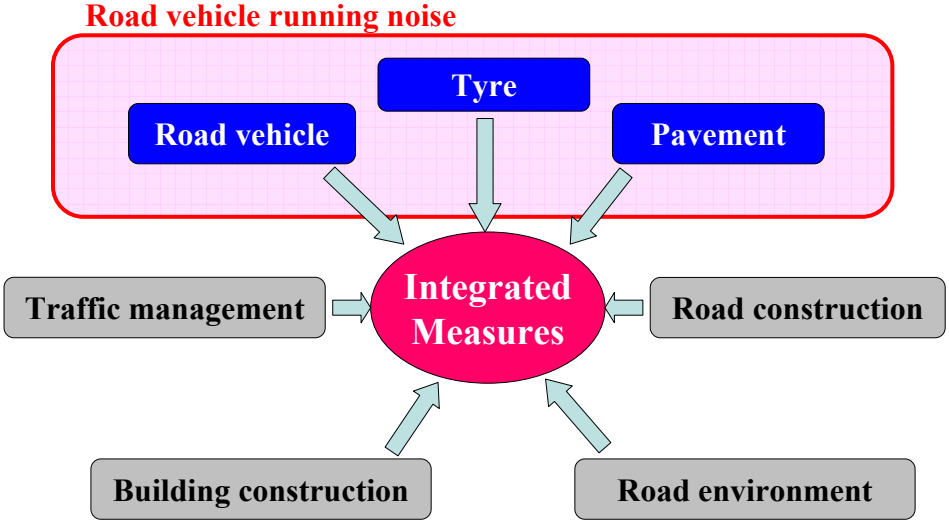
Transmitted by the expert from Japan

Informal document No. **GRB-45-2**
(45th GRB, 20-22 February 2007
agenda item 7.)

Road vehicle noise reduction by low noise road surfaces in Japan

1

Integrated noise reduction measures



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Measurement conditions

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Test road surfaces

Road surfaces	Max. chipping size	Thickness	Remarks
Dense asphalt	13 mm	50 mm	Conventional road in Japan
One layer drainage	13 mm	50 mm	Practical use
Two layer drainege	Upper : 5 mm Lower : 13 mm	Upper : 20 mm Lower : 30 mm	Partial use
Porous elastic		20 mm	Under development for practical use

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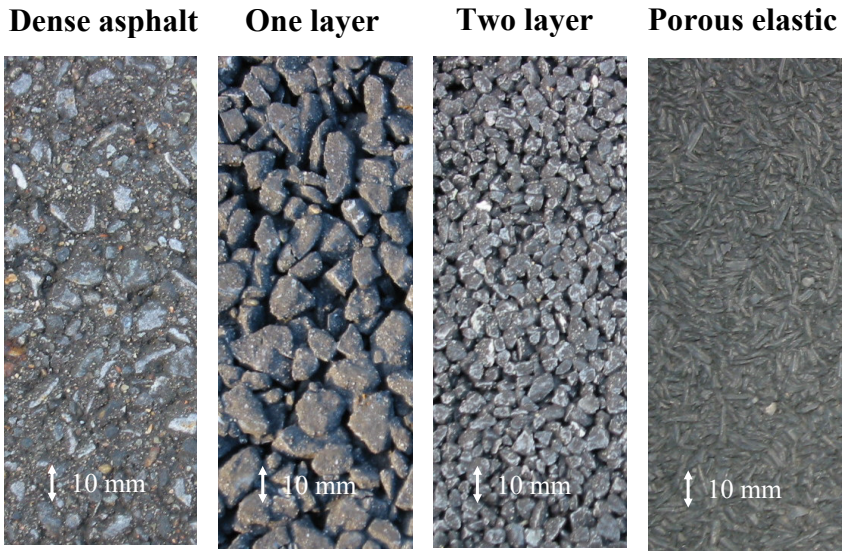
Surface profiles of test roads



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Test road vehicles

Vehicles	Engine	Vehicle weight (GVW)	Tyres
Car	Gasoline engine	1,775 kg	205/65R16 95S
Hybrid car	Gasoline engine + Motor	1,515 kg	165/65R15 81S
Medium truck	CNG engine	4,712 kg	195/85R16
Heavy dump truck	Diesel engine	19,895 kg	10:00-20
Heavy cago truck	Diesel engine	19,470 kg	11R22.5

