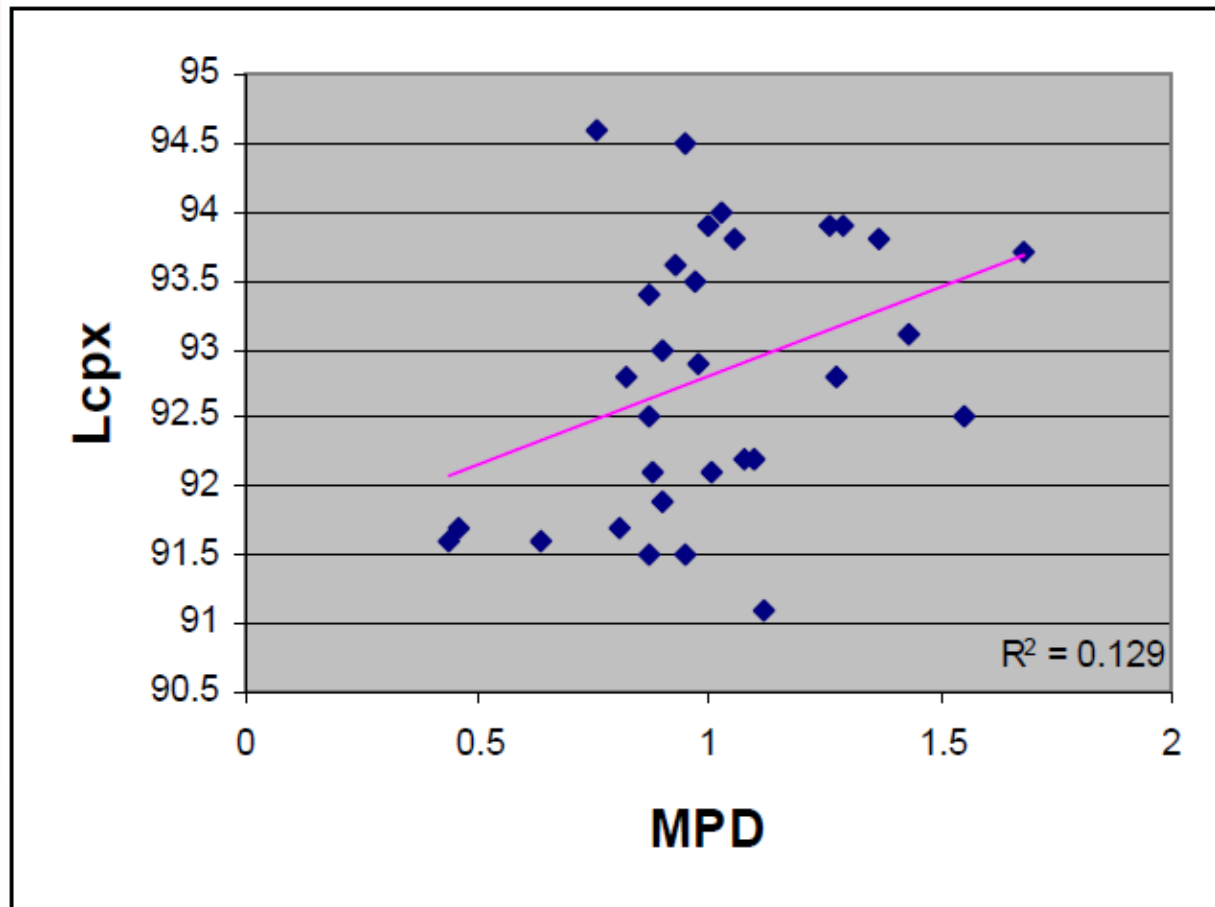


Surface roughness

Traditional measurement methods

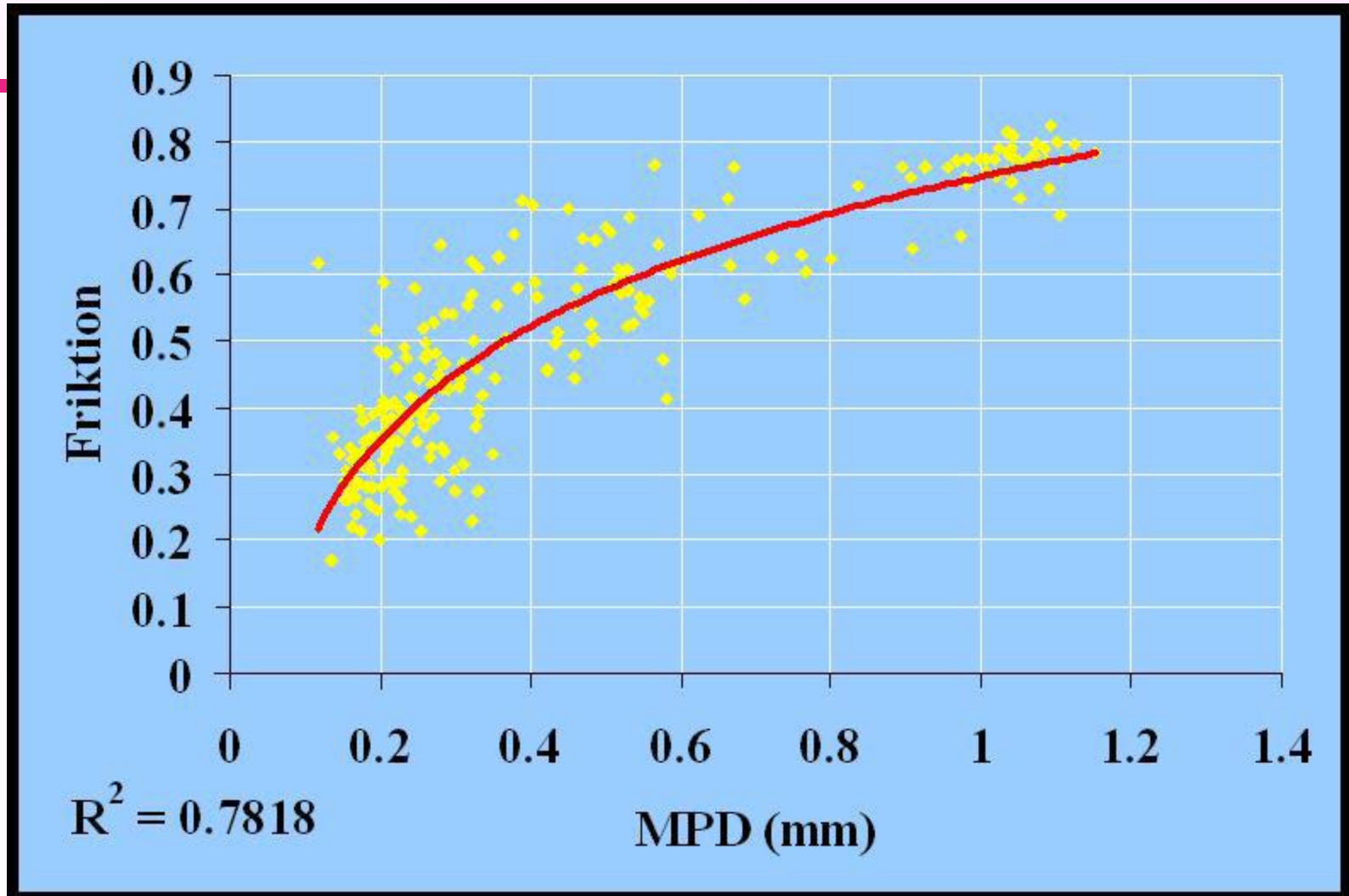
- Texture depth as average values in mm

Correlation MPD - Noise



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How smooth - Friction



Surface roughness Profiles

Bad



Good



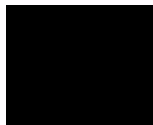
Road roughness measurements

A roughness meter for laboratory and field measurements have been developed.

