

Control of External Noise

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Green Train: Noise

Aims: External noise

... **reduced or preserved external noise levels** ...



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Guidelines: External railway noise

Trafikverkets guidelines:

”Buller och Vibrationer från spårburen linjetrafik” ...

...	$L_{A,eq}$ [dB(A)]	$L_{A,max}$ [dB(A)]
Outdoor residential areas	60	70
...		
Areas for recreation		
- urban	55	
- rural	40	



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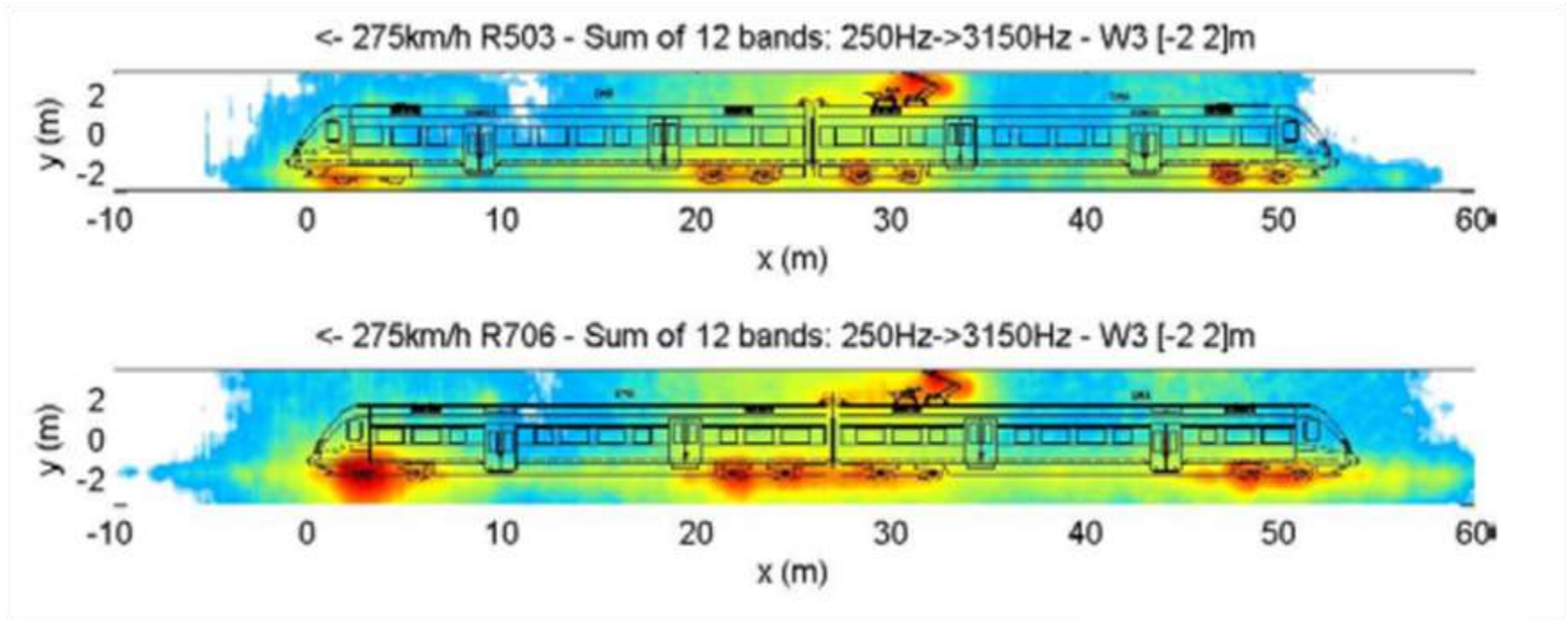


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Sources of external railway noise



External railway noise sources

Green train running at speed 250 – 300 km/h

- Wheel – Rail – Bogie
- Pantograph



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External railway noise control

Measures tested in Green Train project

- Tuned rail damper
- Bogie skirts
- Low screens close to track
- Combinations of above



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External railway noise control

Tuned rail damper:

- Reduce vibration (dissipation)
- Reduce radiating surface

Reduction: 2-3 dB(A)



External railway noise control

Bogie skirt:

- Screen sound radiation from bogie and wheel

Reduction: 2-3 dB(A)



External railway noise control

Low screen close to track:

- Screen sound radiation from rail-wheel and bogie

Reduction: ca 4 dB(A)



External railway noise control

Combined measures:

- Tuned damper + Bogie skirt " ≈ " 5 dB(A)



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External railway noise control

Combined measures:

- Tuned damper + Bogie skirt " ≈ " 5 dB(A) reduction
- Bogie skirt + Low screen " ≈ " 6-7 dB(A) reduction

External railway noise control

Combined measures:

- Tuned damper + Bogie skirt " ≈ " 5 dB(A) reduction
- Bogie skirt + Low screen " ≈ " 6-7 dB(A) reduction
- Skirt + Screen + Damper " ≈ " Even higher but not tested

Low screens close to track

- Efficient for sources in track – wheel – bogie region



Low screens close to track

- Efficient for sources in track – wheel –bogie region
- Environmentally friendly