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Test road vehicles




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Constant speed running noise

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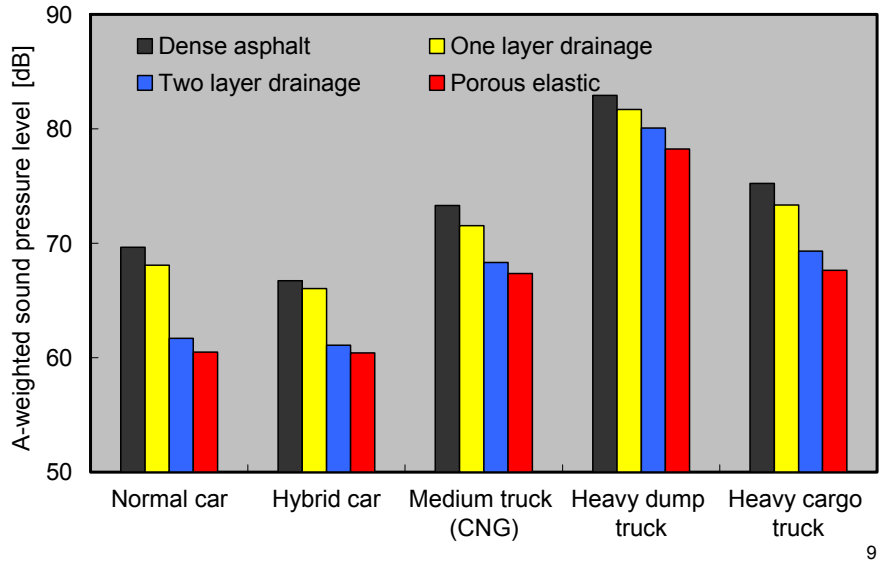
Constant speed running noise (60 km/h)



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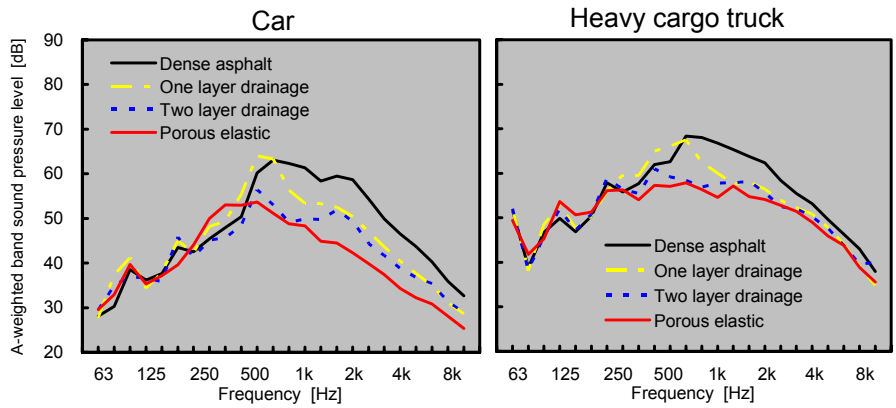
Frequency characteristics of constant speed running noise (60 km/h)



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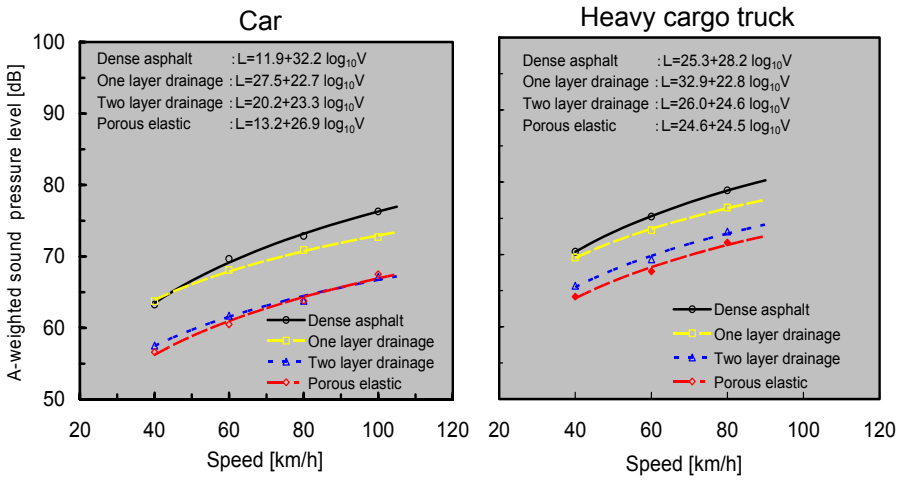
Speed dependence of running noise on each road surface



