

SILVIA

Sustainable Road Surfaces for Traffic Noise Control

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Greener, safer
and smarter
road transport
for Europe



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TRA



Sustainable Road Surfaces for Traffic Noise Control

EUROPEAN COMMISSION

DG TREN - FP5 - GROWTH

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(01 September 2002 - 31 August 2005)

Problem

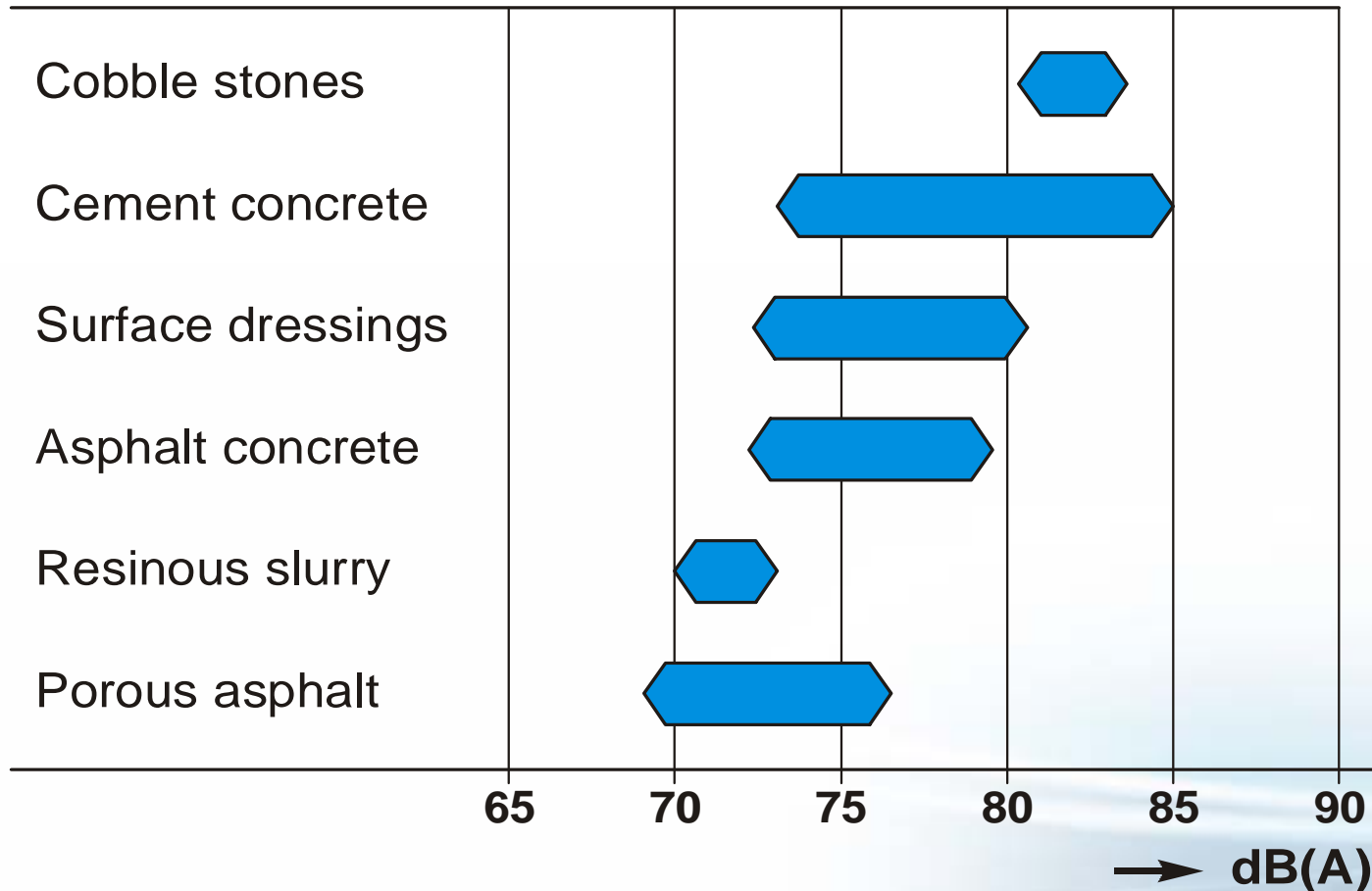


- Threshold of annoyance:
- Threshold of unacceptability:

55dBA

65dBA

Car pass-by noise at 80 km/h



Objective

To provide decision-makers with a tool allowing them to rationally plan traffic noise control measures, including low-noise road surfaces.



