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सत्यमेवजयते

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

No. EL/11.5.5/21 Date: 02-05-2019

Principal Chief Electrical Engineer,

- Central Railway, HQs Office, 2nd floor, Parcel Office Bldg., Mumbai - 400 001
- East Central Railway, Hajipur (Bihar) - 844 101
- Eastern Railway, Fairlie Place, Kolkata – 700 001
- East Coast Railway, Railway Complex, Bhuvneshwar – 751 023
- Northern Railway, Baroda House, New Delhi - 110 001
- North Central Railway, Allahabad – 211 001
- South East Central Railway, Bilaspur - 495 004
- South Central Railway, HQs Office, Rail Nilayam, Secunderabad - 500 071
- South Eastern Railway, Garden Reach, Kolkata - 700 043
- Southern Railway, Park Town, Chennai – 600 003
- West Central Railway, HQs Office, Opp. Indira Market, Jabalpur - 482 001
- Western Railway, Churchgate, Mumbai – 400 020
- Diesel Locomotive Works, Varanasi - 221004

Sub: Minutes of the Meeting held at RDSO, Lucknow on 15.04.2019 with M/s Medha make IGBT based Traction Converter & Auxiliary Converter of 3-phase locomotives.

A meeting on reliability issues of M/s Medha make IGBT based Traction Converter and Auxiliary Converter was held at RDSO on 15.04.2019.

Minutes of the meeting of the same is enclosed herewith for kind information and necessary action please.

02/05/19

(Suresh Kumar)
For Director General/Elect.

Encl: As above

Copy to:

1. **Secretary (Elec. Engg./RS), Railway Board, Rail Bhawan, New Delhi-110 001.** For kind information. (Kind Attn.: Shri A.K. Goswami, DEE/RS)
2. **Principal CEE, Chittaranjan Locomotive Works, Chittaranjan – 713 331(WB):** for kind information please.
3. **M/s Medha Servo Drives Pvt. Ltd.,** P-4/5 B, Nacharam, Hyderabad – 500076

02/05/19

(Suresh Kumar)
For Director General/Elect.

Encl: As above

SN - 259

Minutes of performance review meeting held in chamber of PEDSE/RDSO on 15.04.2019 regarding issues of M/s Medha make propulsion equipment of IGBT based 3 Phase locomotives

Members Present:

RDSO	1.	Shri O. P. Kesari, PEDSE.
	2.	" Suresh Kumar, DSE/TPS
	3.	" Shailendra K. Deo, SSE/TPS.
	4.	" Ran Vijay, JE/TPS.
	5.	" Shivesh Krishna Mishra, JE/TPS.
M/s Medha	6.	" A.N.V. Rao/ Dy Manager
	7.	" P. Venu / Engineer

The meeting was convened to review the issues raised in last reliability meeting held in ELS/HWH on 14/15.02.2019. The detailed deliberations done during the meeting are as under:
Following issues were discussed during the meeting:

1.0 Failure statistics of M/s Medha make Propulsion System

Detailed failure – type wise and shed wise are indicated in table – 1 and 2 respectively.

Table – 1: Failure type wise details

SN	Cause of Failure	No. of failures				
		2016-17	2017-18	2018-19		
				(Apr-Jun)	(Jul-Sept)	(Oct-Dec)
1	Card failure	0	8	3	8	4
2	VCU problem	1	0	2	0	1
3	Software Malfunctioning (Time out initialization, Time mis-match etc)	1	9	14	8	14
4	Converter contactor	2	1	3	3	0
5	Power Module	3	9	0	4	6
6	TM speed sensors	0	4	1	1	5
7	Loose connector / OFC/ Cable defective	0	0	1	0	1
8	Others/Misc.	5	37	22	16	25
	Total	12	68	46	40	56
	Population	9	83	88	99	126
	FRPCPY	133	82	209	162	178

