



No. EL/3.2.19/3-Phase

Date 02.12.2019

Principal Chief Electrical Engineer,

1. Central Railway, Mumbai CST-400 001.
2. Northern Railway, Baroda House, New Delhi-110001.
3. North Central Railway, Subedarganj, Allahabad- 211001
4. North Eastern Railway, Gorakhpur-273 001
5. Eastern Railway, Fairlie Place, Kolkata -700 001.
6. East Central Railway, Hazipur-844101.
7. East Coast Railway, Chandrashekharpur, Bhubaneshwar-751016.
8. Southern Railway, Park Town, Chennai-600 003.
9. South Central Railway, Secunderabad-500 371.
10. South Eastern Railway, Garden Reach, Kolkata -700 043.
11. South East Central Railway, Bilaspur-495004
12. Western Railway, Churchgate, Mumbai-400 020.
13. West Central Railway, Jabalpur-482001.
14. Chittaranjan Locomotive Works, Chittaranjan-713331 (WB)
15. Diesel Locomotive Works, Varanasi-221004
16. DMW, Patiyala- 147003

Sub: Minutes of meeting on reliability related issues of Brake system of 3-Phase Electric Locos held at RDSO on 29.11.2019

A meeting was held at RDSO to discuss the reliability related issues and to review the reliability action plan of Brake System of 3-phase locomotives. Representatives OEMs, CLW and Zonal Railway participated. The MOM has been issued and uploaded on RDSO's website under following link:

https://rdsso.indianrailways.gov.in/view_section.jsp?lang=0&id=0,2,344,351,6047,6049

A. Pandey 02.12.19
(Arvind Pandey)

For Director General electrical

Encl: Nil

Copy To:

- Secretary (Electrical), Railway Board, Rail Bhawan, New Delhi-110001
(Kind attn.: Shri Kishore Vaibhav, DEE/RS/RB) for kind information please.
- M/s. Faiveley Transport Rail Technologies India Limited, P.B. No. 69, Harita, HOSUR, Tamil Nadu- 635 109
- M/s. Knorr-Bremse India Pvt. Ltd. 51/4 KM Stone, Village & P.O. Bhagola, Delhi Mathura Road (NH-2), Palwal-121102 (HARYANA)
- Topgrip Indus Instruments Pvt. Ltd., 37C, Jheel Road, Dhakuria, Kolkata-700 031

A. Pandey 02.12.19
(Arvind Pandey)

For Director General electrical

Encl: Nil

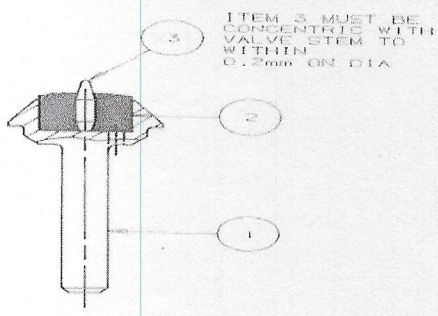
Minutes of Meeting held at RDSO on 29.11.19 on Reliability related issues of brake system for 3-Phase electric locomotive.

Meeting chaired by PEDSE and welcomed to participants, focused on review the reliability action plan which was chalked out at workshop held on 7th & 8th June'19 at ELS/RPM/SR and new issues raised by ZRs as well as new developments of E-70/CCB systems. PEDSE expressed satisfaction with various steps have been taken & that has resulted in improvements in performance but there are certain problem still existing. These should be tackled. Reliability improvements steps should be taken in new products immediately. Failures of pressure gauges being used in brake system are on higher side and OEMs are advised to adopt new technologies e.g. digital gauges to achieve reasonable level of reliability.

