Transmitted by the expert from the Netherlands

Informal document **GRB-60-04-Add.1**
(60th GRB, 1-3 September 2014,
agenda item 10)

Quiet road surfaces

Eurocities - working group noise

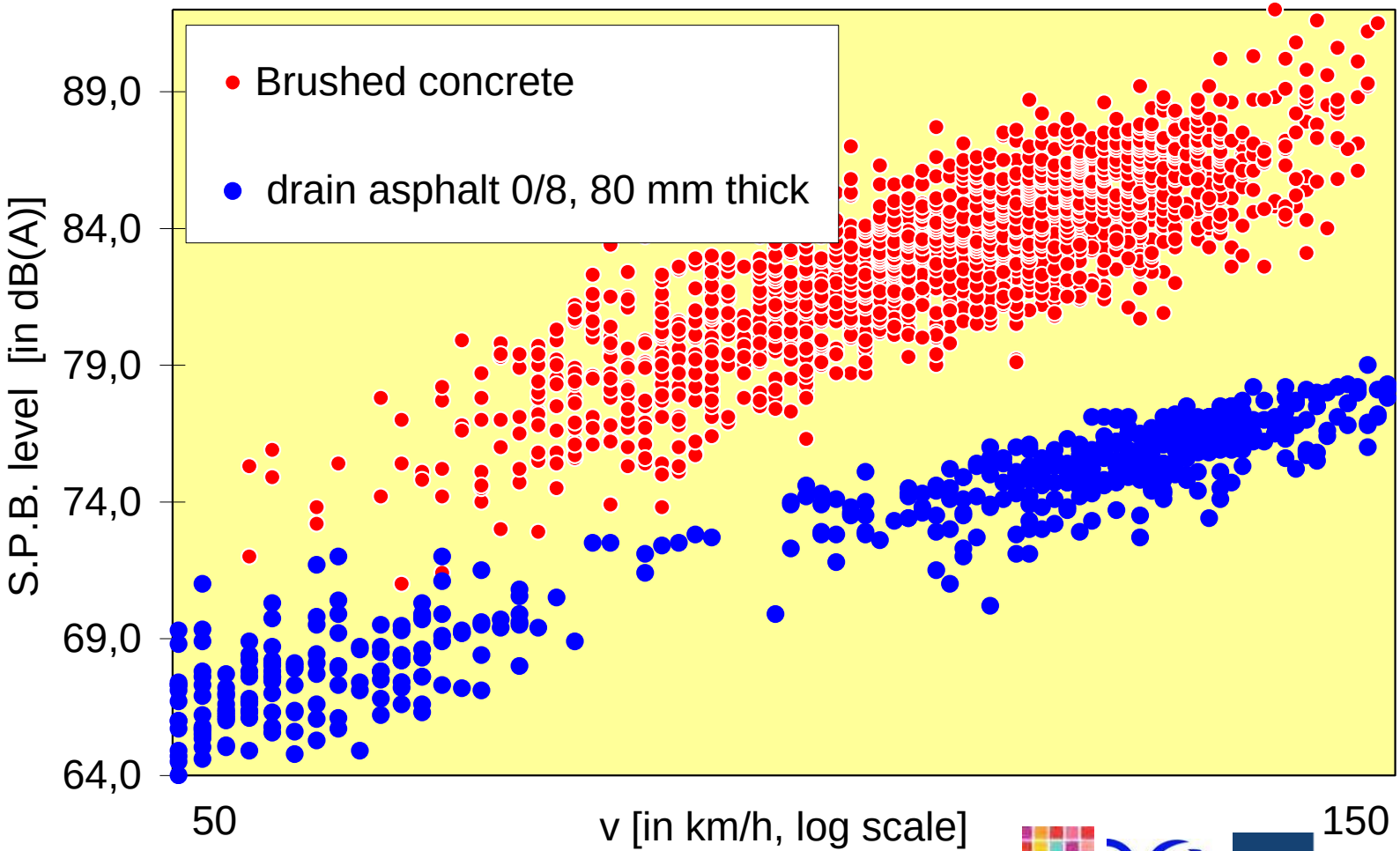
Chair: Henk Wolfert

Source distribution

	Rolling noise (%)	Propulsion noise (%)
Car @ 25 km/h	50	50
Car @ 70 km/h	90	10
Truck @ 25 km/h	20	80
Truck @ 70 km/h	50	50