2.0 Issues of Traction Converter discussed during the meeting are as below:

SN	Item	Action Plan	Remarks
1.	Bursting of capacitor	M/s Medha stated that they have received Analysis Report from M/s. Electronicon, but not satisfied with their report. M/s Medha requested Electronicon to re-examine and submit the root cause analysis.	In loco no. 30553 at ELS/TATA, DC link capacitor burst, which led to failure of Power module. Further the same loco has been transferred to SRC and capacitor bank of another Traction converter was burst. One more capacitor bank burst case was registered in loco No. 30571of ELS/LGD. Re-investigation report from OEM was to be submitted by M/s Medha by 28.02.19 however no report has been submitted yet. PDC-30.04.2019.
2.	PCB card failure	• 15 PCB card failures have been reported during 2018-19 (Apr-Dec). • So far, no investigation report has been submitted to RDSO or Railways. M/s Medha is once again requested to submit the same at the earliest. It has been decided that M/s Medha make voltage sensor may be fitted in 5 locos (WAP7) of ELS/SRC for trial. Further decision shall be taken after performance feedback.	• Out of 15 PCB cards, M/s Medha submitted the details of 7 PCB cards as given below: MTICC card -1, Capacitor failure in LTC card – 1, TCN card – 1, INVCC card – 1, Pressure sensor – 1, DOP card–1, LEM sensor – 1. • M/s Medha was requested to submit the breakup of balance 8 PCB cards along with root cause analysis by 05.05.2019.
3.	Interoperability of MU units	MU operation between Medha & BHEL loco has been successfully demonstrated. Medha has informed that the MU protocol is as per UIC 556. However, they have not submitted details in this regard. M/s Medha is once again requested to submit the details so that the same can be implemented in other makes MU gateways also so that interoperability among different make can be achieved.	Interface control document (C-DAC) has been submitted to CLW. CLW may take action to standardize the protocol and start trial of MUs between the locomotives fitted with Medha & BHEL make propulsion equipments respectively.
4.	Harmonic filter getting isolated	• In case of isolation of any Traction converter automatically / manually, filter current increases and ultimately Harmonic filter getting isolated. M/s Medha has modified	1. M/s Medha has stated that they have modified the software by increasing the delay in monitoring time from 500ns to 1 Sec.

		software to chalk out this issue. • Railways are still reporting the issue. M/s Medha may look into increasing the delay in monitoring time The specification mentions the panto bounce of 45 ms. During this time, traction converter should deliver full power. M/s Medha shall submit the detailed report for which duration of panto bounce, their converter gives full power and reduced power.	• Software updated in 108 Locos out of 113. • Balance – 5 (LGD-2, BRC-1, VSKP-2) PDC: 30.04.2019. 2. ELS/SRC is requested to measure the value of L & C and intimate the same to RDSO. Opening/closing time of harmonic filter contactor will also be intimated. 3. As decided in previous meeting, detailed report on full power and reduced power delivered by traction converter during panto-bounce is still to be submitted. PDC – 30.04.2019.
5.	Several cases of isolation and recovery of subsystem automatically due to transient troubles.	• Updated software have been provided in 10 Locomotives 37001/Ajni, 30547/SRC, 31930/TATA, 31902/TATA, 31920/TATA, 30558/SRC, 30149/GZB, 30700/SRC, 30595/LGD and 30649/GZB. • Railways may critically analyze the merit/de-merit of the individual modification and submit the details to RDSO for further decision on its proliferation.	Performance feedback has been asked from concern Railways.
6.	Message "Converter oil pressure not ok" does not store in DDS and whenever coolant temperature goes out of limit then directly "Converter oil temperature too high" message appears and the respective SR or Bogie gets isolated.		
7.	Bogie isolated on line instead of individual TM-4 isolation.	ELS/BRC reported that bogie isolated on-line after failing one TM in place of individual TM. M/s Medha shall study and incorporate the same suitably in software. A joint may be prepared with ELS/BRC.	M/s Medha stated that in case of problem in a TM, that particular TM only will be isolated. In this particular case of ELS/BRC locomotive, bogie was isolated due to earth fault in TM with message "Earth fault in TM side or at Transformer side". In case of earth fault in any TM, the particular TM cannot be identified and as such the bogie is isolated.