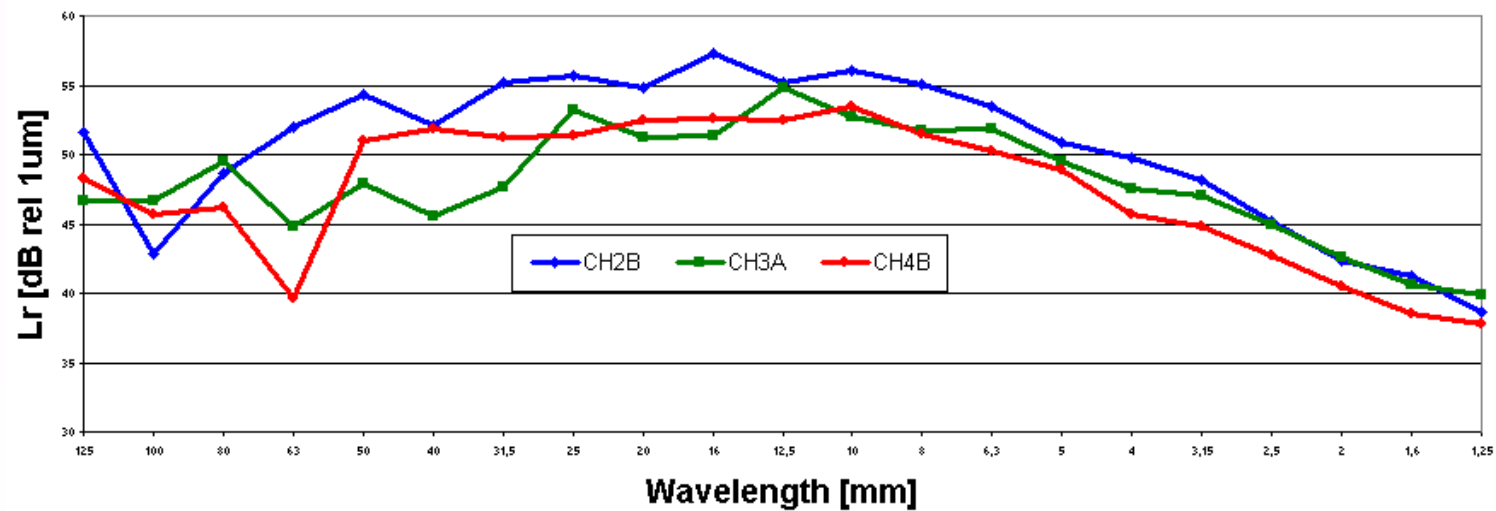
- ▲ Resolution up to 1/10 of a millimetre
- ▲ Controlled by Visual Basic software.
- ▲ Maximum measurement length is 180x180mm
(Enough for tyre/road noise)



[Roughness meter.avi](#)



