

# Development of a Low Noise Road Surface for Inner City Areas

Stockholm, December 11, 2012  
CityHush Dissemination  
Presented by Martin Höjer



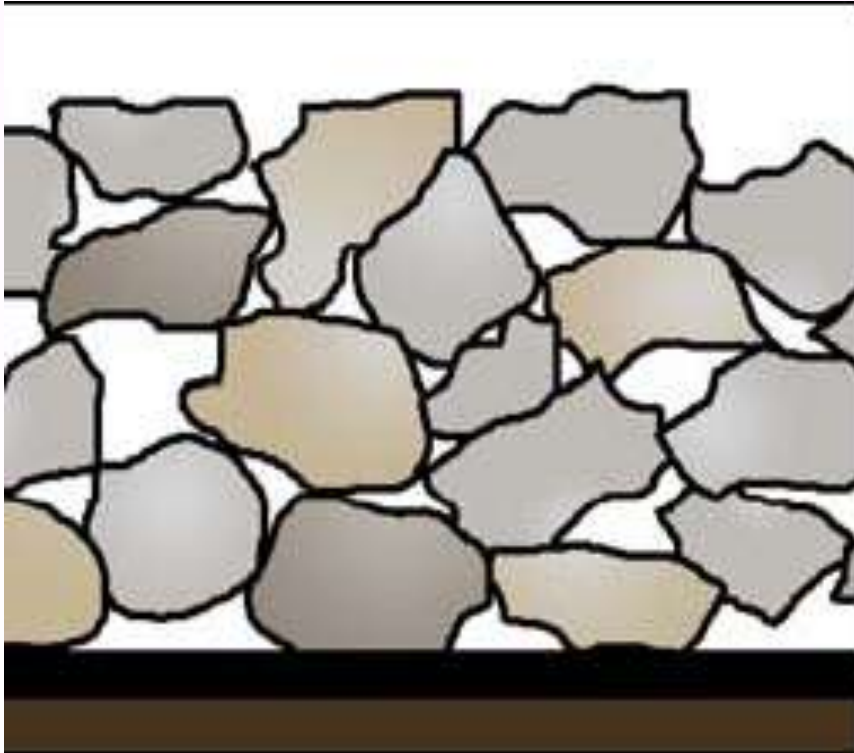
# CityHush project WP3.3

Development of a low noise road surface...

- Partners involved:
  - NCC Roads AB, Sweden
  - Trafikkontoret Göteborg, Sweden
  - Tyréns AB (Acoustic Control AB), Sweden

# 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

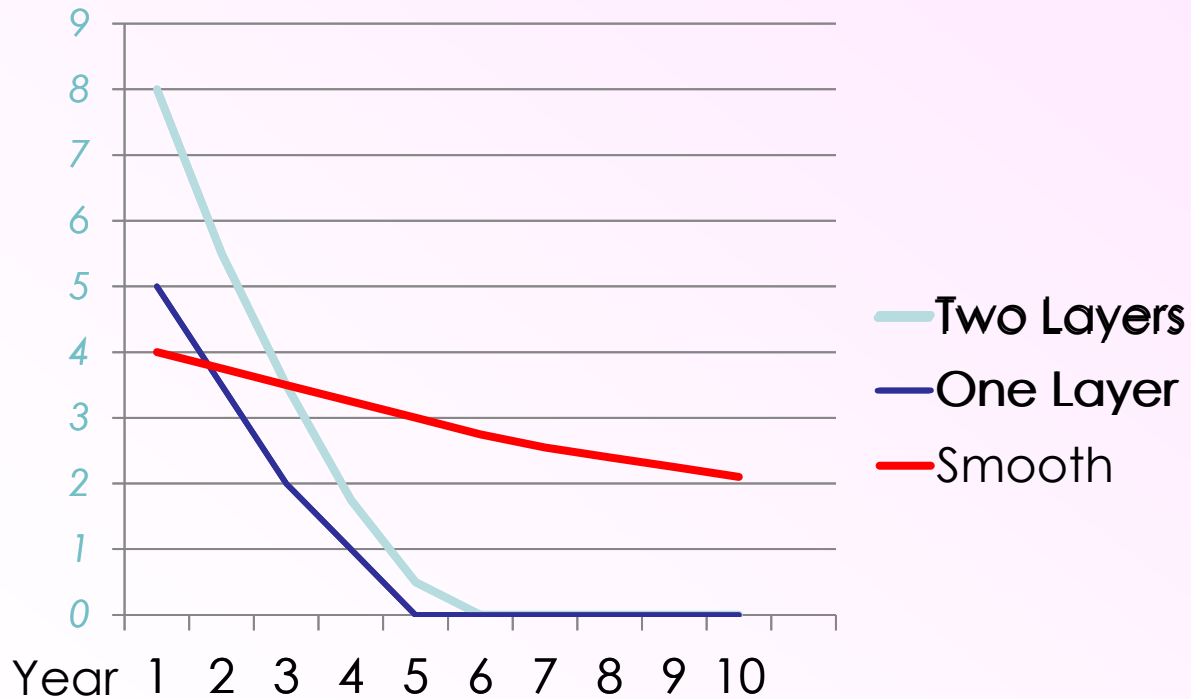
- These traditional solutions with high porosity (void content) are very efficient
- But there is one big disadvantage
- **Clogging from dust and particles**  
(especially serious on low-speed roads)