8.	Initial TE of 18% (40KN) observed in WAP5 locos.	All locos equipped with M/s MEDHA make propulsion reported with same problem by ELS/BRC. M/s Medha to submit the action plan by 28.02.2019.	M/s Medha stated that TE will be given as per the demand generated by throttle and they have reviewed and verified the design and nothing found abnormal.
9.	DC link over voltage	• There are several messages like 'DC link over voltage' which are not available in DDS but available in display unit. There are other such messages. • M/s Medha to submit the complete list of messages which are not available in DDS but available in display unit and submit the action plan.	M/s Medha stated that they have already submitted the detailed fault description document to Railways. Railways may confirm about the discrepancy if any.
10.	"OHE voltage out of range message" not appearing in DDS.	"OHE voltage out of range" message not appearing in DDS and loco does not trip. Due to OHE voltage out of range inverter pulsing stopped and further throttle not responding	M/s Medha has stated that following logics for OHE parameters monitoring have been implemented in software: 1. VCB Opened when U > 31kV or U < 15.8KV. 2. Full power allowed when 22.5 KV <= U <= 29 KV. 3. Power derated from 100 % to 73.3 % when 22.5 KV > U >= 16.5 KV. 4. Power derated from 73.3 % to 0 when 16.5 KV > U >= 16 KV. 5. Power derated from 100 % to 0 when 30 kV > U >= 29 KV. Action will be taken by M/s Medha as per Para – 4.0 of this MoM.
11.	SR gate unit power supply MCB (20 amps) tripping	• SR gate unit power supply MCB (20 amps) tripping causing Traction bogie isolate. The issue is with ABB make MCB. • Railways reported that this issue is not with Schneider make MCB. M/s Medha may take action to replace ABB make MCBs and submit the action plan.	This issue has been reported by ELS/TATA. SR gate unit power supply MCB (20 amps) is provided in SB panel and it is in Railways scope. Electric loco sheds are requested to replace MCBs suitably.
12.	Wrong display of energy regeneration	• In place of Energy consumption, Display showing Energy regeneration in all newly received WAP7 locomotives. • M/s Medha intimated that this may	ELS/TATA is requested to make available the subject locomotive to for testing. M/s Medha is advised to co-ordinate with ELS/TATA and submit the report by 30.04.2019.

		be due to wrong wiring. Medha may study the same and take necessary action.	
13.	Difference in simulation and actual values.	• Railways have reported that the loco operation in simulation is different from actual operation. For example there is contradiction in VCB stuck up message during simulation and actual operation.	M/s Medha will study and remove such anomalies. Detailed action plan may be submitted by 30.04.19.

3.0 It has been reported by Railways that M/s Medha carries out software/hardware modifications without clearance from RDSO/CLW. M/s Medha is requested to take clearance from RDSO/CLW before implementing the same in locomotives.

4.0 At present, Medha make converters give full power between 22.5 kV to 29.0 kV. Other manufacturers have increased upper OHE voltage limit to 30 kV. M/s Medha was requested to study and submit action plan in this regard but no action has been taken by Medha. It is once again requested to submit action plan by 30.04.2019. Medha may also study this and increase the upper voltage limit.

5.0 Software version history of M/s Medha make Traction Converter, Auxiliary converter and Vehicle Control Unit is enclosed as annexure with this MoM for ready reference.

04/05/19

(DSE/TRS)

SN. 256

MEDHA®

Ref : MEC:CLW:2824:18
Date : 05-04-19

The Principal Executive Director/Electrical Directorate
Research Design & Standards Organisation
Lucknow – 226 011

Kind Attn: Shri. Suresh Kumar/Director/DSE-TPL/RDSO

Dear Sir,

Sub : Software Versions of Medha propulsion system.
Ref : 1.RDSO Specification RDSO/2008/EL/SPEC/0071 (Rev.05)
2. Medha Letter No MEC:CLW:5703:18 dated 14-07-2018
3. RDSO MoM letter No EL/11.5.5/5 dated 27-07-2018

With reference to above mentioned subject, we are hereby submitting the software versions of propulsion system (Traction converter, Auxiliary Converter and Vehicle control unit) as Annexure A.

Thanking you, assuring you our best services all times.

Yours faithfully,
For Medha Servo Drives Pvt. Ltd.,

Ravi Kumar M.V
General Manager (Mktg)

Encl : As above.

