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भारतसरकार-रेलमंत्रालय
अनुसंधानअभिकल्पऔरमानकसंगठन
लखनऊ- 226011
Govt. of India - Ministry of Railways
Research, Designs & Standards Organization,
LUCKNOW - 226011

No. EL/11.5.5/21

Date: 04.07.2018

M/s. Bombardier Transportation India Private Limited,
ERDA Road, Maneja
Vadodara - 390013.

Sub: Minutes of the Meeting held at RDSO, Lucknow on 04.07.2018 on Reliability of M/s BTIPL make IGBT based converters fitted in three phase electric locomotives.

Please find enclosed herewith a copy of Minutes of the Meeting held at RDSO, Lucknow on 04.07.2018 on Reliability of M/s BTIPL make IGBT based converters fitted in three phase electric locomotives for information and necessary action.

(Suresh Kumar)

For Director General (Elect.)

Encl: As above.

Copy to:

1. **Secretary (Electrical), Railway Board, Rail Bhawan, New Delhi-110 001.** For kind information.

2. **Chief Electrical Engineer, (For information and necessary action)**

- 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 - 751 017
- 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 - 4000 020
- Chittaranjan Locomotive Works, Chittaranjan - 718 331(WB)

(Suresh Kumar)

For Director General (Elect.)

Encl: As above.

**Reliability meeting of M/s BTIPL make IGBT based conveters fitted in 3-ph loco
held at RDSO on 04.07.2018**

Member Present

	RDSO	M/s BTIPL
1.	Shri O.P. Kesari, PEDSE	Shri Ashok Agrawal
2.	Shri Suresh Kumar	
3.	Shri Ran Vijay	

In this meeting, issues related to M/s BTIPL make IGBT based traction converter have been discussed. The detailed deliberations done during the meeting are appended below.

1.0 M/s BTIPL make Traction Converter

1.1 Failure trend of M/s BTIPL make Traction Converter:

SN	Cause of Failure	No. of failures		
		2016-17	2017-18	2018-19 (Apr-June) Reported by BTIPL
1	Power Module	25	35	08
2	Software Malfunctioning	28	44	03
4	GDU/DCU card	7	22	04
5	Cooling blower	10	17	05
6	Others	8	37	08
	Total Failures	78	155	28
	Total Population	108	231	276
	FRPCPY	78	67	10 (Qtr.)

1.2 Issues of M/s BTIPL make traction converters:

SN	Item	Action plan	Remark
1.	Failures of Power Modules	Presently 2 IGBT being used in parallel combination (4.5 kV, 900 Amp. Rating). To avoid mismatch in paralleling, single IGBT of higher rating (4.5 kV, 1500 Amp, Hitachi make). However, failures of 1500 amp IGBT also being reported. Firm stated that the issues are under investigation by their principals. Firm to find out the root cause of failure of the IGBTs and submit the detailed investigation report for the failed module.	BT has improved the software for over current protection in software version 317T01BT/217T01BT and modified software has been uploaded in 210 locos out of 215 locomotives. However, there is no improvement. Further, BT have carried out temperature rise test to monitor the converter temperature at critical points. This test is being

Ran Vijay

Ashok
4/7/18

			<p>conducted at Kalyan Loco Shed in May'18. Data logger has been installed in loco no. 30490.</p> <p>Data upload for analysis expected when loco next visits shed (Jul 2018).</p>
2.	<p>Software problems:</p> <p>i. Protective action not allowing DJ to reclose if OHE voltage >29 kV (Particularly after crossing NS).</p> <p>ii. Issue of limitation of the TE in case module of other converter isolated.</p>	Modified software addressing issue i& ii has been uploaded.	<p>Firm has stated that both issues have been addressed in software version 317T01BT/21701BT. Modified software has been uploaded in 212 locos out of 215 locomotives.</p> <p>Performance is under watch.</p>
3.	Main power OFF due to 'FLG-1 time out DC link circuit charge'	Addressed in the software version 317T02BT & 217T02BT.	<p>RDSO has given approval for regular use.</p> <p>Modified software has already been downloaded in 80 locos out of 245 locos. Performance under watch.</p>
4.	No regeneration in rear loco in MU operation.	This is software issue and suitable software modification in line with the existing WAG-9/9H need to be carried out.	<p>100% Regenerative breaking is already implemented by CLW in WAG-9/9H locomotives. Same need to be implemented and demonstrated at ELS/VSKP.</p> <p>PDC:: 25.07.2018</p>
5.	Isolating cock in cooling circuit	Isolating cock has not been provided in cooling circuit of traction converter. Required to incorporate the same to prevent drainage of coolant during radiator/converter replacement.	BTIPL has stated that they are working on the design and will come up with a proposal by 15.08.2018.
6.	False message display of "Traction may not be available on this Loco or Slave Loco, Bring throttle to '0' position and set again" in place of "coolant pressure not OK"	Whenever converter-1/2 pump MCB trips, concerned Bogie is getting isolated with display message "Traction may not be available on this Loco or Slave Loco, Bring throttle to '0' position and set again" in place of "coolant pressure not OK", thus confusion LP.	Firm stated that whenever converter-1/2 pump MCB trips concerned bogie isolated with display message "Auxiliaries HB2 - MCB(s) open in Aux Cubicle1/2, traction power may get reduced". Loco pilot Check MCBs in

Wing

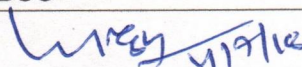
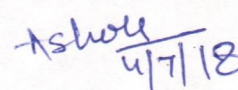
Ashok
4/7/18

			<p>Auxiliary cubicle.</p> <p>Firm has been requested to make a joint note with ELS/HWH.</p>
7.	Integration issue of BT SR with BHEL & AAL make BUR.	DDS messages regarding fault of IGBT Auxiliary converter of BHEL, AAL make (except life sign missing) is not recorded in DDS with BT make IGBT traction Converters.	<p>BTIPL has visited BRC on 3rd July'18 and AAL loaded the modified software version 54 in locc No 30466. As stated by BTIPL the diagnostic messages and parameters are visible at DDS as well as pop up available.</p> <p>Joint report has been prepared between M/s AAL/ M/s BTIPL and ELS BRC by on dt 03.07.2018.</p> <p>In similar lines the issue with the BHEL converters also to be resolved.</p>

Other Issues:

Software modification to utilize the full power of 6000 HP in WAP-5 locomotive.

BTIPL has stated the they are already working on this project and internal testing of modified software has been completed. The modified software shall be installed in one loco no. 30136 of ELS/GZB before 15.07.2018.

RDSO	Firm Representative of M/s BTIPL
 DSE/TPL	 4/7/18