# Low noise pavements

## Smooth dense road surface concept



Typical noise reduction [dB(A)]

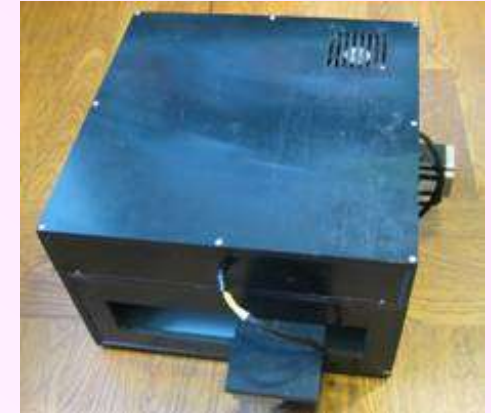
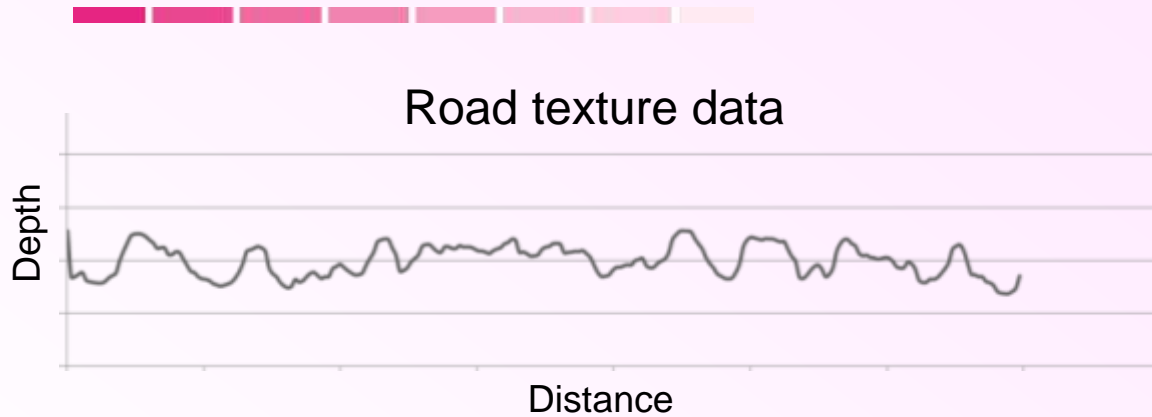