- In urban areas cars dominate vehicle fleet
- In urban driving rolling dominates overall noise production
- > 80% of total environmental noise produced is rolling noise

Road surface type explains most of observed pass-by level difference

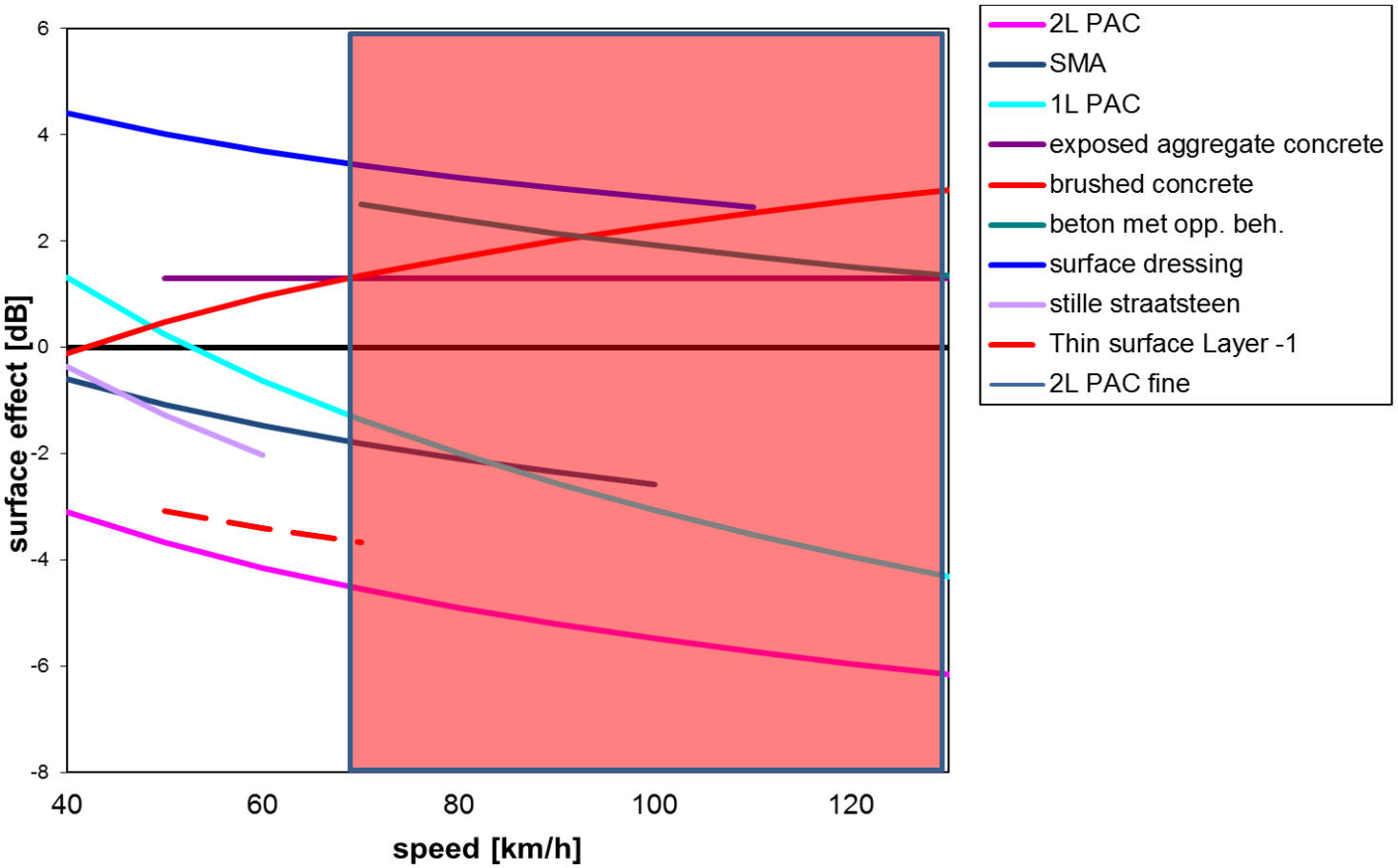


Rolling noise = road X tyre

- Tyre tread profile X road surface **texture** excite tyre structure
- Vibrating tyre structure radiates noise
- Rolling noise **propagates** over road surface (but also propulsion noise)

