(भारत सरकार) **GOVERNMENT OF INDIA**
(रेल मंत्रालय) **MINISTRY OF RAILWAYS**
(रेलवे बोर्ड) **RAILWAY BOARD**

No. 2020/Sig/G/2/RDSO **New Delhi, dated 23 .04.2024**

PCSTEs
All Indian Railways

Sub: Automatic Block Signalling (ABS) - train detection system provided in redundancy.

Ref: (i) RB's letter no. 2012/Sig/M/DAC/DD dtd. 31.12.2013
(ii) RB's letter no. 2023/ABS Committee/Railway Board dtd. 16.11.2023
(iii) RB's letter no. 2007/Sig/M/7/Genl. Dtd. 28.08.2008
(iv) RDSO's TAN no. STS/E/TAN/Dir.Sig.VII Dtd.13.02.2015

The guidelines regarding provision of dual detection and design redundancy to ensure safe & reliable train detection system have been issued vide references above. These include locations and conditions, diversity, resetting, mismatch monitoring through data logger, disconnections etc. However, instances have come to notice in which Zonal Railways have not adhered to implementation of contents of the guidelines. Some important instructions regarding the same to ensure availability of Signalling system with safe and reliable train detection system are reiterated/ given below:

1. All Automatic Block signalling shall be done with Axle counters with design redundancy. Both systems should be monitored separately through data logger along with generation of exception reports/alarms, to be transmitted to S&T staff/ Signal Control about mismatch / failure of the system, which should be attended promptly.

2. Axle Counter DPs to be preferably clamp mounting type, on different rails, with required stagger.

3. During failure of any one of the systems in dual detection, the resetting shall invariably be activated automatically i.e. Auto resetting of failed system by other healthy system with prescribed time delay.

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4. Resetting of axle counters shall always be in preparatory mode.

5. In case of failure of both systems in dual detection, Resetting arrangement shall be kept in ASM room and manual resetting to be done with cooperation of ASMs of adjacent stations after ensuring no train in section on the concerned line on which resetting is performed.

6. Redundancy to ensure availability of system has to be designed right from the stage of power supply with separate DC to DC converters for each system, separate cables for main and standby system with cabling in separate paths.

7. Provision of AT supply as per extant guidelines should be ensured along with IPS.

8. Monitoring of auto hut door lock through data logger to be provided.

9. For safety of staff, while working in big groups, provision of lookout person should be adopted.

10. Provision of VHF sets, including 25W sets at auto huts, if required, should be ensured for better communication during maintenance and attending failures.

11. Barring exceptional circumstances, Porta cabins not to be used for S&T works. Auto huts to be provided with proper fencing and earthing arrangements, at approximately 3 KMs or as required. Auto huts to have future space for telecom equipments with separate entry.

23/04/2024

(रामेश्वर मीना)
(Rameshwer Meena)
कार्यकारी निदेशक(सिगनल)
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Government of India
Ministry of Railways
Railway Board

No. 2012/Sig/M/DAC/DD **New Delhi, dated 31.12.2013**

The CSTE
All Indian Railways

Sub: Safe and Reliable Train Detection – Redundancy in Design.
Ref: (i) EDCE(G)'s letter No. 2013/CEDO/CCRS/1 dt. 14.08.2013
(ii) CSTE/SER's letter No. S&T/S/329/Pt.V dt. 01.08.2013

CCRS vide Ref (i) raised the issue of Dual Detection on suburban sections of CR & WR and requested Railway Board to issue clear procedure for deployment of such device on Indian Railways. CSTE/SER vide letter under Ref.(ii) has also requested to issue necessary guidelines regarding redundancy in train detection for better reliability.

The locations and conditions under which such a system is required to be provided, is defined in Board's letter No. 2007/Sig/M/7/Genl. Dt. 28.08.2008 and refterated in July, 2011 after CSTE's Conference held in June, 2011 (Letter No. 2011/Sig/PCDO/Misc. dt. 20.07.2011).

As far as the issue of laying down procedure for Installation, Maintenance and Rectification of failures of Dual Detection System is concerned, Board (ML & MT) has approved the following procedure for provision of safe and reliable Train Detection Devices with redundancy (Dual Detection) in design in future works:

(a) As far as possible, diverse system may be considered for Dual Detection for optimum performance, i.e. one based on logic, like Axle Counters, SSDAC, MSDAC etc. and the other based on AC/DC electric currents like AFTC and Conventional DC Track Circuits.
(b) Diversity has to be built right from the stage of power supply and the connecting cables and the method of train sensing and train detection.
(c) Wherever Axle Counters have been used as one of the Train Detection Systems, the resetting shall invariably be activated automatically by the other Train Detection Device. Resetting of Axle Counters shall always be in the preparatory mode.
(d) Each of these Train Detection Devices shall be separately monitored by the Data Loggers and Exception Reports/alarms be transmitted to Maintenance Team & Signal Control, in case of mismatch/failure of devices. Messages received about mismatch/failure of the devices should be promptly attended.
(e) During failure of any one device of Dual Detection, train shall be dealt on proper signal. Failed device shall be attended & rectified, where required, only under proper disconnection, taken during lean period of traffic.