Road roughness measurements

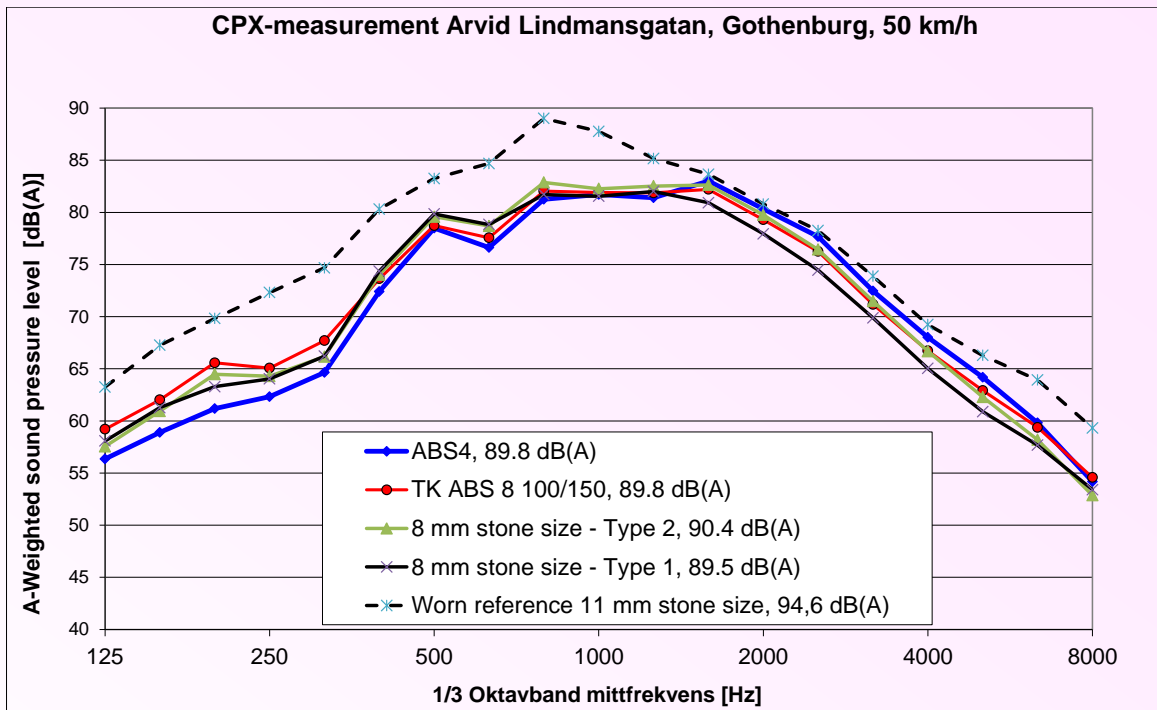


WP 3.3 – CPX-measurement in Gothenburg

The CPX-measurement indicate a noise reduction of 5 dB(A) units at 50 km/h compared to the worn reference.

The two tested road surfaces with 8 mm max stone size differs 1 dB(A) unit.

The tested road surface with 4 mm max stone size gives lower levels at low frequencies but higher at high frequencies.

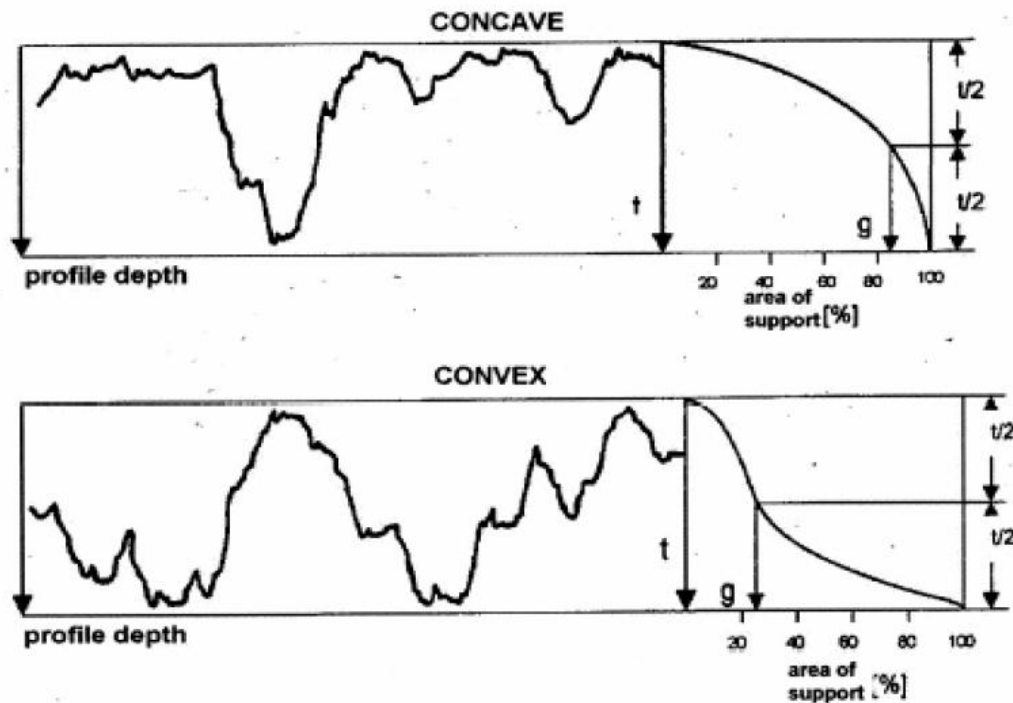


Profile and CPX-measurements



Surface roughness Profiles

Pos. / neg. Texture *(rpt M+P.MVM.99.3.1 rev 1)*



Concave and convex profiles and their shape factor g.

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Product from WP 3.3

**Directions for optimization of profile
(surface roughness) for noise
reduction for
Smooth dense surfaces**

WP 3.3

Thank you for your
attention