- Road surface type is decisive for ambient noise level

Road surface effect (rel. to DAC 0/16): cars between 40 and 70 km/h

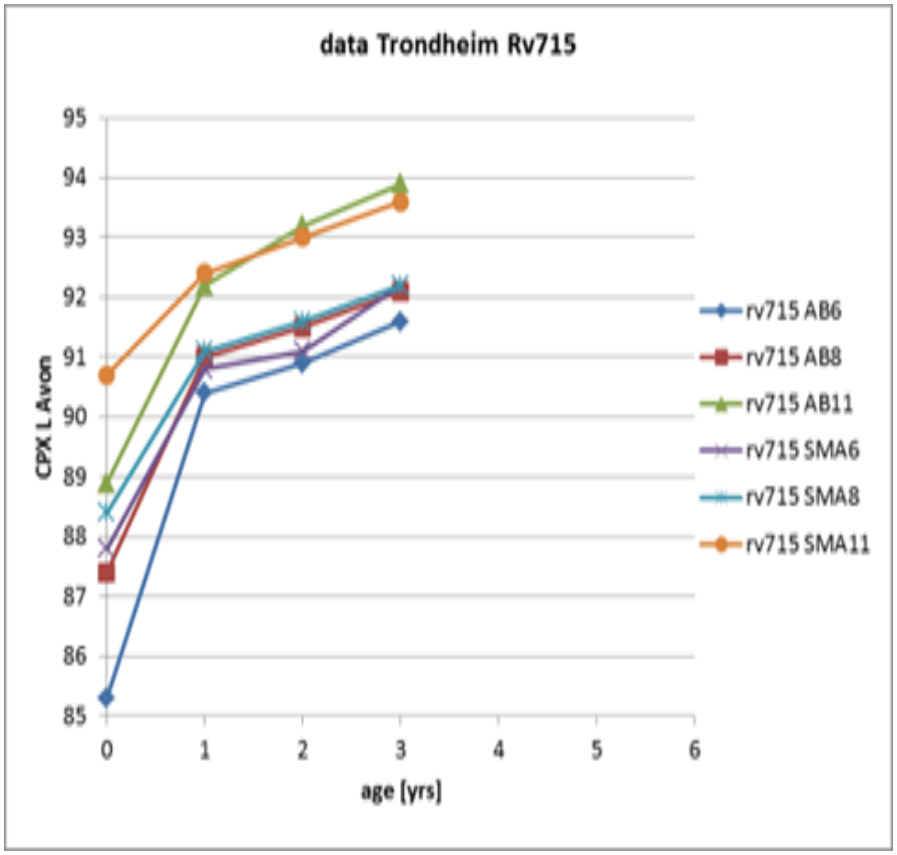


Aspects of Quiet Road Surface Application in cities

- Magnitude of reduction
  - Depends of traffic speed
  - Depends on traffic composition
- Wear and durability
  - Free flowing or stop & go traffic
  - Straight driving or turning
  - Winter maintenance
- Costs vs. Benefits