(f) In case of failure of both the devices, trains shall be dealt on written authority at restricted speed. Rectification and restoration work should be done after receipt of failure memo/under proper disconnection as required as per extant practice.

(g) Dual Train Detection Devices should be checked and inspected regularly as per the stipulated periodicity of maintenance and inspection.

This issues with the approval of Board (ML & MT).

(Harsh Deep Srivastava)
Director (Signal)

Copy forwarded for information and necessary action to:

1. Sr. ED/Sig/RDSO, CAO/IRPMU, Director/IRISET
2. CCRS/LKO, All CRSs

(भारत सरकार) GOVERNMENT OF INDIA
(रेल मंत्रालय) MINISTRY OF RAILWAYS
(रेलवे बोर्ड) RAILWAY BOARD

No.2023/ABSCOMMITTEE/RailwayBoard New Delhi, dated 16.11.2023

General Manager
All Indian Railways

Sub: Guidelines for provision of Automatic Signalling and Twin Single line working over Indian Railways.

Ref: (i). Signal Directorate Letter no. 2021/Sig/WP/Action Plan dated 14.06.2022.

(ii).RB order no. ERB-I/2023/23/50 dated 05.09.23

1. Vide above reference letter no (i), guidelines for provision of Automatic Signalling (ABS) on Indian Railways were issued on 14.06.2022.
2. Subsequently, a committee, vide ref (ii), was constituted by Ministry of Railways to review the guidelines for selection of sections for ABS, provision of Twin Single Line working and spacing of common loop.
3. Based on the recommendations of the committee, revised guidelines for provision of ABS are as under:-
    a. All sections on HDN Routes on IR.
    b. Sections on HUN routes identified by Zonal Railways based on Traffic density.
    c. All notified "sub-urban sections".
    d. ABS shall be provided on sections where 3rd and/or 4th line works are being undertaken. Further, in future works, on routes where corridors of similar speed trains are not possible and there is heavy mixed traffic with high speed differential, 3rd and 4th line may be planned along with ABS. Also, alignment of 3rd and 4th line shall be planned to avoid Permanent Speed Restrictions (PSRs). Possibility of bypassing major junctions depending on traffic patterns may be contemplated while planning 3rd and 4th line.
    e. ABS may also be planned for any other section identified by Zonal Railways based on traffic requirements.
    f. While planning ABS works, safety and feasibility should be examined based on site requirements like gradient etc. Accordingly, location for Signals in ABS shall be decided by Zonal Railways. For this joint survey by inspectors of traffic, TRO, Engineering and S&T may be done before finalisation of Roll Diagram/ SIP of auto sections.
    g. ABS works shall be done with dual detection as per existing policy guidelines to improve availability. RDPMS may also be planned for ABS territory as per RDSO specifications.

h. At Major Junctions, integrated master plan for traffic from all directions shall be prepared. Upto three block sections on approach of Major Junctions shall be provided with ABS to minimize congestion. Further, based on site requirements, bypass chord/ ROR around Major Junctions may be planned to address congestion. These chord line/ROR and other related works can be part of traffic facilities works in proposed Amrit Junction umbrella.

i. Balance ABS works identified in Mission 3000 MT shall be sanctioned and all ABS works under Mission 3000 MT may be commissioned by 2026-27 to get maximum benefits of enhanced line capacity.

Further, following guidelines regarding Twin Single line and Common loop may be followed:-

i)Twin Single line working improves operation flexibility. Zones may plan implementing twin single line while planning doubling works based on traffic pattern and maintenance requirements.

ii) Common loop shall be planned as per standard layouts issued by Board vide letter No.2015/Sig/WG/Standardise Layout dated 12.07.2017. Normally, common loop shall be planned at every 4th station. However, in case of Gatishakti cargo terminals, good sheds or other terminals, common Loop may be planned as per site requirement.

This issues with approval of Board (MI, MOBD and CRB & CEO).

16/11/23

(Jonal Chaudhary)
JD/Gati Shakti/S&T

Copy to:

(1) PPS to MI- For kind information of MI.
(2) PPS to MOBD- For kind information of MOBD.
(3) PPS to MF- For kind information of MF.
(4) PED/GS, PED/CC- For kind information.
(5) PCOMs, All Zonal Railways- For kind information and necessary action.
(6) PCSTEs, All Zonal Railways- For kind information and necessary action.
(7) CAO/Cs, All Zonal Railways- For kind information and necessary action.