ISO 9001 IRIS Certification CMMI level 3 NABCB
Certified Company
Corporate Identity Number : U31103TG1984PTC004436

R&D Centre : 2-3-2/A, Behind Mint Compound, Cherlapally, Hyd - 500 051, Telangana State.
Ph : 040-67237000 / FAX NO : 040-67237081, 27260005, Email : marketing@medhaindia.com

Works : Jodimetla Cross Road, Korremula (Vill), Ghatkesar (m), Medchal Dist., Telangana State : 500088.
Ph : 040-67237999/9642365345 FAX NO : 040-67237898,URL : http://www.medhaindia.com

Regd. Office : P-4/5B, Industrial Park, Nacharam, Hyd - 500 076, Telangana State.
Ph : 040-67237000/67237001/9885190083 FAX NO : 040-67237081.

Annexure A

Unit	Base Version	Versions History	Remarks
TRACTION CONVERTER UNIT (SR)	1.0	1.01	Software versions changed during First loco commissioning at CLW.
		1.02	
		1.03	
		1.04	Software Tuned for Pantograph Bouncing issues.
		1.05	Released Software for Ver-2 Design of Traction Converter (Design clearance has been given by RDSO)
		1.06	TM Terminations changes as per CLW Letter C-D&D/T/24 dated 27-04-2017
		1.07	Common software released for Ver-1 & Ver-2 ***Current Version***
		1.08	Added 500ms delay to announce "Harmonic filter current maximum" with other improvements
VEHICLE CONTOL UNIT	1.0	1.1	Software versions changed during First loco commissioning at CLW.
		1.2	
		1.3	
		1.45	For Flasher light and Alarm chain pulling logic changed compatible with CCB & E-70
		1.5	Software changed for Ver-2 design of Propulsion system
		1.6	MU compatability with BHEL logic implementation as suggest by RDSO
		1.7	MU compatability with BHEL logic implementation as suggest by RDSO
		1.8	BIO Toilet logic modifications as per CLW Letter No ELDD/3221 dated 27-05-2017
		1.9	Harmonic filter stuck off – feedback monitoring increased to 2 sec as per the Tata nagar Minutes of Meeting held on 03-11-2017 with RDSO & CLW Throttle failure logic is kept same as MICAS Hotel load converter related logics updated as per CLW's Letter No C-D&D/T/05 dated 20-09-2017
		2.0	Showing of Trail Loco fault messages in Lead Loco diagnostic data in case of MU as per ELS/LGD Observations
		2.1	Shunting mode speed limit to 15 kmph logics are improved as per Joint note and discussions held at ELS/BRCY
		2.2	VCB tripping along with isolation of bogie considered for LTC coolant temperature & pressure related faults as per RDSO minutes, Traction interlock condition monitoring removed for Regenerative Brake fail. ***Current Version***
AUXILIARY CONVERTER VER-1	2.0	2.01-2.06	Software versions changed during First loco commissioning at CLW.
		2.07	Software Modified as per ELS/TATA Suggestions vide letter RS/TATA/T/3Ph Medha/710 dated 25-04-2016.
		2.08	Inverter temporary shut down Wait time and ramp time reduction to reduce MR low pressure fault as suggested by ELS TATA during Meeting held on 03-11-2017 with RDSO & CLW
		2.09	BUR1 Ventilation command reduction to 45Hz for Ventilation 2 and Ventilation 3 as per LGD shed requirement.
		2.10	This version number is not used because of confusion may create between 2.1 and 2.10
		2.11	BUR1 Ventilation command reduction to 45Hz for Ventilation 2 and Ventilation 3 as per LGD shed requirement, is removed DC link Cap High Voltage debounce time is reduced because of LV25P failures ***Current Version***
AUXILIARY CONVERTER VER-2	1.11	1.12	Commissioning Software
		1.13	Input Frequency Disturbance Issue Resolving as suggested by ELS TATA during Meeting held on 03-11-2017 with RDSO & CLW
		1.14	DC Link Over Voltage issue resolving as per ELS/LGD requirements
		1.15	Inverter ramp up time changed to 15 seconds as per RDSO requirement ***Current Version***