Don't fix on the figures



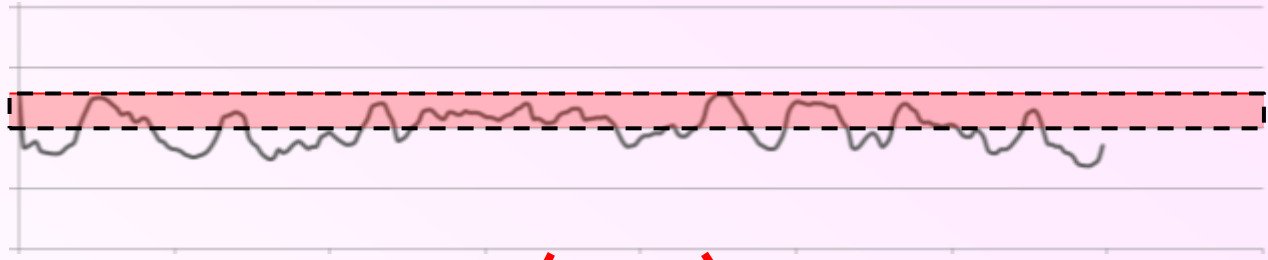
# Road texture measurements

## Two-dimensional laser scanner



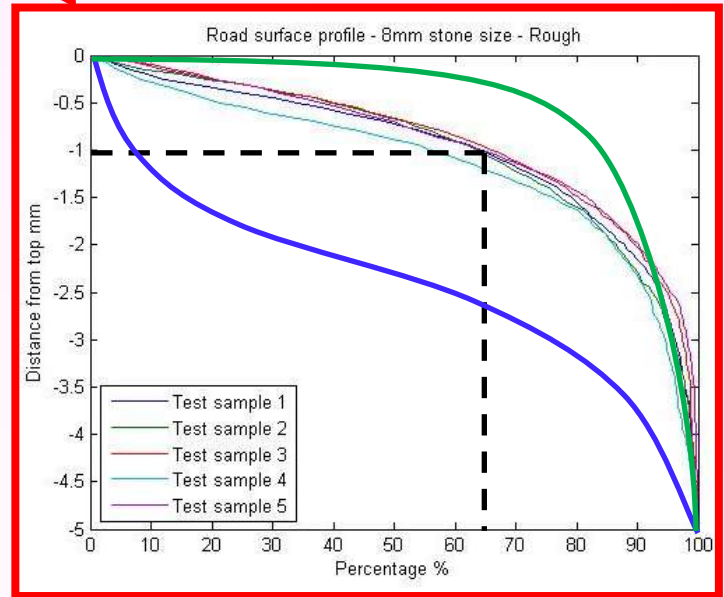
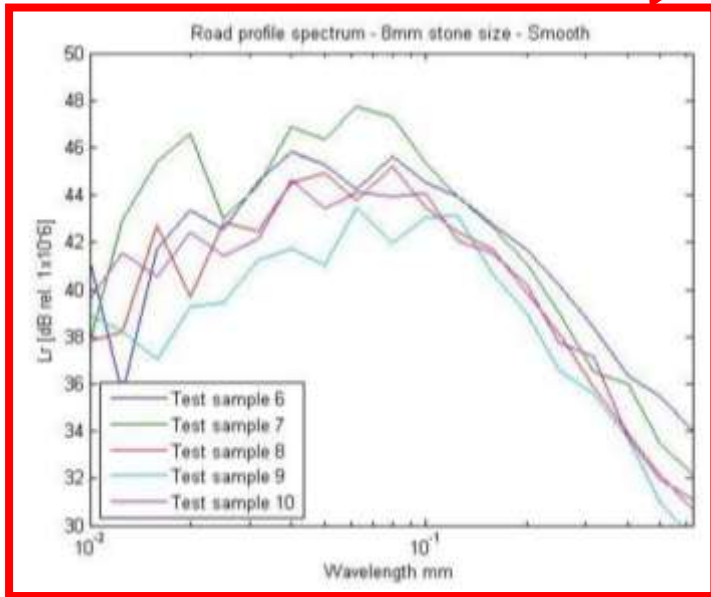
# Road texture measurements

## Definition of the road texture spectrum



Road texture spectrum

Road texture profile





# Project plan

- Laboratory tests on 150 mm test samples
  - In particular surfaces with 8 mm maximum stone size was studied.
  - Profile measurements using a laser scanner
- Field tests in Gothenburg
  - Profile measurements
  - Noise measurements using the CPX-method
- More laboratory tests
- More field tests in Gothenburg.
  - Arvid Lindmans Gata