Government of India (Bharat Sarkar)
Ministry of Railways (Rail Mantralaya)
(Railway Board)

No2007/SIG/M/7/GEN

Dated 28.08.2008

The C.S.T.Es.,
All Indian Railways

The CSTE/MTP/Kolkata, CORE, Allahabad

The Sr.ED/Signal
RDSO, Lucknow.

Sub:- Working instructions for use of SS/MS Digital Axle Counters.

1. There is greater emphasis on improved asset reliability and faster execution of through put enhancement & safety related works to meet with IR's targets of carrying increased volume of Freight & Passenger traffic. Most of the signaling works in this connection involve track detection as one of the major component, which is presently provided through adoption of various means such as conventional DC/AC track circuits, Audio frequency Track Circuit and Axle Counters.

2. A large number of switches & crossings are currently on steel sleepers. Its replacement with PRC lay out, which is pre-requisite for DC/AC track circuit as well as AFTCs, is a time consuming activity and often leads to delay in execution of projects due to poor availability of track material (switches & crossings on PRC). Adoption of Axle Counters for track circuiting will, as such, facilitate faster execution of work besides lowering maintenance effort.

3. Moreover, the adoption of a track detection system which is immune or least susceptible to track (ballast resistance, drainage etc.) & traction conditions and which can reliably work in theft prone & flood prone areas, is the need of the hour.

4. Use of Analog Axle Counters for future works need to be discouraged due to obsolete technology & its limitations. It is seen that track occupancy detection by means of SS/MS Digital Axle Counter overcomes the shortcomings of conventional track circuits as well as AFTCs.

5. In consideration of the above, Board (ML) has approved the use of Single Section/Multi Section Digital Axle Counters predominantly for following applications on IR :-

a) Splitting of block section with the introduction of IBS.
b) Proving clearance of block section.
c) Track circuiting of flood prone suburban section.
d) Track circuiting of station section having poor drainage.
e) Automatic block signaling.

6. Railways are advised to take necessary action as per above instructions.

28/08/08

(R.L.Gupta)
Executive Director/Signal
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Government of India - Ministry of Railways
Research Designs & Standards Organisation
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Ref: STS/E/TAN/Dir.Sig.VII

13th February 2015

The CSTE, **Central Railway, Mumbai CST-400 001.** **Eastern Railway, Fairlie Place, Kolkata-700 001.** **East Coast Railway, Rail Vihar, BDA Rental Colony, Chandrashekarpur, Bhubaneswar.** **East Central Railway, Hajipur.** **Northern Railway, Baroda House, New Delhi-110 001.** **North-Eastern Railway, Gorakhpur-273 012.** **North-East Frontier Railway, Maligaon, Guwahati-781 011.** **North Western Railway, Jaipur.** **North Central Railway, Hastings Road, Allahabad.** **Southern Railway, Park Town, Chennai-600 003.** **South Central Railway, Rail Nilayam, Secunderabad-71.** **South Eastern Railway, Garden Reach, Kolkata-700 043.** **South East Central Railway, RE Office Complex, Bilaspur.** **South Western Railway, Main Office, Club Road, Keshavpur, Hubli-580023** **Western Railway, Churchgate, Mumbai-400 020.** **West Central Railway, Jabalpur.**	सी.एस.टी.ई., मध्य रेलवे, मुम्बई, सी.एस.टी. – 400 001 पूर्व रेलवे, फेयरली प्लेस, कोलकाता – 700 001 पूर्व तटीय रेलवे, रेल विहार, बी.डी.ए. रेन्टल कालोनी, चन्द्रशेखरपुर, भुवनेश्वर – 751 023 पूर्व मध्य रेलवे, हाजीपुर – 841 101 उत्तर रेलवे, बड़ौदा हाउस, नई दिल्ली – 110 001 पूर्वोत्तर रेलवे, गोरखपुर – 273 012 पूर्वोत्तर सीमान्त रेलवे, मालीगांव, गुवाहाटी – 781 011 उत्तर पश्चिम रेलवे, जयपुर – 300 206 उत्तर मध्य रेलवे, हेस्टिंग रोड, इलाहाबाद – 211 001 दक्षिण रेलवे, पार्क टाउन, चेन्नई – 600 003 दक्षिण मध्य रेलवे, सिकन्दराबाद – 500 371 दक्षिण पूर्व रेलवे, गार्डन रीच, कोलकाता – 700 043 दक्षिण पूर्व मध्य रेलवे, आर.ई. ऑफिस काम्पलेक्स, बिलासपुर दक्षिण पश्चिम रेलवे, मुख्य कार्यालय, क्लब रोड, केशवपुर, हुबली – 580 023 पश्चिम रेलवे, चर्चगेट, मुम्बई – 400 020 पश्चिम मध्य रेलवे, ओ.एस.डी. कार्यालय, जबलपुर – 482 001
The CSTE, **CORE, Nawab Yusuf Road, Civil Lines, Allahabad-01.** **Metro Railway, 23-A, Jawaharlal Nehru Road, Kolkata-1.** **Konkan Rail Corp. Ltd., Belapur Bhawan, Sector-11, Belapur, Navi Mumbai** **Delhi Metro Rail Corporation Ltd., N.B.C.C. Place, Bhishma Pitamah Marg, Pragati Vihar, New Delhi-110003**	सी.एस.टी.ई., कोर, नवाब यूसूफ रोड, सिविल लाइन्स, इलाहाबाद–211 001. मेट्रो रेलवे, 23–ए, जवाहर लाल नेहरु रोड, कोलकाता–1 कोंकण रेल कार्प लि0, बेलापुर भवन, सेक्टर–11, बेलापुर, नवीं मुम्बई डी.एम.आर.सी., एन.बी.सी.सी., प्लेस, भीष्म पितामह मार्ग, प्रगति विहार, नई दिल्ली–100003

