Impact and Control of Reflected Noise from an Overpass Bottom

Supplemental Data

Table S1 Cadna A calibration input parameters table (different overpass bottom materials (steel and RC))

	Item			Parame	ter value	
	1. Noise source on road					
	(1) Average vehicle speed (mea	asure	ed)			
	Road name		Light vehicle (ki	n/h)	Heavy vehicle (km/h)	
A.	 National Freeway No. 1 (Northbound) 		90		88	
B.	National Freeway No.1 (Southbound)	93		88		
C.	Xiwu Overpass (Northbound)		88		86	
D.	Xiwu Overpass (Southbound)		96		91	
	(2) Traffic flow (measured)					
	Road name		Traffic flow (vehi	cle/h)	Heavy	vehicle ratio (%)
A.	National Freeway No. 1 (Northbound)		3,903		16.3	
B.	National Freeway No. 1 (Southbound)		4,605		16.0	
C.	Xiwu Overpass (Northbound)		4,978		1.1	
D.	Xiwu Overpass (Southbound)		3,722		1.5	
	 (3) Pavement surface corrected value 2. Road structures (1) Basic geometry 	3 dI (Leq	3 is used for model (1h) at each measure	calibration. A ment site sho	After correction ould be close to	n, the simulation values b measurement values.
	Road name		Number of lanes	Road ele	vation (m)	Road width (m)
Α.	National Freeway No. 1 (Northbound)		4	6.2	~ 7.2	20.1
В.	National Freeway No. 1 (Southbound)		4	5.8	~ 7.1	20.1
C.	Xiwu Overpass (Northbound)		3	16.1	~ 18.8	15.8
D.	Xiwu Overpass (Southbound)		3	15.7	~ 19.1	15.8
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	3. Civil structures					
	(1) Buildings					
А. В.	Corrected value for building reflect The height of each floor is around 3	ion: 8 m.	2 dB (A) (default va	lue for the m	odel).	
	(2) Acoustic barriers					
	T/ TT 1/	$\langle \rangle$	Γ.		0 1 1	

Item	Height (m)	Form	Sound absorption coefficient		
Embankment	4	Comont board	Inner side: 0.21		
section	4	Cement board	Outer side: 0.21		
Dridge costion	2 (not including breast	Motol boord	Inner side: 0.6		
Bridge section	wall)	Metal board	Outer side: 0		

4. Sound absorption rate of overpass bottom: Steel: 0; RC: 0.02.

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Item		Parameter value				
	1. Noise source on road					
	(1) Average vehicle speed (me	ası	ured)			
	Road name	Light vehicle (km/h)		Heavy vehicle (km/h)		
A.	National Freeway No. 1 (Northbound)	88		81		
B.	National Freeway No.1 (Southbound)		92		83	
C.	Xiwu Overpass (Northbound)		91		88	
D.	Xiwu Overpass (Southbound)		92		86	
	(2) Traffic flow (measured)					
	Road name		Traffic flow (vehic	cle/h)	Heavy vehicle ratio (%)	
A.	National Freeway No. 1 (Northbound)		2,208	,	14.3	
B.	National Freeway No. 1 (Southbound)	2,768		16.3		
C.	Xiwu Overpass (Northbound)		1,422		4.25	
D.	Xiwu Overpass (Southbound)		1,629		4.3	
	(3) Pavement surface corrected value	0 dB is used for model calibration. After correction, the simulation value $(L_{eq}/1h)$ at each measurement site should be close to the measurement values.				n, the simulation values se to the measurement
	2. Road structures					
	(1) Basic geometry					
	Road name		Number of lanes	Road ele	evation (m)	Road width (m)
A. National Freeway No. 1 (Northbound)			2	11.6 ~ 14.2		12.6
Β.	B. National Freeway No. 1 (Southbound)		2 11.6		~ 14.4	12.6
C.	C. Xiwu Overpass (Northbound)		2 13.1		~ 31.7	12.0
D	Xiwu Overpass (Southbound)	2 19.7		7~31.7 12.0		
	• • • •					•
	3. Civil structures					
	(1) Buildings					
A. B.	Corrected value for building reflec The height of each floor is around 2	tio 3 r	n: 2 dB (A) (default va n.	lue for the n	nodel).	
	(2) Acoustic barriers					

Table S2 Cadna A calibration input parameters table (different overpass heights)

Item	Height (m)	Form	Sound absorption coefficient	
Embankment	4	Comont board	Inner side: 0.21	
section	4	Cement board	Outer side: 0.21	
Pridge section	2 (not including breast	Matal board	Inner side: 0.6	
Bridge section	wall)	wietai board	Outer side: 0	

4. Sound absorption rate of overpass bottom: RC: 0.02.

Item		Parameter value				
	1. Noise source on road					
	(1) Average vehicle speed (me	as	ured)			
	Road name		Light vehicle (km/h)		Heavy vehicle (km/h)	
A.	National Freeway No. 1 (Northbound)		105		88	
B.	National Freeway No.1 (Southbound)	107		85		
	(2) Traffic flow (measured)					
Road name			Traffic flow (vehicle/h)		Heavy vehicle ratio (%)	
A.	National Freeway No. 1 (Northbound)		4,560 15.4		15.4	
B.	National Freeway No. 1 (Southbound)	4,287 17.0		17.0		
(3) Pavement surface 0 dB is used for model calibration. After correction, the simulation va $(L_{eq}/1h)$ at each measurement point should be close to the measurem values.				, the simulation values se to the measurement		
	2. Road structures					
	(1) Basic geometry					
Road name			Number of lanes	Road ele	vation (m)	Road width (m)
A	National Freeway No. 1 (Northbound)		4	115.0	~ 125.5	20.1
B	National Freeway No. (Southbound)	1	3	115.0	~ 125.5	16.4

Table S3 Cadna A calibration input parameters table (overpass crossing the road)

3. Civil structures
(1) Buildings
A. Corrected value for building reflection: 2 dB (A) (default value for the model).
B. The height of each floor is around 3 m.
B. The height of each floor is around 3 m.

(2) Acoustic barriers

Item	Height (m)	Form	Sound absorption coefficient	
Embankment	2 (not including breast wall)	Metal board	Inner side: 0.21 Outer side: 0.21	

4. Sound absorption rate of overpass bottom: RC: 0.02.