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No. EL/1.2.9.1

Dated: 08.05.2017

Chief Electrical Engineer,  
All Zonal Railways & CLW

**Sub:** Minutes of Performance Review Meeting of 180 KVA  
Static Converter held RDSO on 28.04.2017

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The minutes of review of performance meeting of 180 KVA Static Inverter held at RDSO on 28.04.2017 is enclosed herewith for kind information.

The aforesaid Minutes of meeting have been uploaded on RDSO website and may be downloaded through following link

rdso.indianrailways.gov.in → Directorate → Electric loco → important letter/Documents.

*14/5/2017*  
(Aseem Kumar)

Encl: As above

for Director General/Elect.

Copy to:

1. Secretary (Elect.), Railway Board, Rail Bhawan, New Delhi-110 001  
- Kind attention : **Sri A.K.Goswami DEE/RS/Railway Board**
  2. M/s. Autometers Alliance Ltd., C-63, Sector - 57, Noida - 201 307
  3. M/s. Siemens Ltd., Industry Sector, Mobility Division, I MO RS IS, 5th Floor, R&D Centre Building, Kalwa, Thane, Mumbai - 400 601
  4. M/s. Medha Servo Drive Pvt. Ltd, P-4/5B, IDA Nacharam, Hyderabad - 76
  5. M/s. Hind Rectifier, Lake Road, Bhandup (W), MUMBAI - 400 0785.
  6. M/s.ABB Limited, Survey No 88/3, 88/4. Basavanhalli Kasaba Hobli, Nelamangala Taluk, Bangalore 562 123.
- for kind information and necessary action please.

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(Aseem Kumar)

Encl: As above

for Director General/Elect



**Minutes of Performance Review Meeting of 180 kVA Static Converter held at RDSO on 28.04.2017**

**Present:** As per list enclosed.

Performance review meeting of 180KVA Static inverter was held at RDSO on 28.04.2017. Firm wise analysis of failures and progress of implementation of modification plans were discussed during the meeting.

At the outset EDSE (Co-ordination) welcomed all the participants of the meeting. He express his concerned about high rate of failures of SIV of all the suppliers which are adversely affecting the train operations.

Discussion held during the meeting and action to be taken by firms/ Railway are as under:

**(A) Performance review.**

1.0	M/s AAL	
SN	Items	Action to be taken by firm & Railways
1.1	<b>MCU Card:</b> Sudden voltage changes across QCON relay contact which leads to sticking up of QCON relay contact, hence MCU failures are there.	<ol style="list-style-type: none"><li>1. Firm stated that they have provided RC damping network across Q-CON relay in all the units.</li><li>2. Another modification of replacing higher rating Reed relay with 2 Amps &amp; 5 lacs operations in place of earlier one with 1 Amp &amp; 1 lac operations is also complete in all units.</li></ol>
1.2	<b>Cooling Fans:</b> Reasons of cooling fan failure were mainly due to bearing failures, loose fitment in Aluminum housing and burning of motor winding.	<ol style="list-style-type: none"><li>1. Design of Fan has been modified and validated in field trials. (Havells make). Total 160 no modified cooling fan fitted and no failure of modified cooling fan has been reported.</li><li>2. RDSO also issued modification sheet no RDSO/2016/EL/MS/0449 Rev 0 dated 30.03.2016.</li><li>3. Firm has advised that bearing of cooling fan of ZIEHL-ABEGG is to be replaced in 18 months and full unit is to be replaced after a service of 6 years.</li></ol>