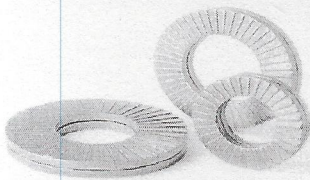
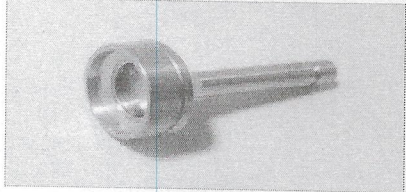
A. Issues Pertaining E-70 brake system:

SN	Issues	Last update	Action/Current status
1	BP not dropping by DBC in service zone. (Deliberated in 39 th MSG, CELE/WR letter dated 10.9.19 & ELS/LGD letter dated 25.10.19)	System operated Automatic Emergency Braking (SOAEB): Presently 3 units of SOAEB are working in one loco each in ELS/TATA, RPM & AQ (31658/TATA from 23.03.18, 30366/RPM from 31.03.18 & 31368/AQ from 29.06.18) for field trial. The concerned ZRs were requested to send the performance. ELS/LGD suggested fail safe design of BP dropping to zero whenever E-70 BP control transducer is open was already existed in some of older control cards of 2006 & 2008 vintage. It was requested to M/s FTRTIL for n/a.	Control card strategy to be modified. Study to be made for brake application when E-70 unit transducer get defective/mal function. SOAEB is not accepted as deliberated in 39 th MSG. ZRs are not in favour of SOAEB. M/s FTRTIL is advised to study the matter as raised by ELS/LGD and submit needful proposal.
2	Validation of Brake system to new spec 0126	The firm apprised that they will offer for prototype testing in August 2019.	The firm apprised that they will offer for prototype testing in Feb'2020.
3	Standardization of VCD	The firm stated that they had already tested the unit jointly with Railways after necessary rectification at ELS/RPM on 16.03.19 in loco-30631 (WAP7) successfully. Two additional pressure switches were provided in same line as 269.6/1 & 269.6/2 (Independent BC-PS). The firm was requested to give their proposal to RDSO for regular cut in and retro fitment of the added features.	The firm apprised that they will offer proposal soon to RDSO for regular cut in and retro fitment of the added features.
4	Provision of Auto Emergency Brake (AEB) :	The firm explained their proposal of AEB, However, they will require an input for speed from locomotive. This matter will be discussed later on along with the VCU and speedometer suppliers.	This matter will be discussed later on along with the VCU and speedometer suppliers.

A. R. Sanyal

5	Operation in PTDC mode	The firm apprised that their prototype development and in house testing is completed and would like to make a fitment trial by 15.07.2019. During the meeting it was decided that fitment trial will be carried at ELS/RPM.	The firm apprised that: Prototype development & In-house Testing in E-70 panel completed. Patenting under progress – EDC 31/12/2019. After patenting, trial in one loco each at ELS_LGD & BIA shall be made in Jan 31 st 2020.
6	Electronic cards:	Firm has provided 06 sets of electronic cards (M/s Avalon make) at ELS/GZB vide their letter dated 26.09.19. Performance is under monitor.	Performance from ELS/GZB to be taken.
7	E-70 Valve assembly failures:	FTRTL agreed to provide 20 sets of special tool to various sheds. 18 sets of special tools were dispatched to sheds namely ELS,BIA, ELS/HWH, ELS/SRC, ELS/CNB, ELS/LDH, ELS/KZT, ELS/RPM, ELS/Tata, ELS/BNDM, ELS/ED, ELS/BRC, ELS/NKJ, ELS/ET, ELS/VSKP, ELS/AQ, ELS/KLY, ELS/BSL & ELW/BSL. 02 more sets are ready and it was decided that they will be given to ELS/ GMO & TKD. Apart from this, a kit consisting of only Seals have been made by firm so that it can be replaced during TOH if required.	The firm apprised that they will give special tools to all sheds by Dec'19.
8	Limiting valve ELS/TKD also reported vide letter dated 27.08.19 leakage of limiting valve no. 79	The firm apprised that they have already provided improved valve stem to the sheds and they can provide additional valve stem as float stock if required by sheds . Sheds/ ZRs were requested to approach the firm for any further requirement. Sheds suggested that there should be some kind of marking to know in which valves this improved stem is to be provided. ELS/AQ also pointed out that in some cases of failures, they had observed that the Pin Hold provided in the pressure plate is not exactly in the center. The firm may look into the matter.	The firm apprised that Improved valve stem can be provided. As per Design, 0.2 mm concentricity to be maintained. Marking in stem is not possible but modification in stem to do stem in centre is done. Status has to be provided by Firm. 
9	CP Non Return Valve	The sheds apprises that there are failures of CP NRV especially in new locos where the screw and plate ring is coming out. The firm has upgraded to use 263 Loctite instead of 242 Loctite. However, the sheds suggested to the firm to use hex	The firm apprised that as advised by COC, proposed to use Nord Lock washer in place of multi tooth washer & Hex Bolt in place of CSK screw. Under Implementation in supplies.

