

Experimental Analysis of Wheel Radiation Noise of HANVIT 200 Train in Curve Lines

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Key Words: Wheel Radiation Noise() Hanvit 200 Trains(200), Wheel/Rail Interface(/)

Abstract

The wheel radiation noise characteristic of Korean tilting train(Hanvit 200) on curved rail under the field test conditions is analyzed in this paper. The test railroad track was selected from Seodaejon to Songjeongri in Honam line. 5th and 6th car are decided to measure radiation noise level among a train of six cars. The test subject curve radius executed from R400, R500, R600, R700 and R800 segments. The speed of test trains when from R600 and R800 curves existing operation speed and speed up 20% of existing speed. On curved rail at the time of operation speed of Hanvit 200 trains from below 95km/h wheel radiation noise level at 94dBA~99dBA, the operation speed from between 100km/h~144km/h wheel radiation noise level at 100dBA~106dBA.

1.

200

2001

2008

2

180km/h

(tilting train)

200

)

(10% ~ 30%

200

20%

200

180km/h

(squeal noise)

200

†

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*

ISO 3095

가 . Table 1
200

Table 1 Specification of Hanvit-200 train

Description	Specification
Formation	4 Motorized Cars + 2 passenger Cars
Seats	Total 278 seats
Max. speed of operating	180km/h
Max. speed of design	200km/h
Max. tilting angle	8°
Max. tilting angle speed	4°/sec
Interior noise	70dBA at 180km/h
Wheel base	2,600mm
2nd spring	diaphragm + emergency spring
1st spring	conical rubber spring
bogie	bolster type
material of carbody	Composite + steel
Weight of car type	Tc 451kN, M1 510kN, M2 461kN
Ride comfort	Jerk limit 0.7

2.

200

R400 R500 R600 R700 R800

R1000

. Table 2

Table 2 Operating curve of track curve condition for Ho-nam line(Seodaejeon-Songjeongri)

kilo -post (km)	Curve (m)	Normal speed (km/h)	Test speed (km/h)
23.00 - 23.92	R400	85	85
29.50 - 29.90	R500	95	94
36.70 - 37.40	R700	110	109
51.75 - 52.60	R600	100	100
70.19 - 71.62	R600	100	120
116.55-117.60	R800	125	125
125.25-125.80	R800	125	144
127.55-128.75	R1000	135	135

Table 2

R400 R500 R700

R1000

R600 R800

20%

Seodaejeon

Songjeongri

#1 #2 #3 #4 #5 #6

Mcp1	M1	T1	T2	M2	Mcp2
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: TEST BOGIE

Fig. 1 Test train with bogie position

Fig. 1 200

Fig. 1

#5

#6

Fig. 2

B&K 4189

2 , B&K 2671

2 ,

SONY SIR1000

1 ,

Photo sensor

E3S-CD11 1 ,

F/V

Convertor K3TR-NB11A,

Power

supply IV60 6-hannel ICP Supply 1

LMS s/w

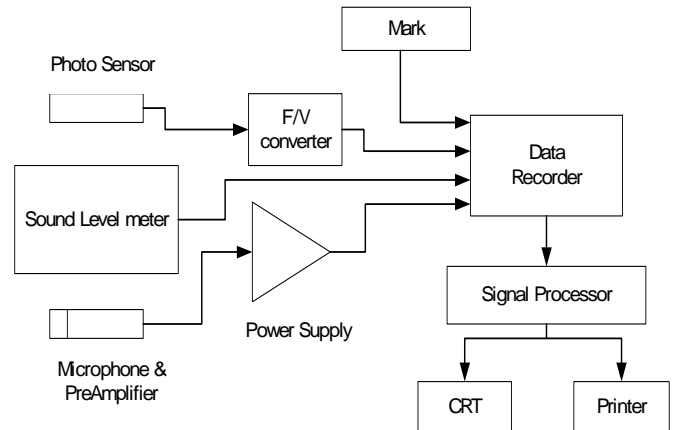


Fig. 2 Block diagram of wheel radiation noise measuring

3. 200

200
6 (Mcp1 - M1 - T1 - T2 - M2
- Mcp2)
Table 2 R400 R500
R600 R700 R800 R1000 #5
#6
Fig. 3