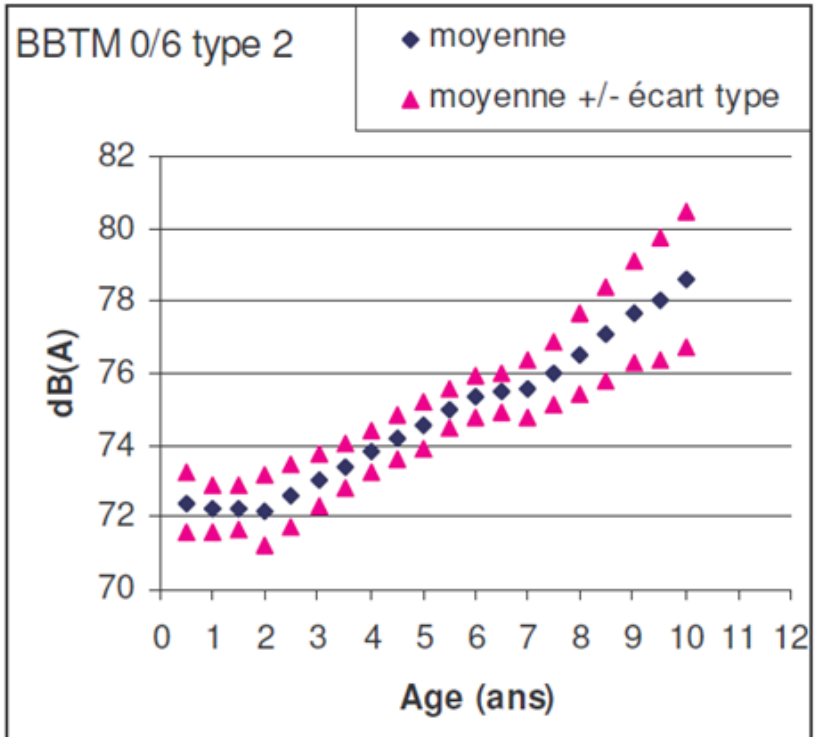
Durability in N, SE and SF

- Trials in Finland and Norway not successful
  - service life <3 yr.
  - >4 dB level increase in 1 yr.



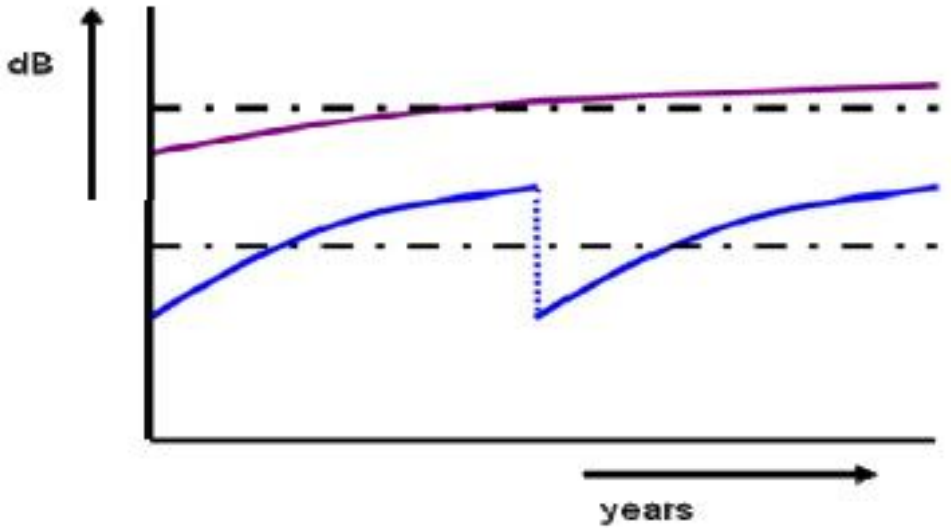
Durability in mainland Europe

- Trials partly successful
  - Very open wear quickly, especially at crossings
  - Partly open wear moderate (after 8 yrs still 50% functioning)
  - ≈ 4dB loss after 7 yrs.