A. B. Sanyal

		bolt, spring washer and reduced thickness of plate ring in place of counter sunk screw and plate ring. This is similar to conventional loco CP NRV design that has less failures.	 <p>Fig. Nord lock washer</p>
10	Air Horn valve failures	M/s FTRTIL apprised that defective Valve Stem was measured and found that the profile was not ok. Due to this the 'O' Ring is coming out from the groove when the valve is in operation. In the Measurement report 10 degree measures 6.41 degree one side and other side is found ok. Firm replaced the machining tool and corrective action taken from 30.07.2016. Replacement are being provided to Customers. As recommended by their CoC, Material is also changed from steel to Brass.	<p>The firm apprised that material is changed from steel to Brass, replacement is under progress. It will be added in maintenance kit.</p>  <p>Fig. Brass Stem</p>
11	D2 Relay valve failures	Sheds reported Rubber seal for D2 relay valve is of 'NON-GACO' make received in 2018 is getting torn, part no 004701000A. M/s FTRTIL apprised that Pioneer Weston Seal Received 502 nos on Feb '2018 from FT UK as alternate source of Gaco, same were replaced in sheds after failures were reported. Since Gaco is going to close Alternate Source is under development. New seal will be implemented only after validation and feedback of performance from sheds. Total 8 Nos. of seal (5No.s in DBV, 2 No.s in D2 relay valve and 1 no in Brake way protection valve) fitted in ELS/AQ and performance is under monitoring. Firm is advised to provide more number of seals to other sheds for performance monitoring.	<p>The firm apprised that:</p> <ul style="list-style-type: none"> • 60 seals arranged for field Trial & given to various shed. • 20 Nos despatched to ELS/TKD and our Service Engineer in Delhi will hand over. • 20 Nos. despatched to Kolkata to hand over to ELS/Tata. • 20 Nos. despatched to Kolkata to hand over to ELS/GMO.

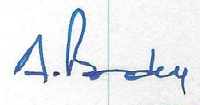
B. Pressure Gauges: Presently Analog Pressure gauges are being used of M/s Topgrip & M/s Midland make in E-70/CCB systems. Although various improvements have been taken for reliability improvements of pressure gauges but still cases are reported by ZRs. M/s TOPGRIP INDUSTRIES, Hyderabad, during meeting shown a presentation of better type of pressure gauges having both digital & analog display of readings and proposed for use in electric locomotives for MR+FP, BP, BC1+2 & AFI in a cluster of 04 gauges as per existing arrangement. This type of cluster of gauges is in service in two locos at ELS/TKD, in one loco each at ELS/HWH & ELS/KYN in one cab from last 03 months approx. The performance reported by ELS/TKD as satisfactory vide letter no WCR/L/05/2303 dated 19.11.2019. Both

A. R. Singh

OEMs were advised to consider the use of digital gauges in their make of system on trial basis. On the basis of performance this may be proliferated. ZRs are also requested to provide it in few locos and monitor the performance.