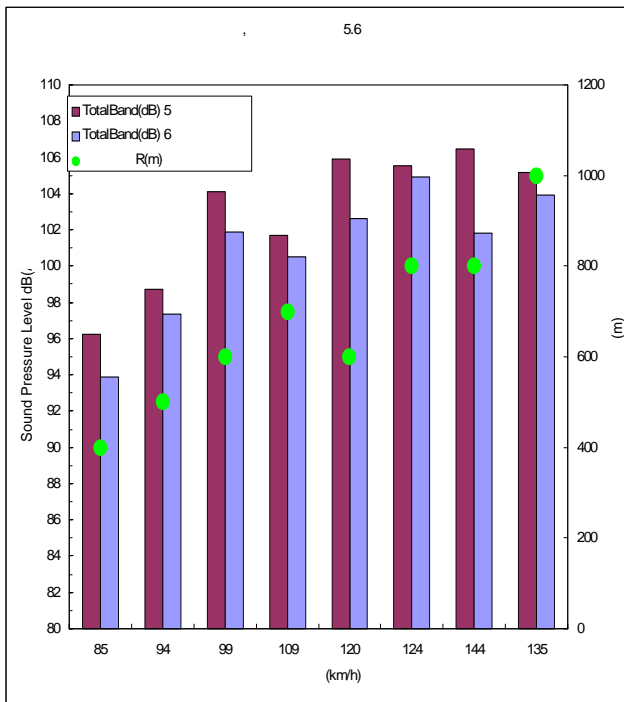
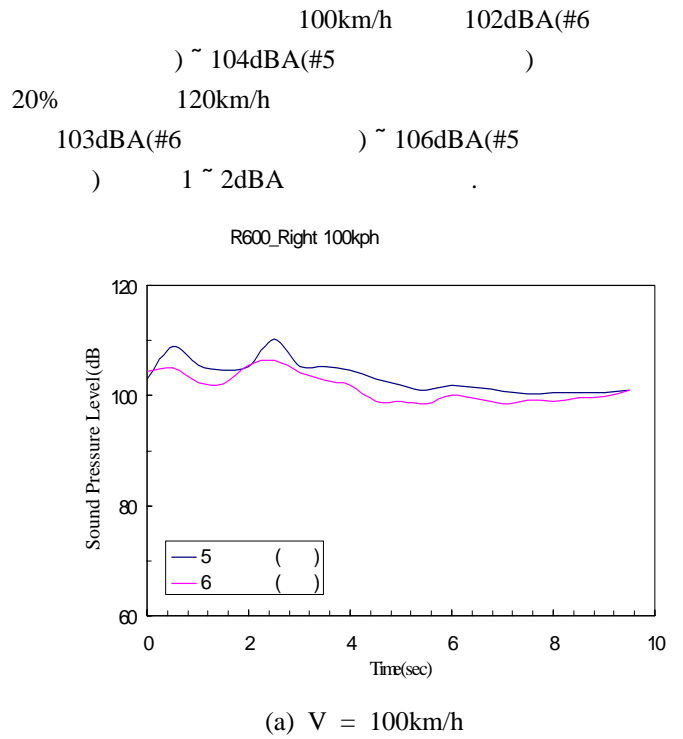


