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सत्यमेव जयते

Government of India
Ministry of Railways
Research, Designs &
Standards Organization,
LUCKNOW - 226011

EL/2.2.1/High Reach

Date: 29.01.2020.

To,

M/s. SCHUNK Metal & Carbon (India) Pvt. Ltd.,
No. 54/2, White Field Road, Mahadevapura-P.O.,
Bangalore-560 048.

Sub: Minutes of Meeting on Performance of High Reach Pantograph Type WBL-85HR on 24.01.2020 at RDSO.

In reference to above subject, Minutes of Meeting are being issued for your necessary action.

29/01/2020

(Aseem Kumar)
for Director General/Elect.

Encl: As above:

Copy to:

1. Secretary (Electrical), Railway Board, Rail Bhavan, New Delhi-110 001. (Kind Attn: Sh. Kishore Vaibhav, DEE/RS/RB) .--- For kind information
2. Principal Chief Electrical Engineer, Northern Railway, Baroda House, New Delhi-110 001.--- For kind information and necessary action please
3. Principal Chief Electrical Engineer, Western Railway, Churchgate, Mumbai-400 020. - - - For kind information and necessary action please.
4. Principal Chief Electrical Engineer, North Central Railway, Subedarganj, ALLahabad-211 001--- For kind information and necessary action please
5. Principal Chief Electrical Engineer Chittaranjan Locomotives Works, Chittaranjan-713331 --- For kind information and necessary action please

29/01/2020

(Aseem Kumar)
for Director General/Elect.

Encl: As above:

Minutes of Meeting on Performance of High Reach Pantograph Type WBL-85HR on 24.01.2020 at RDSO

Member Present:

SN	Name (S/Shri)	Designation
RDSO		
1	Sanjiv Swarup	PEDSE
2	Aseem Kumar	DSE/Pn.
3	V. K. Yadav	SSE/D/Elect.
Railways		
1.	Harikesh Meena	Sr.DEE/TRS /BRC
2.	M. K. Gupta	ADEE/TRS/GZB
3.	S. Swain	SSE/TRS/BRC

SN	Name (S/Shri)	Designation
M/s. Schunk		
1	Lokesh Bopanna	Managing Director
2	Austin Jayakiran	VP/Operations

A meeting was held at RDSO in continuation to meeting at Railway Board on 14.01.2020 and to ascertain results of trial done in WR for reviewing the performance of High Reach Pantograph of M/s. Schunk type WBL-85HR for electric locomotives as many cases of sparking have been observed by WR. Following were discussed during the meeting:

1. Current collection with WBL-85HR pantograph of M/s. Schunk report: Current collection from CLDY(KM 507) to VG (KM 557) section of WR was carried out on 22.12.2019, 09.01.2020, 17.01.2020 and 18.01.2020. Normal OHE is from KM 507 to 520/18. Transition OHE section is from 520/18 to 521/14. High Rise OHE section is from 521/14 to Km 557. Summary of observations is given below in the table:

		Current collection date **22.12.2019(Knee Leading)**			Current collection date **09.01.2020 (Knee Leading with 8kg setting)**			Current collection date **17.01.2020 (Knee Leading with 10kg setting)**			Current collection date **18.01.2020 (Knee Trailing with 8kg setting)**		
Speed	Severity of sparks	No. of sparks	Normal OHE	High Rise OHE	No. of sparks	Normal OHE	High Rise OHE	No. of sparks	Normal OHE	High Rise OHE	No. of sparks	Normal OHE	High Rise OHE
Up to 79 kmph	High	37	07	30	19	01	18	5	1	4	0	0	0
	Medium	13	01	12	21	02	19	4	0	4	1	1	0
	Low	36	13	23	59	08	51	20	1	19	1	1	0
	Total	86	21	65	99	09	93	29	2	27	2	2	0
Above 80 kmph	High	188	6 (3Tr)	182	270	03 (2Tr)	267	76	3	73	1	1	0
	Medium	62	10 (1Tr)	52	82	09 (2Tr)	73	45	4 (4Tr)	41	0	0	0
	Low	113	33 (7Tr)	80	135	22 (7Tr)	113	176	9 (5Tr)	167	8	7	1
	Total	363	49	314	487	22	453	297	16	281	9	8	1

2. It is observed that there is sudden increase in sparks above the speed of 80 Kmph in knee leading position and hardly any spark in knee trailing position in high rise OHE is seen. Few sparks at speed less than 80 Kmph are also observed in knee leading position.

3 Sparking problem in knee leading condition above 80kmph speed is a serious matter and related to design that needs to be corrected immediately in all the High Reach Pantographs (in existing and new supplies). Failure of firm in resolving this issue may lead to penal action against the firm as per RDSO's vendor development guideline.

4. M/s. Schunk apprised that they have designed an aero-foil for correction of mean contact force within the specified limits as per IEC 62486 . They will submit their proposal in 2/3 days to RDSO. Their team will reach Ahmedabad trip shed on 03.02.2020 with a few units of designed aero-foils. The aero-foil will be provided in their make High Reach Pantograph and current collection will be carried out after fitment in section CLDY-VG section of WR. Western Railway is requested to coordinate.