C. Issues pertaining CCB brake systems :

SN	Issues	Last update	Action/Current status
1	Training of CCB to Loco Pilots	Vide RDSO letter no. EL/3.2.19/3-Phase (CCB) dated 01.11.18, ZRs were requested that one hour slot during each refresher course to be arranged at ZTCs to impart training regarding CCB system by technical experts of M/s KBIL. ZRs are once again requested include lectures by engineers of M/s KBIL in their Induction and refresher courses of Loco Pilots.	The firm apprised that as planned 26 nos training sessions completed and apart from planned 23 nos also conducted.
2	Provision of brake interface unit for DPWCS	DPWCS Interface & Dynamic testing completed satisfactorily with M/s ARCL equipped system in one Locomotive each at ELS_Tata & BNDM. Further refer MOM issued on meeting held at RDSO on 11.06.19.	<ul style="list-style-type: none"> •The firm apprised that further, DPWCS Interface testing with M/s Lotus also done at KBIL satisfactorily. Offer to test with loco to be given by firm to signal directorate. •Further, trial of TCAS operation with M/s Medha make TCAS system done successfully on WAP-7 locomotive at GZB. Firm has to submit testing details. •Further, KBIL apprised that TCAS software for WAP-5 is ready for trials of on locomotive. Offer to be given to Signal directorate.
3	Validation of Brake System as per RDSO's specification no. 0126	Lab test software received and can be tested at KBI works. Results already submitted w.r.t. TPS to RDSO.	KBIL apprised that Software as per provision of new RDSO Specification received from NAYAB. Firm has to offer for validation.
4	Provision of Auto Emergency Brake (AEB)	M/s KBIL stated that for this operation no unit is required. Only command for restricted speed is required to CCB system from VCU.	No action pending from KB side, provisions to be made from VCU at CLW.
5	Provision of EM contactor for harmonic filter in place of EP contactor	KBI along with MSI Italy is working on suitable EM contactor mounting and the same is expected by end of July 2019. The same can be tried out on loco in the month of Aug 2019.	KBI submitted proposal to RDSO. Proposal is under examination with DSE/TPS/RDSO.
6	Operation in PTDC mode with enhanced speed	KBI apprised that they have supported ELS/LGD with material however the feedback for the same is awaited from LGD. ELS/LGD has already forwarded the matter for necessary modifications in software to CLW which is awaited.	The firm apprised that CLW to ask with OEMs of VCU to enhance the speed to 30KMPH in PTDC mode.
7	Failure of check	The firm apprised that to address the	Information already submitted by



	valves(CV and ACV):	moisture entry in Aux panel, they have improved the filter housing and added one small reservoir to store moisture from aux compressor (fitted in Locomotives of RPM – (30424 & 30417), KYN – (31473, 31551 & 31590), LGD – 31474 & 31618), so that moisture developed from Aux Compressor is collected at the entry of the Aux Panel. They have also modified the Check Valve cap (as suggested by IR) as mentioned to avoid getting stuck. They have sent 75 nos of Modified check valve guides to Electric sheds and would be able to fit based on the availability of the locomotive. As on date 59 nos out of 75 nos have been replaced. ZRs are requested to monitor the performance and provide feedback to RDSO.	firm, Examination is under process. It may be implemented after getting performance from sheds. KBIL to provide details of supplies to various sheds.
8	Aux reservoir drain arrangement	KBI has modified the Reservoir Drain Handle which will be extended outside for proper visibility and also going to provide an indicative sticker for the same by end of June-2019. M/s KBIL apprised that out of 230 locos , 45 nos have been sent. They have to ensure to provide stickers also (02 for cab and 01 at panel).	The firm apprised that field modification is in process & Implemented in new supplies. Firm has to visit ELS/CNB & ELS/HWH to demonstrate.
9	Failure cases of EBV	M/s KBIL apprised that matter is under investigation and being consulted with NYAB.	Matter still under investigation and need 2-3 month of time.
10	Pressure switches failure	Mainly failures of PAN-PS switch are there.	The firm apprised that, this will get resolved after implementation as discussed in point # 7 above.
11	Provision to change Pneumatic supply for ULV, TC1&2 and FC-Coc	The firm has supplied 09 nos retro fitment kits (KYN-3, RPM-1, LGD-2, TATA-2, TKD-1). ZRs are requested to monitor the performance and provide feedback to RDSO for further decisions.	<ul style="list-style-type: none"> •For existing locos draft MS is to be issued as per proposal of M/s KBIL in ref. to 39th MSG decision. Firm has to submit proposal. •For new supplies, KBIL have remapped internal channels of the auxiliary manifold with this improvement. <p>Clearance to provide on trial basis in 10 new locos has been given vide RDSO letter no. EL3.2.19/3-phase(CCB) dated 21.11.19.</p> <ul style="list-style-type: none"> •Further it is decided in meeting to provide 10 more modified aux manifold panel fitted CCB system for field trial.
12	Failures of feed valve	After receiving satisfactory field trial performance from sheds, vide letter no. EL/3.2.19/3-phase/CCB Dt. 27.03.2019, RDSO has advised to firm for supplying	This is part of remapped Aux Panel.

