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सत्यमेव जयते

भारत सरकार – रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ – 226011
Government of India - Ministry of Railways
Research, Designs & Standards Organization,
LUCKNOW - 226011

No. EL/3.1.35/2 Dated 14.07.2009.

Chief Electrical Engineers,

- East Central Railway, Hazipur – 844 101 (Bihar)
- South East Central Railway, Bilaspur-495 004.
- West Central Railway, Opp. Indira Market, Jabalpur-482001
- Northern Railway, Baroda House, New Delhi-110 001.
- Central Railway, 2nd floor, Parcel Office Bldg., Mumbai CST-400 001
- South Central Railway, Rail Nilyam, Secunderabad – 500 071.
- Chittaranjan Locomotive Works, Chittaranjan-713 331 (WB)

MODIFICATION SHEET NO. RDSO/2009/EL/MS/0380 (Rev.0), Dated 06.07.09.

1.0 Title:

Closure of two central ventilators in WAP-7 and WAG-9 locomotives

2.0 Object:

In order to avoid ingress of dust in three phase locomotives, machine room of these locomotives are pressurised using machine room blowers. The air delivery of machine room blowers first passes through heat sink of electronic cubical of power converter, auxiliary converter, vehicle control unit and thereafter it goes to machine room compartment and finally escapes out through ventilators. It is noted that although WAP5 locomotives is shorter in length by almost 2 meters but it has only four ventilators for escaping out the air, whereas WAG9/WAP7 has six ventilators even though its machine room size is larger in volume.

The outlet air velocity in WAP7/WAG9 and WAP5 were recorded in stationary condition to evaluate the pressure inside the machine room. These results are given below.

S.N.	Location	Outlet Air Velocity (m/sec) WAP7 Loco No.30243	Outlet Air Velocity (m/sec) WAP5 Loco No.30005
1.	Ventilator 1/CAB-1	3.6	10.2
2.	Ventilator 2/CAB-1	3.6	10.0
3.	Ventilator 1/CAB-2	4.0	8.7
4.	Ventilator 2/CAB-2	3.9	9.5
5.	Ventilator Centre	4.3	NA
6.	Ventilator Centre	4.7	NA

Table-1

It can be seen from above measurements that the air velocity in WAP5 locomotive at ventilator point is almost twice as compared to WAP7/WAG9 in stationary conditions.

More trials were conducted by different sheds to evaluate the direction of air flow from the ventilators in WAG9/WAP7 locomotives at different speed with four/six ventilators/ (blocking the two centrally located ventilators). The results are given below.

S.N	Speed	Location	WAG9 Loco No. 31114 (Cab1 working and all six ventilators open)	WAG9 Loco No.31118 (Cab1 working and two middle ventilators closed)	WAP7 Loco No.30232 (Cab1 working and all six ventilators open)
1.	40	Ventilator 1/CAB-1	6.3 Upward	5.4 Upward	Not recorded upto 100 kmph
		Ventilator 2/CAB-1	7.2 Upward	5.5 Upward	
		Ventilator Centre	2.2 Upward	-	
		Ventilator Centre	4.4 Upward	-	
		Ventilator 1/CAB-2	4.0 Upward	6.2 Upward	
		Ventilator 2/CAB-2	2.0 Upward	6.2 Upward	
2.	60	Ventilator 1/CAB-1	7.9 Upward	7.0 Upward	
		Ventilator 2/CAB-1	8.8 Upward	7.0 Upward	
		Ventilator Centre	0.0 Upward	-	
		Ventilator Centre	4.1 Upward	-	
		Ventilator 1/CAB-2	1.4 Upward	5.3 Upward	
		Ventilator 2/CAB-2	0.6 Upward	5.3 Upward	
3.	80	Ventilator 1/CAB-1	9.8 Upward		
		Ventilator 2/CAB-1	10.1 Upward		
		Ventilator Centre	4.0 Upward		
		Ventilator Centre	1.5 downward		
		Ventilator 1/CAB-2	0.2 downward		
		Ventilator 2/CAB-2	0.6 downward		
4.	100	Ventilator 1/CAB-1	10.9 Upward	9.5 Upward	
		Ventilator 2/CAB-1	11.1 Upward	9.5 Upward	
		Ventilator Centre	3.8 Upward	Not available	
		Ventilator Centre	2.5 downward	Not available	
		Ventilator 1/CAB-2	1.8 downward	1.5 Upward	
		Ventilator 2/CAB-2	2.0 downward	1.5 Upward	
5.	110	Ventilator 1/CAB-1	Not recorded	Not recorded	16.2 upward
		Ventilator 2/CAB-1			15.3 upward
		Ventilator Centre			6.3 upward
		Ventilator Centre			2.7 downward
		Ventilator 1/CAB-2			4.5 downward
		Ventilator 2/CAB-2			4.2 downward

Table-2

From table 2, it may be noted that air starts flowing into the locomotive through the rear ventilators after 80 kmph onwards in those WAG9/WAP7 locomotives which have six ventilators open and the velocity of inflow increases with the increase in speed of locomotives. Also when trial was conducted after blocking two centrally located ventilators no inward air flow was recorded due proper pressurisation of machine room column 5 of table 2. Therefore dust ingress into machine room can be prevented by blocking two centrally located ventilators.