Evaluation of reduction effect

- Takes into account :
  - Aging of reference surface
  - More frequent re-surfacing
  - Average over several cycles

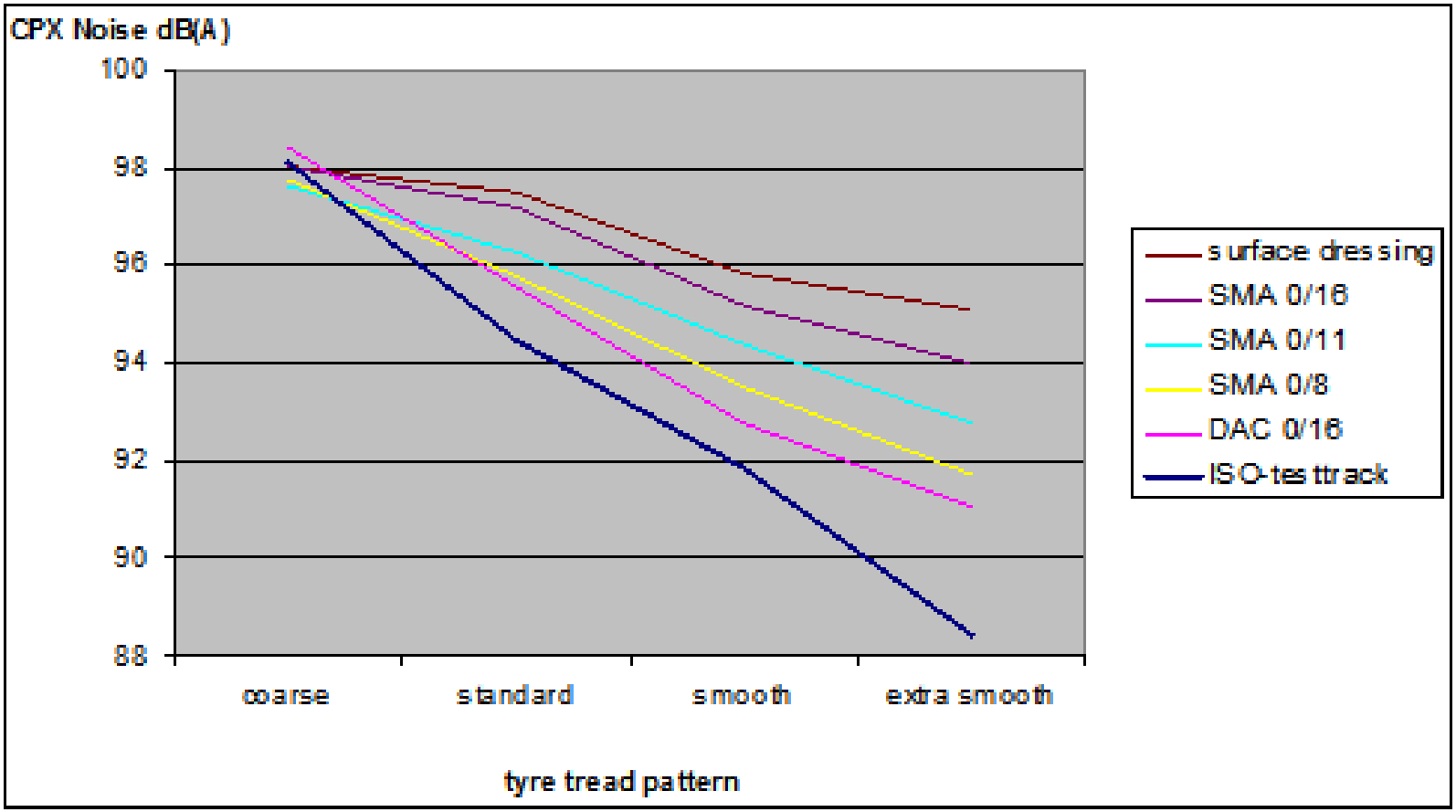


Cost & benefits

- Costs of noise reducing road surfaces often higher than conventional road surfaces
  - Cost of construction is higher
  - Lifetime is less
  - More maintenance necessary

- Cost/benefit ratio still better than other noise reducing measures like façade insulation and noise barriers

Smooth road surfaces amplifies low noise tyre effect



Conclusion

- Low noise road surfaces valuable measure to reduce traffic noise
- In general positive C/B ratio
- Application shall be engineered with knowledge of limitations
- Win-Win with other noise reducing strategies; especially low noise tyres

Application for highways

- Will be presented next GRB
- By Wiebe Albers, chair of CEDR noise working group