A. B. Jey

		new check valve of feed valves to the electric sheds. Accordingly, they have supplied 400 nos to sheds and already fitted in 127 Locomotives. Balance qty will be arranged by July-2019.	
13	Failure of Auto Drain Valve	KBI has improved the design and provided a seal in between metal to metal contact within Auto Drain Valve so that the excess breathing which was leading to leakage is addressed. KBI has already provided one modified Auto drain valve seal in 30410/RPM Loco on 06.06.2019 that is under trial. RDSO advised to provide some more seals for trials at ELS/GZB, AQ, LGD, RPM and KYN. ZRs are requested to monitor the performance and provide feedback to RDSO.	Supplied additional 15nos seals to Ghaziabad sheds for trial and waiting for feedback. Based on the performance feedback from NR this will be implemented in new supplies.
14	ERCP failures	KBI explained about fault code 125 & resetting procedure. However, KBI has to provide investigation report, corrective and preventive action for ERCP leakage.	This is not leading to line failures and being addressed in new software.
15	Procedure for checking of pn efficiency of locos with CCB system.	SR reported for this test when following para 5.8 of TC113, CCB system senses train line emergency & reduced BP to zero in spite of holding at 4.0Kg/cm ² . Same discussed with ELS/TKD also, they stated that it occurs with CCB only. So they make practice to drop BP to zero before start this test and results are under limit.	When the BP pipe is opened suddenly for capacity test with 7.5 mm orifice as per TC113, CCB senses it as Train line Emergency and applies Emergency penalty which is a safety feature available in CCB. Procedure suggested by firm: Select EBV on "TEST" mode first and then open angle cock with orifice in place and then moving the Mode Selector Switch back to LEAD, the BP Capacity test can be done. Further, BP drop under this condition should be within limit. Sticker to be provided by firm for guidance of capacity test.

D. Common issues pertaining to E-70 and CCB :

SN	Issues	Last update	Action/Current status
1	Pressure Gauges	It has been observed that the main contribution-of shed arising related to brake systems over IR is due to failures of pressure gauges. Hence, the brake system suppliers are requested to explore more sources to supply better models of reliable gauges that can be put on for field trials. Suppliers of pressure gauges should also develop better type of gauges that can be put on for field trials.	Ref. Para. B