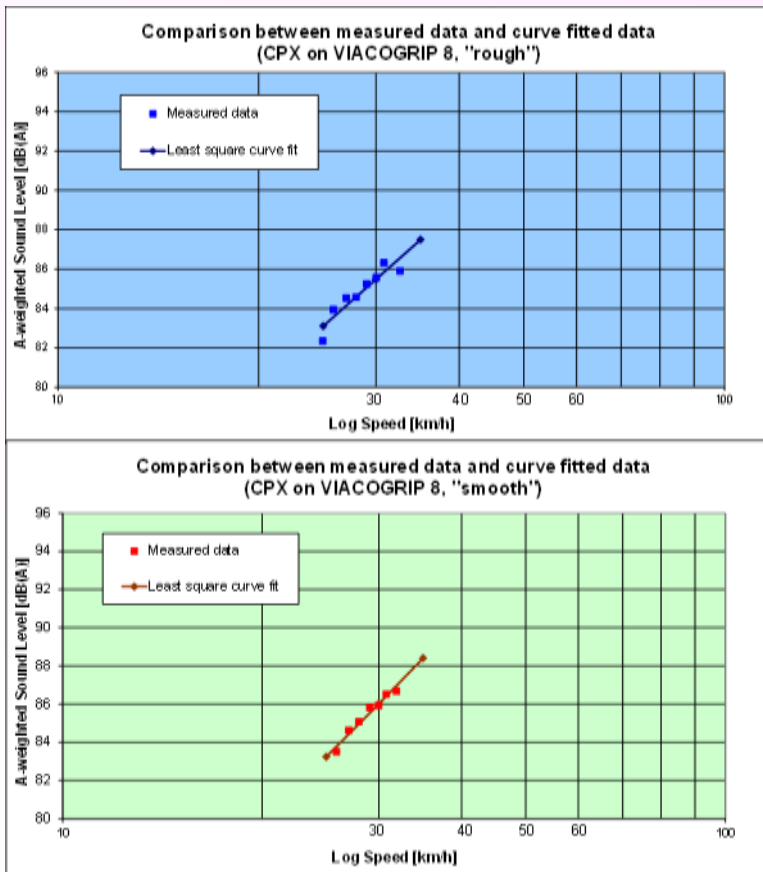
# Validation in Gothenburg

## Questions to answer

- Is it possible to reproduce the texture from the laboratory in field production?
- Will there be any noise reduction?
- (Is the texture sustainable over time?)

# Validation of results

## CPX-measurements using the single wheel trailer



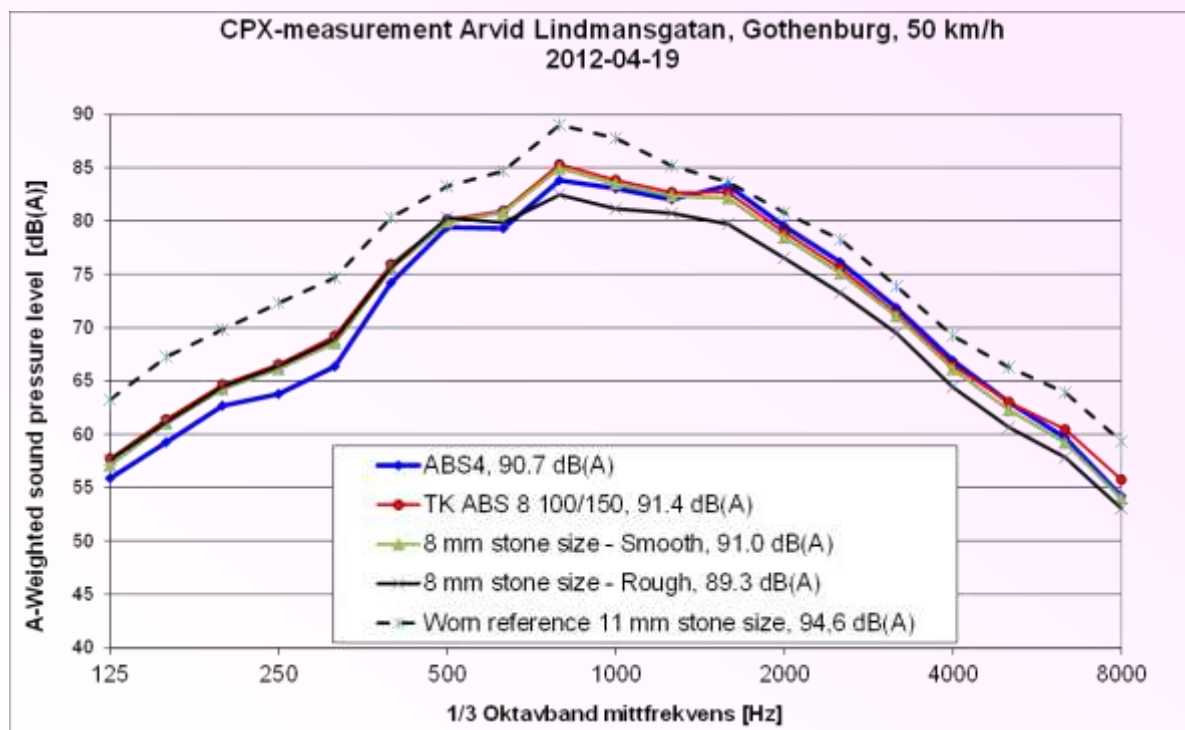
# Validation of results

## CPX-measurements at Arvid Lindmansgatan



# Validation of results

## CPX-measurements using the single wheel trailer



Measurements after 6 months later.