3.0 Existing Arrangement with cross-references of respective design document:

In existing arrangement in WAP-7 & WAG-9 locomotives six ventilators are provided two near back side of CAB-1, two near back side of CAB-2 and two in the centre one above OCB and other E-70 brake panel (refer attached Annexure).

4.0 Modified Arrangement to replace existing arrangement as given above in 3.0:

4.1 There have been leakages noticed from the joints on the suction side of OCBs, TMBs and Scavenging blowers which suck machine room air resulting in further reduction in machine room pressure. This causes inrush of air from rear ventilators even at lower speeds, bringing dust along with. Hence it is necessary to turn out locos from CLW/Sheds with all these leakages properly arrested.

4.2 The two ventilators provided in the centre one above OCB and other above E-70 brake panels are required to be closed through a dummy MS sheet of proper size.

5.0 Application to class of locomotives:

WAP-7, WAG-9, WAG-9H.

6.0 Material Required:

MS plate of 2 mm thickness of required size.

7.0 Material Rendered Surplus:

Nil.

8.0 Reference:

Nil

9.0 Modification Drawing:

Attached.

10.0 Agency of Implementation:

CLW and Loco Sheds holding, WAP-7 & WAG-9 locomotives.

(Sandeep Srivastava)
for Director General/Elect.

Encl: As Above .

Copy to:-

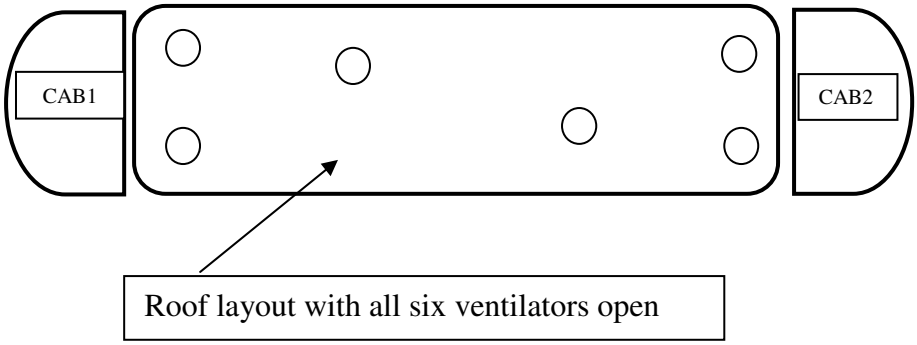
1. **Secretary (Electric Traction),** Railway Board, Rail Bhavan, New Delhi-110 001
2. **Sr. DEE (TRS), Electric Loco Sheds,**
   - Central Railway, Ajni (Nagpur)-440008.
   - South East Central Railway, BMY Complex, Bhilai, Durg-490 025.
   - Western Railway, Tughlakabad, New Delhi-110 044.
   - Northern Railway, Ghaziabad (UP)-201 001.
   - East Central Railway, Gomoh-828 401
   - South Central Railway, Lalaguda, Secunderabad – 500 017.

(Sandeep Srivastava)
for Director General/Elect.

Encl: As above

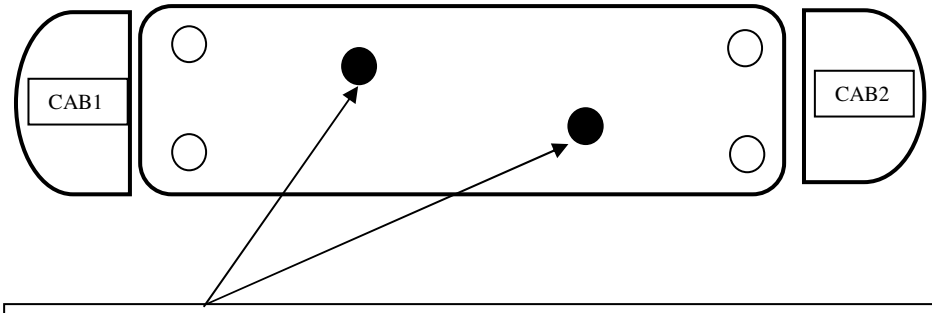
O/C

Annexure



Roof layout with all six ventilators open

EXITING ARRANGEMENT



Roof layout with two central ventilators closed with MS plate of 2 mm thickness.

MODIFIED ARRANGEMENT