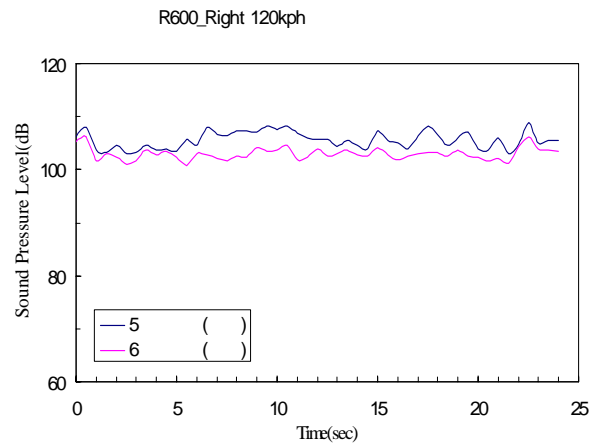
Fig. 3 Wheel radiation noise of Hanvit 200 train in curve lines

Fig. 3 200
가
R700 109km/h
R600 99km/h
Fig. 3 가
200 #5 가
#6 1dBA ~ 3dBA
200

(attack angle)
Fig. 4 R600
100km/h (a)
20% 120km/h
(b)



(a) V = 100km/h



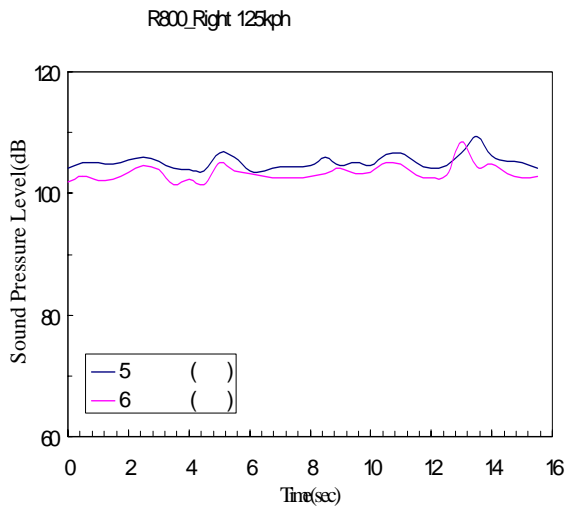
(b) V = 120km/h

Fig. 4 Wheel radiation noise of Hanvit 200 train in curve lines at R600

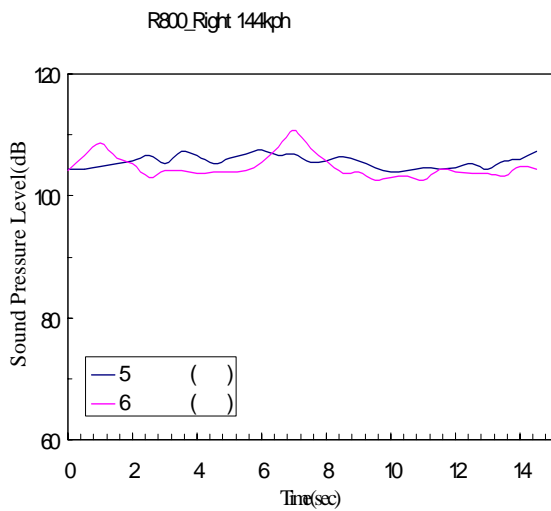
Fig. 5 R800 125km/h (a)

19km/h 144km/h (b)

125km/h 105dBA(#6)
) ~ 105.5dBA(#5)
 20% 120km/h
 102dBA(#6) ~ 106dBA(#5)
) 1 ~ 3dBA



(a) V = 125km/h



(b) V = 144km/h

Fig. 5 Wheel radiation noise of Hanvit 200 train in curve lines at R800

4.

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(1) 200 R400 R500 R600
 R700 R800 R1000

(2) R600 R800
 19 ~ 20km/h
 1 ~ 3dBA

가
 (3)

본 연구는 국토해양부 미래철도기술개발사업으로 시행되고 있는 틸팅열차 주행성능 안정화 향상 기술연구의 일환으로 수행되었습니다.

(1) , , 2007
 , pp.595 - 596.

(2) , , 2007
 pp. 208