Partnership

BASt	Germany
BRRC	Belgium
CROW	Netherlands
DTF	Denmark
DWW	Netherlands
INRETS	France
ITALGRIP	Italy
LCPC	France

M+P	Netherlands
SKANSKA	Sweden
TØI	Norway
TRL	Great Britain
TUG	Poland
TUW	Austria
VTI	Sweden

Classification



- Classification scheme, type approval procedure and Conformity-Of-Production criteria
- Measurement methods to determine acoustic quality of road surfaces
- Certifying equipment for conformity testing
- Use of models to relate acoustic performance to surface characteristics

Cost / Benefit Analysis

- Evaluate safety aspects of low noise road surfaces
- Evaluate sustainability aspects of low noise road surfaces
- Conversion of all relevant impacts to monetary terms
- Development of a calculation procedure for cost-benefit analysis

Cost / Benefit Analysis

- Costs of travel time
- Vehicle operating costs
- Road accident costs
- Costs of traffic noise
- Costs of air pollution
- Costs of renewing road surface

Project costs - road surfaces - € for given road length and road width (present value)									
Alternative	Investment (layer)	Investment (Drainage)	Maintenance (Writers)	Maintenance (Cleaning)	Maintenance (Clean pipes)				
Alternative 0	316,554	0	54,485	0	0				
Alternative 1	740,072	210,611	83,024	20,756	50,917				

Noise/environmental/accident/insecurity/time/veh.operation costs to society - marginal costs per vehicle km - € - Alternatives 0, 1a. (From calculation sheets 0 and 1a)									
Alternative	Noise	Local air pollution	Global air pollution	Accidents	Insecurity	Time	Vehicle operation	Sum total	Speed km/h
Alternative 0	0.017	0.063	0.014	0.102	0.014	0.278	0.158	0.647	70
Alternative 1a	0.010	0.063	0.014	0.102	0.014	0.278	0.158	0.639	70

Noise benefits to society (reduced noise costs) - calculated € value for estimated dB(A) change per household per year - Alternatives 1b, 2, 3		
Alternative	Average noise reduction in expected life time - dB(A)	Noise benefits per dwelling per year
Alternative 1a	4.3	€ 789
Alternative 1b	5.0	€ 474
Alternative 3	9.0	€ 2,249

CBA results - relative to Alternative 0 (that is, additional benefits and costs compared to baseline alternative)									
	Alternative 1a low-noise asphalt (benefits all effects)		Alternative 1b low-noise asphalt (benefits noise)		Alternative 2 barrier (plus ev. ins.) (benefits noise)		Alternative 3 insulation (benefits noise)		
	€/year	€/project	€/year	€/project	€/year	€/project	€/year	€/project	
Benefits	70,880	574,683	315,713	2,559,742	426,212	3,455,652	899,781	7,295,265	
Costs, investments	78,212	634,129	78,212	634,129	171,768	1,392,667	246,675	2,000,000	
Costs, operations/maintenance	12,360	100,213	12,360	100,213	2,200	17,837	0	0	
Tax-cost factor	18,114	146,868	18,114	146,868	34,794	282,101	49,335	400,000	
Benefits - Costs (net benefit)		-306,527		1,678,532		1,763,047		4,895,265	
Benefit-cost ratio		0.65		2.90		2.04		3.04	
Net benefit-cost ratio		-0.35		1.90		1.04		2.04	
Total project cost per dwelling			272	2,203	522	4,232	740	6,000	
Project costs per dB(A) reduction per dwelling			64	518	104	846	82	667	

Sustainable Solutions

- State-of-the-Art from existing data on noise, safety, rolling resistance, maintenance, recycling and costs
- Measurements on new sections with promising characteristics
- Durability:
 - ▶ Measurements on old sections where historical data is available
 - ▶ Evaluation of laboratory test methods



Integrated Measures

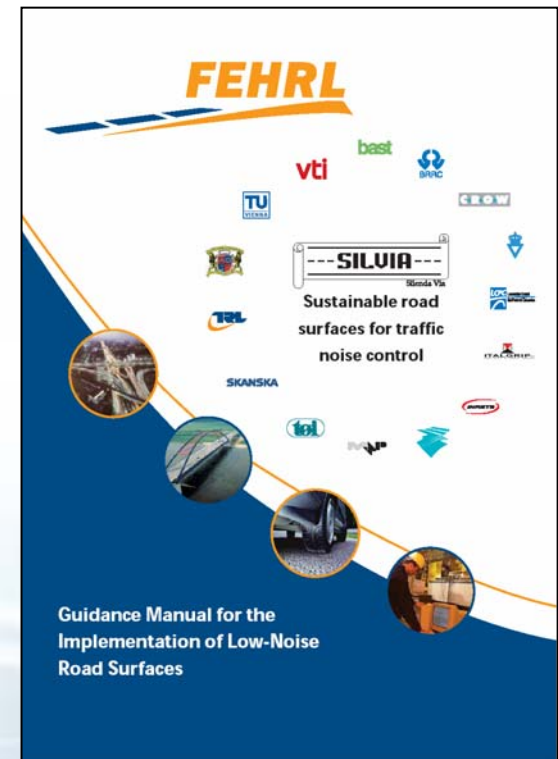
- Combination of pavement and tyre design
- Taking local conditions into account
- Traffic management measures
- Combinations of low-noise pavements with barriers and earth mounds



Guidance Manual 'Implementation of Low-Noise Road Surfaces'

Contents

- Overview of vehicle/tyre/road noise
- Guidance on acoustic measurements
- Noise classification procedures
- Equipment certification procedures
- Lifetime acoustic performance of surfacings
- Compared effectiveness of noise control measures
- Cost-benefit analysis
- Advice for road administrations
- Assessment of road surfaces for traffic noise control
- Literature compilation
- CD-ROM with full technical details



Web site

Free download from:

www.trl.co.uk/silvia