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Start-acceleration running noise

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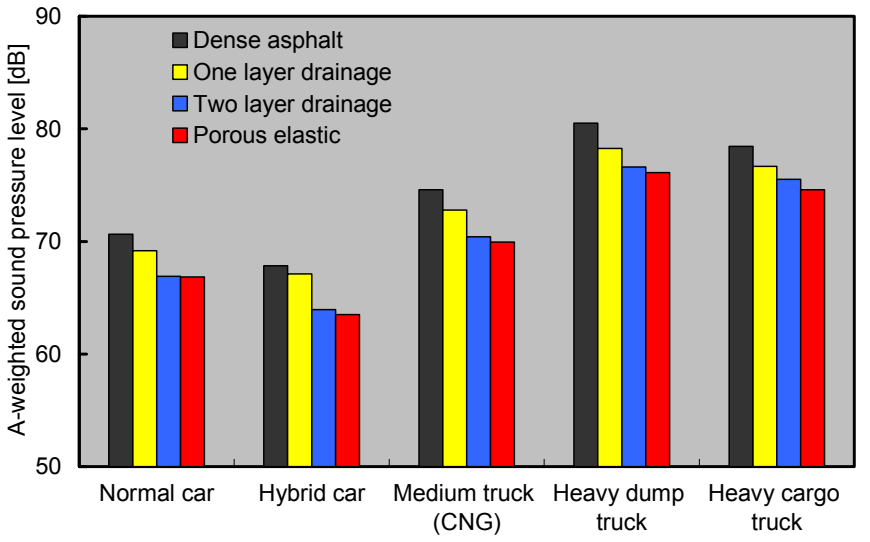
Acceleration running noise



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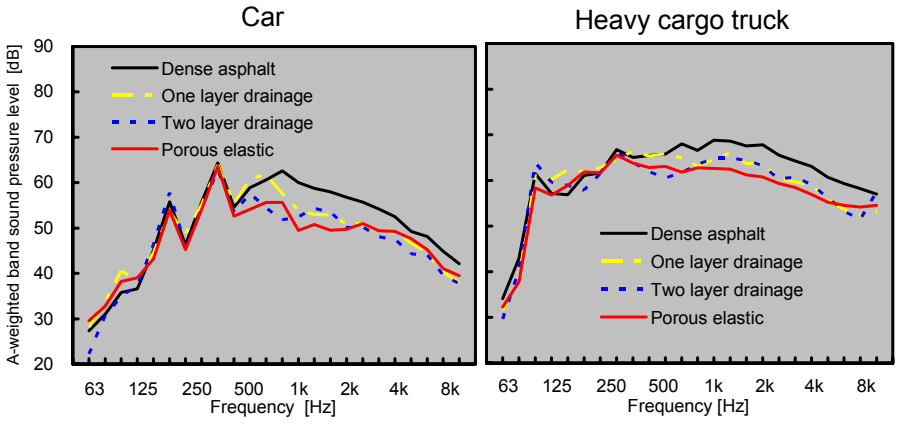
Frequency characteristics of start-acceleration noise



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Comparison with radiation noise on dense asphalt pavements of public roads

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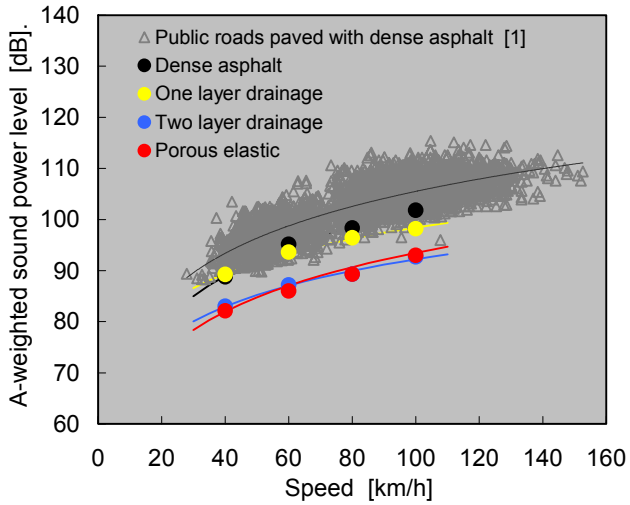
Effect of low noise road surfaces (Cars)