*8/5/2017*



1.3	<b>ZCT:</b> Cable of AC choke was passing just beneath the ZCT leading to erratic operation of ZCT due to variation. Also, mechanical stresses developed on the core of ZCT which leads to its failure.	Firm has replaced 100 defective units. Rlys. are replacing remaining ZCTs of DEESYS make of Korea by M/s. Broycee Control of England and till date Rlys has replaced 118 no.'s. There is reduction in failures of ZCT's. Further performance is under watch.
1.4	<b>GDU card:</b> GDU card of Battery charger are failing due to decrease in winding resistance & voltage range of Pulse transformer particularly after 5 years of service.	<ol style="list-style-type: none"> <li>1. Winding resistance and voltage range of pulse transformer measurement of Battery Charger GDU card is to be done by Sheds and to be replaced on condition basis.</li> <li>2. ELS/BZA identified that in GDU card the winding resistance of pulse transformer is 0.2 to 0.3 <math>\Omega</math>. And voltage range of pulse is + 16 V to -11V (<math>\pm 1V</math>). If the winding resistance and voltage range of pulse varies then pulse transformer is to be replaced. By cyclic checking of the pulse transformer the failures of Battery Charger GDU card at ELS/ BZA has reduced.</li> <li>3. Firm has also advised that the old cards (&gt; 09 years service) are to be replaced by new modified cards.</li> </ol>
1.5	<b>DCCT:</b> There have been frequent failures of Battery Charger and chopper CT. All failures were of ABB make CTs. There was a loose connection in power supply terminals due to wrong position of screw. All failures were due to defective batch of 180 no.'s.	<ol style="list-style-type: none"> <li>1. Firm has replaced defective 130 no.'s.</li> <li>2. Firm has been advised to replace remaining with LEM make CT.</li> <li>3. RDSO vide letter no EL/1.2.9.1 dated 25.01.2016 also advised to replaced spurious faulty CTs.</li> </ol>

2.0	M/s Siemens	
SN	Item	Decisions/ Target
2.1	<b>Indigenized Battery charger:</b> Indigenized Battery charger failed due to failure of rectifier module due to Diode getting	<ol style="list-style-type: none"> <li>1. Firm has to modify rectifier section in their Indigenized Battery charger.</li> <li>2. Amongst 286 units 260 units has been modified by the firm.</li> </ol>



	open circuit.	3. Firm has been advised to modify balance 26 units within 30.06.2017.(PDC 30.06.2017).
<b>2.2</b>	<b>Cooling fan</b> The cooling fan of M/s Siemens failed due to bearing failures and Jam. Firm stated that the major failure of cooling fan bearing is due to either improper mounting of cooling fan or improper maintenance.	1. Firm has advised that the bearing of cooling fan is to be replaced after a service period 4.5 years. 2. RDSO has issued guideline vide RDSO letter no EL/1.2.9.1 dated 29.04.2016 3. Zonal railways to replace bearing as per OEM recommendation and also follow the guideline as issued by RDSO.
<b>2.3</b>	<b>Inverter</b> The failures of inverter module are repetitive due to various reasons like component failures, IGBT failure etc. There are two cases of warranty failures of Inverter in Loco no 28726 and loco no 27263 of ELS/AQ and ELS/BSL respectively.	Firm stated the causes of failures along with action plan are to be submitted to RDSO. Firm also stated that no clear trend has been noticed for inverter failures.

<b>3.0</b>	<b>M/s. Medha Servo Drive</b>	
<b>SN</b>	<b>Item</b>	<b>Decisions/ Target</b>
<b>3.1</b>	<b>TDC-IF Card:</b> The tripping of SIV occurred due to sensing over voltage of OHE though OHE voltage was below specified limit.	1. The case has been studied by the firm and found that heat generated in TDC-IF card which leads to opening of a solder joint of a resistor. The firm has now provided RC network in place of resistor. 2. On further study the limit of OHE sensor of SIV is being increased from 500 ms to 1 sec. by software modification and also average time increased from 200ms to 500ms. 3. Software modification in 20 locos in ELS/CNB and KZJ has been completed by the firm. The performance is satisfactory. Firm has been advised to implement the modification in all units.
<b>3.2</b>	<b>Fuse of Battery charger :</b> The fuse failure took place	Firm advised to ensure proper quality of crimping / soldering of the contact.