(smooth): - 0.4 dB(A)  
(rough): **-2,1 dB(A)**

(Relative a new 8mm reference road surface)

# Validation of results

## Road texture, Arvid Lindmansgatan



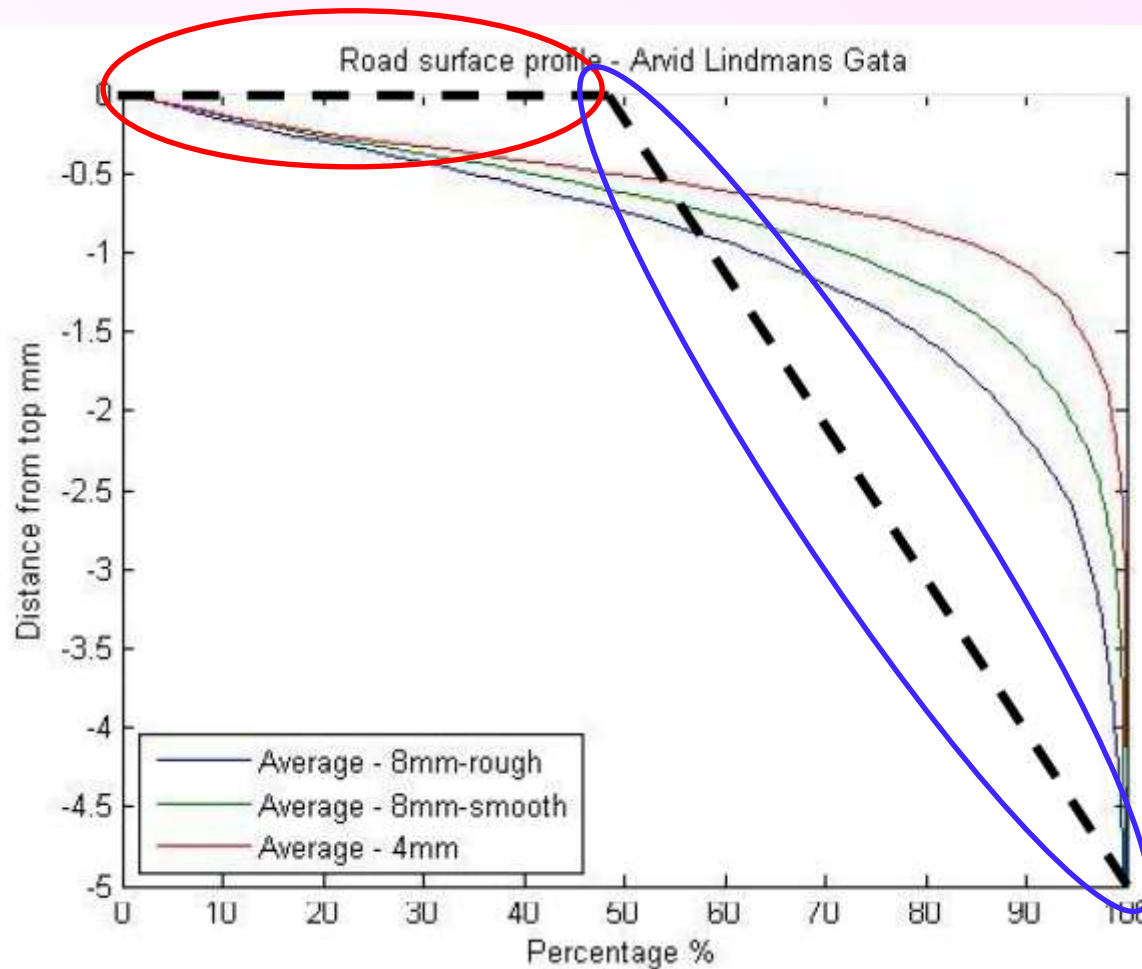
# Validation

## Questions to answer

- Is it possible to reproduce the texture from the laboratory in field production?
  - Yes it is possible! (In the beginning the “real” texture is covered with bitumen etc.)
- Will there be any noise reduction?
  - About 2 dB(A) noise reduction has been achieved compared to a new road surface with 8mm maximum stone size.
- (Is the texture sustainable over time?)
  - Time will tell.

# Conclusions

## Findings from the CityHush project



Smooth surface giving a good support for the tire

Enough roughness that allows for leakage effects between the stones.



# Low noise pavements

## Smooth dense road surface

### Typical road thickness

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

Reduced thickness => reduced cost

Thank you for you attention!

Martin Höjer

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