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No. EL/3.1.3/DPWCS

Date: 16.08.2016

All Chief Electrical Engineers,

**SPECIAL MAINTENANCE INSTRUCTION NO. RDSO/2016/EL/SMI/0295(REV.'0'),
Dated 16.08.2016**

1.0 Title

Special Maintenance Instruction for maintenance of Distributed Power Wireless Control System (DPWCS) for AC Tap-changer & 3- phase Electric Locomotives.

2.0 Brief History

The inception of DPWCS in the name of LOCOTROL is a decade old on diesel locomotives. However, the inception of same could not be initiated on the electric locomotives anywhere in the world because of difficulties in interfacing of system with electric circuits which is quite cumbersome especially for synchronization of notches in all the locomotives beside precise negotiation of neutral section. In spite of all the constraints, RDSO initiated the development of WMUCS (Wireless Multiple Unit Coupler System-earlier nomenclature adopted by IR) for electric locomotive & developed a specification and finally developed the first working prototypes of WMUCS on two no. ARNO based WAG7 locomotives in the year 2011. The 1st set of WMUCS was not having the feature of synchronized braking & during trial of same in long haul; it was observed & concluded that without synchronized brake application in lead & remote locos, the coupler forces were out of limits & in turn the system was not effective for long haul. To address the issue, RDSO revised the specification by incorporating the feature for synchronized braking & other requirements based on field trials & renamed the equipment as 'Distributed Power Wireless Control System (DPWCS)'.

Similarly, for 3-phase locomotives Radio Remote Control System (RRCS) name was initiated with but later this name was also changed into

Distributed Power Wireless Control System (DPWCS) for 3-phase locomotives in specification of Alt-A, issued on August' 2015.

A locomotive that has been fitted with distributed power (DP) equipment may be set up as either a Lead or Remote 'active' unit; the Lead unit being the controlling locomotive. Locomotive control can be synchronous (MU), whereby control commands made by the Loco Pilot in the Lead unit are transmitted instantly via radio telemetry to/and are followed immediately by all Remote units in the train, or independent whereby the Loco Pilot may set up and independently operate the Remote locomotives.

3.0 Definitions

Throughout this document, the terms:

SN	Term	Description
a)	SMI	Special Maintenance Instruction
e)	Electric locomotive	Means Tap changer electric locomotives and 3-phase electric locomotives
f)	DPWCS	Distributed Power Wireless Control System
g)	RRCS	Radio Remote Control System
h)	IR	Government of India, Ministry of Railways, Railway Board, New Delhi or its nominees
i)	Minor Schedule	IA,IB,IC
j)	Major Schedule	AOH/TOH,MOH,IOH,POH
m)	RDSO	Research, Design and Standards Organization
n)	BIU	Brake Interface Unit
o)	CCU	Control & Communication Unit
p)	DIU	Driver Interface Unit
q)	NSN	Neutral Section Negotiation Switch
r)	CPU	Central Processing Unit
s)	WMUCS	Wireless Multiple Unit Coupler System

4.0 Object

To provide Maintenance Instruction for Distributed Power Wireless Control System (DPWCS) for AC Tap-changer & 3- phase Electric Locomotives.

5.0 Maintenance Works

5.1 Works to be done during Minor Schedules (IA/IB/IC):

SN	Description of Work
1.	Clean the Antenna mounted on the roof top and verify the antenna Connectors.
2.	Check the tightness of all Connectors on CCU, DIU, BIU Units and on BD panel.

3.	Check all the pneumatic connections for leakages & conditions of pressure sensors.
4.	Check the tightness of Notch Encoder fitted on the SMGR Manual drive inside the machine room(Applicable to Conventional Loco only)
5.	Check the touch functionality of the DIU and calibrate if required.
6.	Observe the synchronization of lead and remote locomotives with notch/TE/BE/Speed reference (if available in shed).
7.	Check all the functions of DPWCS for its normal working.
8.	Check the status of GPS receiver in the status screen of DIU. (During GPS Verification the antenna mounted on roof top of the locomotive should be visible to sky.)
9.	Check the speedometer input by moving the locomotives after grouping.
10.	Verify the NSN switch Functionality by pressing the NSN button for 02 Second and verify the NSN progress Message or Crossed 500 Meter Board message on DIU. Press the NSN Cancel button in DIU for cancel the NSN function. Verify this operation from Both DIU.
11.	Verify the Emergency switch functionality from Both DIU.
12.	Update the wheel diameter of loco in software of DPWCS.
13.	Downloading of logged data & clearing of memory.
14.	Check the grouping and various working modes of lead/remote loco(if available in shed)

5.2 Works to be done during Major Schedule (AOH/TOH/MOH/IOH/POH)

SN	Description of Work
1.	Follow the Minor schedules under Para 5.1
2.	Visual inspection of PCBs for its healthiness and suitable cleaning with brushes and do conformal coating.
3.	Check the battery of CPU cards/Radio and replace if required.
4.	Cleaning of air filters of BIU, heat sinks of all modules.
5.	Replacement of panel gaskets in IOH schedule.
6.	Replace all the churning fans of DPWCS during IOH.
7.	Check continuity and IR values for all the Data/Electrical cables.
8.	Do Calibration test of Electronic Pneumatic Valve of BIU.
9.	Do Calibration of sensors.

6.0 Application to the Class of Locomotives:

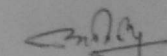
DPWCSs fitted in Tap-changer 25 kV AC conventional electric locomotives and 3-phase electric locomotives.

7.0 Agency of Implementation:

All Electric Loco Sheds/shops.

8.0 Periodicity of Implementation:

Minor schedule inspections (IA/IB/IC), TOH (Earlier AOH), MOH, IOH, POH overhauling schedules and any other unscheduled maintenance.

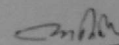


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Encl: Nil

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