	due to loose cable contact (in voltage feed-back circuit).	
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<b>4.0</b>	<b>M/s. Hind</b>	
<b>SN</b>	<b>Item</b>	<b>Decisions/ Target</b>
<b>4.1</b>	<b>QCON timer card :</b> Initially wiring of delay timer was tapped from secondary of Auto transformer at $380 \pm 5\%$ V but the voltage spikes use to melt the fuses sometimes.	1. The firm has advised that they will change the secondary tap point taken from $380 \pm 5\%$ V to $110 \pm 5\%$ since at low voltage spikes will be less and they will use 110 V timer. 2. Firm has modified 20 units and after satisfactory performance, RDSO has advised firm to modify all the units.
<b>4.2</b>	<b>Crow Bar Thyristor:</b> The problem was unwanted firing pulse to crow bar thyristor for protection of DC link over voltage. Firm introduced an energy absorption unit.	Firm has introduced energy absorption unit in 06 locos (04 no ET, 01 CNB 01 JHS), which reduces the excess energy generated due to unwanted firing of crow bar thyristor and thereby preventing the melting of fuse. Another 50 units has been permitted for implement. (PDC 30.06.2017)
<b>4.3</b>	<b>Snubber capacitor:</b> The capacitance value (0.47 mF) of Snubber capacitor is deteriorating after a service period of 3 to 4 years of service to 0.5 nano farad.	1. The capacitors are Oil filled and are to be replaced by dry type. 2. Firm has checked 247 units and replaced defective snubber capacitors in 26 units with dry type. 3. Rlys are requested to check the value of capacitors during maintenance and replace if required.
<b>4.4</b>	<b>Control card:</b> There are failures of Control Cards A 704 (Chopper) & A 703 (Inverter).	1. Firm sent the failed control cards to M/s. Transtanik/ Germany for investigation. It was reported by the firm that diode (VD-9) and PLD (Programmable logic device) of SCR board damaged and these were replaced by the firm. 2. Firm is advised to submit action plan to eliminate control card failures.
<b>4.5</b>	<b>Cooling Fan :</b> The basic problem is bearing failure. All the bearing failures are after a service period of 4 years.	Zonal railways are advised to replace bearing as per OEM recommendation.
<b>4.6</b>	<b>Fuse of Battery Charger :</b> The fuse of 25 Amps rating	Firm has advised that 25A fuses of M/s EATON and FERRAZ are to be replaced by



	in Battery charger output failed frequently.	35 Amps. Firm stated that all such fuses are replaced. The fuse of Siemens is not required to be replaced.
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<b>5.0</b>	<b>M/s ABB</b>	
<b>SN</b>	<b>Item</b>	<b>Decisions/ Target</b>
<b>5.1</b>	<b>Cooling fan:</b> Mainly there are failures due to jamming of bearings.	<ol style="list-style-type: none"> <li>1. Firm stated that the cooling fan bearings are failing after a service life of 04 years and advised that they are to be replaced after a service period of 04 years.</li> <li>2. Zonal railways are advised to replace bearing as per OEM recommendation</li> </ol>

**(B) Common points**

<b>a)</b>	Zonal Railways are advised to monitor the performance of the SIV and assist firm to implement the modification. It is also requested to send the feed back to RDSO.
<b>b)</b>	<b>Earth Fault</b> – The matter regarding clearing the block section after earth fault in SIV was discussed. All the firms agreed that during earth fault either internal or external, HSIV could be to be kept on '0' and loco pilot can clear the section within 45 minutes after pressing the ELD push button. However the matter is still under deliberation and formal advice will be conveyed to railways.
<b>c)</b>	RDSO has issued SMI on AMC bearing no RDSO/2016/EL/SMI/0291 Rev 0 dated 21.06.2016. All firms have been advised to adopt AMC of SIV. All Zonal railways are advised to insist OEM for AMCs.

Meting concluded with vote of thanks.

*3/5/17*

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List of Participants

SN	Name (S/Shri)	Designation	Railway
1	O.P. Kesari	EDSE (Co)	RDSO
2	Aseem Kumar	DSE (PS & SC)	RDSO
3	Ankut Tiwari	Account Head ( Mktg)	AAL
4	Vipul Jain	Product Head	AAL
5	Sudhanshu Pal	Account Head	AAL
6	Sumit Wahi	Account Head	AAL
7	Sarvesh Trivedi	Service engr	AAL
8	Rajesh Srivastava	Chief Manager	Siemens
9	Manu Garg	Manager/ Service	Siemens
10	V.K.L. Swamy	Product Engr / Medha	Medha Servo Drive
11	Vikash Jha	Marketing/Engg Medha	Medha Servo Drive
12	Deepak Aher	Manager service	Hind Rectifier
13	P.S.Patel	Manager	Hind Rectifier
14	N.S.Nawaz	Techno comm./ABB	ABB
15	Animesh Mathur	Product responsible	ABB