[1] Y.Oshino, S.Kono, A.Iwase, H.Onishi, T.Sone and H.Tachibana, "Road traffic noise prediction model "ASJ Model 1998" proposed by the Acoustic Society of Japan - Part 2 : Calculation model of sound power levels of road vehicles-, Proc. Inter-noise 2000

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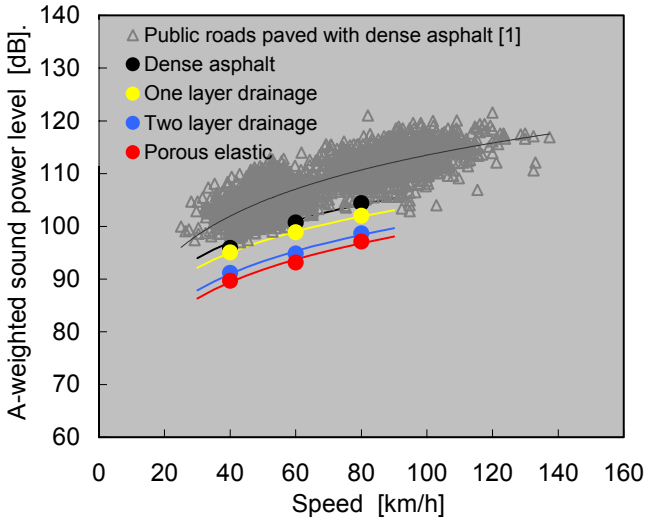
Effect of low noise pavements (Heavy trucks)



[1] Y.Oshino, S.Kono, A.Iwase, H.Onishi, T.Sone and H.Tachibana, "Road traffic noise prediction model "ASJ Model 1998" proposed by the Acoustic Society of Japan - Part 2 : Calculation model of sound power levels of road vehicles-, Proc. Inter-noise 2000

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Actual use of drainage pavements on public roads in Japan

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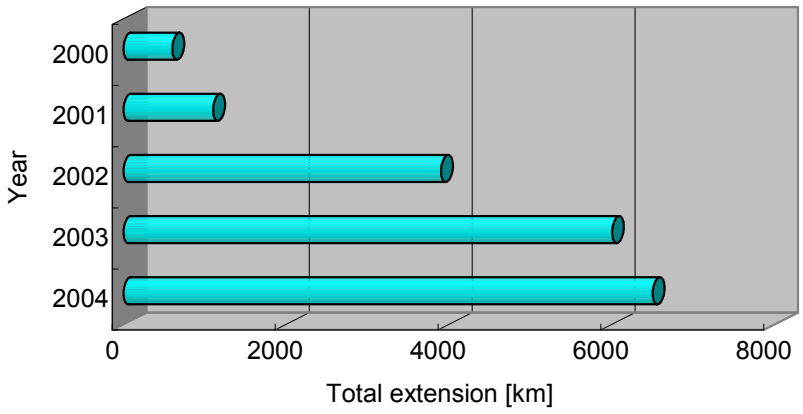
Total length of major urban roads paved with one-layer drainage asphalt in Japan



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Main trunk road in Tokyo constructed by two-layer drainage pavement

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Urban road in Tokyo constructed by porous elastic pavement

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Conclusions

1. The noise reduction effects of two layer drainage pavement and the porous elastic pavement are large. The level difference between these low noise pavements and dense asphalt pavement is 5 to 8 dB for constant speed running, and 3 to 4 dB for start-acceleration running.
2. It is technically possible to reduce vehicle noise by about 10 dB by integrating the latest noise reduction technologies for vehicles, tyres and the pavements.
3. In Japan, the construction standard for public roads is changing from the dense asphalt to drainage pavement. In Tokyo, two-layer drainage pavement has recently been used to achieve further noise reduction on main trunk roads

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