A. B. Jey

E. 39th MSG issues related to Brake System:

Item SN	Items	Recommendations	Remark
18(i)	BP not dropping through DBC in E-70 brake system.	Officials from DLW, RDSO, ELS/ LGD and ELS/RPM will conduct a quality audit of the new source for electronic cards developed by M/s FTRTIL for brake system. If the performance of cards from new source is found satisfactory, then the firm will have to replace the control cards having manufacturing defect.	<u>Ref para A(1)</u>
18(ii)	Failure of AFI gauges.	Zonal Railways/PUs should provide polycarbonate glass of good quality, which should be replaced during IOH schedule. CLW/RDSO are requested to advise approved vendors to use polycarbonate glass for AFI gauges as well as LCD gauges on trial basis for new locos to improve the reliability of gauges.	<u>Ref para B</u>
18(iii)	Modification of air circuit in CCB.	Modification in air circuit of CCB as proposed by KBIL and working satisfactory in 9 loco should be carried out on regular basis.	<u>Ref para C(11)</u>
18(iv)	Modification for tapping control pressure of unloader & auto drain from MR-1 instead of Aux Compressor pressure in locos equipped with CCB brake system.		
18(v)	Usage of reliable, precision range & low cost pressure switches for E-70 and CCB brake systems.	RDSO should review the performance of various makes of pressure switches by collecting failures data from Zonal Railways.	In the meeting Comparative performance of Eaton, Danfos & Squire D make pressure switches was discussed and both the OEMs has expressed that they are using Eaton make pressure switch which has been validated by them worldwide over a period of time and they would like to continue with M/s Eaton make pressure switches. However it has been also noted that some of the ZRs are not carrying out the setting as per SMI-327 that also causing failures of pressure switches. Therefore, sheds should carry out the setting strictly as mentioned in SMI-327.

A. B. Singh

Participants in meeting held at RDSO on 29.11.2019 on reliability related issues of brake system for 3-Phase Electric Locomotives.

S N	Name & Designation Shm	Railway /Firm	Mobile no.	Email ID	Signature
1	O. P. Kesari/PEDSE	RDSO	—	—	—
2	Aseem kumar, DSE	"	—	—	—
3	Ratnesh Srivastava, ADE ELS/CNB	NCR	9794845005	ratneshsrivastava3852@gmail.com	
4	Prashant Choudhary, GM-Series	FTRTIL	8870233777	prashant.choudhary@wabtec.com	
5	MILIND BASLE DUMSATES	FTRTIL	9794996969	milind.basle@wabtec.com	
6	M. ARUNACHALANI, MANAGER -PRODUCTION	"	9486736710	m.arunachalani@wabtec.com	M.A.R.
7	G. J. Nataraj	FTRTIL	9894230786	g.j.nataraj@wabtec.com	
8	Gopal. Sharma, Dy. Manager Mktg & Service	KBIL	9310931001	gopal.sharma@knorr-bremse.com	
9	Yogesh kumar - sr. manager	KBIL	9873908452	yogesh.kumar@knorr-bremse.com	
10	Avinash Kumar, Jt. AGM	KBIL	9873663694	avinash.kumar@knorr-bremse.com	
11	Pabitra Das Manager	KBIL	9818305811	pabitra.das@knorr-bremse.com	
12	YUSUF HARBIB TOPURIP INDUSTRIES	TOPURIP	9949316332	yusuf@topgurip.co.in	
13	ABDUL KADER TOPURIP INDUSTRIES	TOPURIP	9831167223	topguripusteyhoo.com	
14	RAHUL KUMAR	ELS/HWH	8709961593	rahulkrbgs9@gmail.com	Rahul Kumar
15	SHISHU KUMAR	ELS/CNB	7525001672	ShishuKumar.SH@gmail.com	Shishu.
16	Subhankar Kumbhakar	SSF/DG CW	8420043340	Kumbhakar.77@gmail.com	
17	Mahendrabal, PDSO	PDSO	2459850025	—	
18	V. K. Gupta	JEDD	9794862737		
19	G. K. GUPTA	GM-Mktg	9971011079	 GOVIND GUPTA @Knorr-Bremse	
20	Uday veer Singh	FTRTIL	9793570498	Uday.Singh@wabtec.com	

PTO