



wind velocity measurement; multiple differential pressure test; railways in wind areas;  
vehicle-induced wind velocity

[A12]:  
9.5

[1-4]

[A13]:  
10  
18

Bruschi [5]

0.9 8.4 m/s

C.Liu [6]

8

[6]

0.91 39 m/s

39 m/s

12

1

[A14]:  
13

12

1.1

[A15]:  
10

1

Re

.

1-a  $P_1^+$   $P_1^-$   $P_2^+$   $P_2^-$   $P_3^+$   $P_3^-$   
 1-b

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1				2	.	‰	M191D
		±3 kPa		68 m/s.			
2		1	M				

$$\theta_0 = -7.5 \cdot \frac{P_1 - P_3}{P_2 - \frac{P_1 + P_3}{2}} \quad 7$$

$$D = P_1 - P_3 \quad S = P_2 - (P_1 + P_3)/2$$

$$P_0 = P_2 + \frac{7.5D^2}{120S} \quad 8$$

v

$$v = \sqrt{\frac{2P_0}{\rho}} \quad 9$$

 $\rho$ 

$$\rho = 1.205 \text{ kg/m}^3$$

5°

360°

±15°

P<sub>2</sub>

12

30°

360°

3

12

40 m/s

12

3

7

8

9

S

1

1

3

$\theta$	$P_1(\theta)/\text{Pa}$	$P_2(\theta)/\text{Pa}$	$P_3(\theta)/\text{Pa}$	$\theta / ^\circ$	$v/\text{Pa}$	$v/(\text{m} \cdot \text{s}^{-1})$
15°	532.2	800.9	829.7	15.7	978.7	40.3
10°	378.9	901.5	676.4	10.5	994.0	40.6
5°	87.2	968.0	468.1	5.4	992.8	40.6
0°	206.4	995.7	209.1	0.0	995.7	40.7
5°	473.9	959.0	88.2	5.5	984.8	40.4
10°	670.4	895.1	376.4	10.5	986.6	40.5
15°	823.9	798.3	531.2	15.6	974.3	40.2

1

0.7°

1.75%.

3

3.1

Cobra 270

0.8 m × 1.0 m

3.4 m

60 m/s

5 m/s .

0.5%

0.8°

0.8% .

4

a

0.1 m/s .

3.2

5 ~ 60 m/s

5 m/s

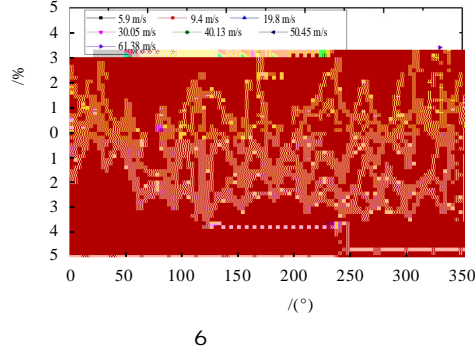
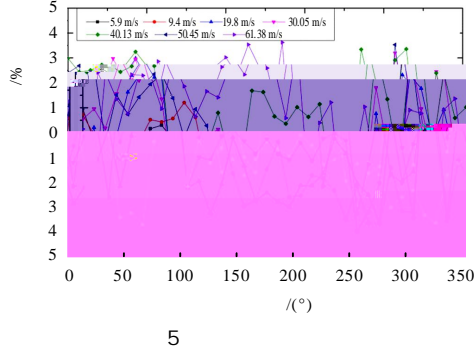
10°

4%

5

4°

6



5

6

4

10 cm

5 ~ 60 m/s .

4%

4°

±15°

3-a

±20°

D

$\theta$

9

[1] [J]. 2006, 34(4): 9-11. [A23]: 10

[2] [J]. 2009, 31(8): 32-34.

[3] [J]. 2009(6): 90-92.

[4] [J]. 2012, 43(2): 756-762.

[5] BRUSCHI P, DEI M, PIOTTO M. A low-power 2-D wind sensor based on integrated flow meters[J]. IEEE Sensors Journal, 2009, 12: 1688-1696.

[6] LIU Cheng, DU Lidong, ZHAO Zhao. A directional anemometer based on MEMS differential pressure sensors [C]// IEEE International Conference on Nano/micro Engineered & Molecular Systems, Wakiki: IEEE, 2014: 517-520. [A24]: 15

[XXX]

[A25]: 10