5. Instrumentation as discussed in the meeting on 26.12.2019 at RDSO and 14.01.2020 at Railway Board to measure contact force, contact wire height, contact point displacement in vertical direction during run and current collection as per BS EN 50317: 2012, is to be planned and carried out by firm to validate its design under actual conditions. Firm agreed to provide feedback in a month.

6. Some of the other types of failures reported by ZRs on M/s Schunk make High Reach Pantographs are summarized below:

Failure Type	**No. of cases**	**Shed**
Heavy leakage from exhaust port	3+1	TKD+BRC
Heavy leakage from 3/2 valve and PRV	4+2	TKD+BRC
PRV heavy air leakage	14+3	TKD+BRC
Air leakage from filter assembly drain valve	1	BIA
Rubber spindle of PRV valve found burst causing excessive leakage from PRV.	27	CNB
Air leakage from ORD	1	BIA
Diagonal rod breakage(1MS & 1SS)	2+n number	BRC+ Other shed
Unable to adjust control unit setting	2	BZA
Upper frame Bolt loose	2	BRC
High Wear rate	n number	WCR, SCR...

7. For extensive trial of new type of ORD switch, firm has to replace them in Baroda Shed and performance report is to be submitted by ELS/BRC.

8. For failure of different valves, and leakage through pneumatic equipment of control box, firm has to resolve and implement the solution in all the pantographs. Firm said the failures are due to dust and moisture from inlet air supply. However, this reason cannot be accepted as there are lot of other pneumatic valves which are functioning well in a locomotive with same air supply. Firm is advised to resolve the issue through good quality material or design. Further, Zonal Railways are also requested to maintain air dryer in service.

9. Railways also reported about similar life of carbon strip of M/s Schunk make strips though the cost of their strip is 5/6 times more than those of other make strips. As such they are not

finding any advantage in maintenance of carbon strip with respect to previous conventional pantograph carbon strips. The firm should look into this and take corrective actions.

10. Firm has to explain and resolve Erratic behavior of PRV setting observed and its corresponding contact force and other issues as mentioned in joint note dated 11.01.2020 with RDSO at ELS/BRC. Firm explained that there is as such no direct correlation between PRV setting and Contact force. Contact force depends on coupling rod length, threaded wire rope and PRV . Proper procedure is required for setting of contact force. WR reported there is no sealing /proper locking arrangement of PRV. Detailed procedures for replacement of parts are not given in their Manual. Firm has to examine all these issues and resolve the same. Firm apprised that to ensure correct contact force, KM11 machine is required. M/s. Schunk will arrange training, measurement and correction through KM11 machine in 5 sheds holding High Reach Pantographs starting from ELS/BRC.

11. Following failures listed by PCEE/WR in his letter which were included in joint note dated 11.01.2020 at ELS/BRC, were also discussed:

(i) Bending of Parallel Guide bar and Coupling Rod- 1 case at ELS/Valsad

(ii) Breakage of Diagonal rods at fixing point even after changing material from MS to SS- 1 case at ELS/BRC and 2 cases at ELS/Valsad

(iii) Loosening of bolts of CSL & Pan Head(Plunger)- 2 cases at ELS/BRC and 2 cases at ELS/Valsad

(iv) Heavy air leakage from PRV and 3/2 way valve of control box due to internal gasket torn out – 3 cases at ELS/BRC

(v) Bending of bellow side pan and carbon strip crack – 1 case at ELS/Valsad

Firm apprised that they will investigate the failures and revert back to shed.

12. WR and NR will conduct further measurements on the High Reach Pantograph in high speed section of High Rise as well as conventional OHE to observe the behavior of High Reach Pantograph. Checking should be jointly done along with TRD staff having OLIVER-G measurement facility in WAP-5/WAP-7 loco. Measurements in Gatiman express may also be carried out by NR and NCR providing High Reach Pantograph in 160kmph fit WAP-5 locomotive. These measurements should be done in both knee leading and knee trailing positions of the pantograph involving the firm and results informed to RDSO.

13. Till the firm resolves the matter of sparking in high rise OHE, 80kmph speed restriction in knee leading position and 110kmph in knee trailing position in high rise OHE is to be

followed by Zonal Railways. In case still sparking are noticed, RDSO should be informed immediately.

14. Wind tunnel test up to 3.8m height of the pantograph should be planned to be carried out by the firm and if the facilities are not available, then simulation of the same should be expedited and report regarding the same should be submitted. It was informed that many other agencies are doing simulation by making their smaller models of Missiles, Aircraft, wagons etc at IIT Kanpur Wind tunnel facility, which may be made use of by the firm .

15. M/s. Schunk will provide revised Maintenance Manual of High Reach Pantograph to each electric loco shed. Maintenance Manual should be in line with the schedules of inspection of electric locomotive being followed in Zonal Railways. Copy of the present schedule of inspection of locos was given to M/s. Schunk.

16. Firm apprised that they will submit their program about development of High Reach Pantograph as per Revision "3" of RDSO specification within 15 days .

29/01/2020