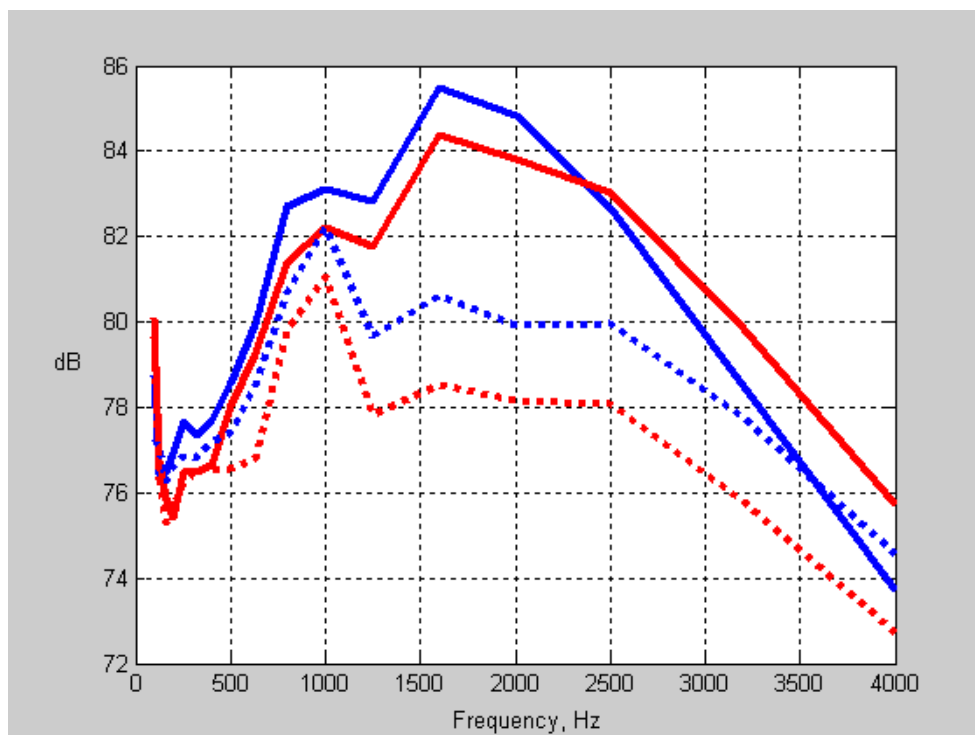
Low screens close to track

- Efficient for sources in track – wheel – boggi region
- Environmentally friendly
- Relatively low cost



Low screens close to track

Green Train at average speed 240 km/h

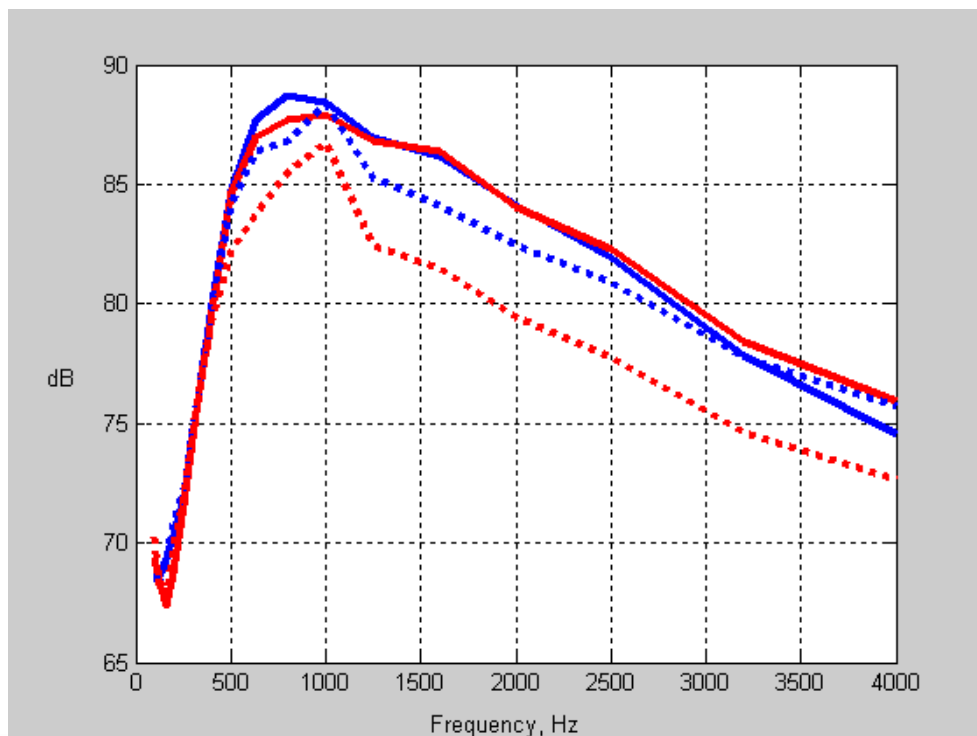


Red: 1.2 m above track
solid: Without screen
dotted: with screen

Blue: 3.5 m above track
solid: Without screen
dotted: with screen

Low screens close to track

Freight Train at average speed 97 km/h



Red: 1.2 m above track
solid: Without screen
dotted: with screen

Blue: 3.5 m above track
solid: Without screen
dotted: with screen

Green Train: External noise

Conclusion:

The present external noise levels for the X2000 can be maintained for the new generation high speed train running at 250 km/h.



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Thank You!

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