Sub: Technical Advisory Note No. 7006 for Digital Axle Counters.

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During the CSTE's Conference held on 31.07.2014 & 01.08.2014, a technical advisory was circulated. Same advisory along with additional suggested measures is attached in the form of TAN-7006 for suitable implementation in the Railways so as to have further improvement in performance of Digital Axle Counters.

(पी.के.वर्मा)
निदेशक/सिगनल
कृते महानिदेशक/सिगनल

DA: As above.

Technical Advisory Note			
Subject	Technical Advisory for Digital axle counters		
Document Number	STS/E/TAN/7006	Version	1.0
Dated	13/02/2015	Page	1

A general technical advisory for installation and maintenance of Digital axle counters is mentioned below.

Quad Cable

1. Periodic checking of Quad cable parameters including IR, Loop Resistance, attenuation and cross talk. Parameters are mentioned in PCCL also. IR should preferably be equal to or better than 10Mohms, Loop resistance should generally not exceed 56 ohms/km, attenuation loss should not be greater than 30dB, FEXT/NEXT should be better than 55dB. It should be ensured that line loss is not more than specified by OEM.
2. Twisting of quad cable pair should be upto the terminations - one twist/inch.
3. Earthing connections to quad cable screen should preferably be through clamps soldered to screen to have good connection.
4. Avoid using same cable as DP information for long distance relay circuits. Under unavoidable cases, the quads used should be farthest in spatial distance.
5. Technical advisory note no. 6001 (wiring discipline) has already been issued earlier. This should be strictly followed.

Power Supply

6. Measurement of Voltage levels and AC ripples at DAC input. Ideally ripples should be less than 50mVp-p.
7. Separate power supply/module for DAC to be used.
8. Avoid bunching of power and DAC cables in relay room.
9. Line-wise segregation of Evaluators and its power supply to be followed.

Earthing and SPDs

10. Earthing of cable armor & screen - to achieve a low screening factor. Continuity also to be ensured.
11. Surge protection arrangement on power/communication/reset lines is required to be provided.
12. SPD & their wiring – short and straight wire with low inductance away from other wiring of electronics, SPD of proper quality needs to be ensured. Periodic checking of SPD should also be undertaken.
13. The filter and SPD unit, wherever provided separately, should always be kept in circuit. Periodic checking of same needs to be ensured.
14. TAN no. 7005 has already been issued for lightning protection measures to be taken in DAC installations.

Others

15. Continuity of Traction bonds in the vicinity of the sensors (50m) should be ensured to keep earth potential rise near DP minimum.
16. DP should be away from neutral section by 30m. Distance separation between 2 adjacent DPs should be min. 2m.
17. Sensors should be sufficiently far away from rail joints.

18. As far as possible, TX/ RX coils need to be installed on non-cess rails. This will prevent failures due to movement of rail dolly etc.
19. Screen of Sensor cables should be properly earthed at location end.
20. Redundancy in media can be planned where communication failures are high. Media changeover arrangement/ switch should be provided for this.
21. Use of High availability SSDAC in high density traffic areas can give more availability and reliability of system (BPAC applications).
22. For MSDAC, Evaluators should be kept in dust free and ventilated rooms.
23. Interactive website has been developed by CEL & Eldyne to log complaints and get feedback. Siemens have also circulated email Id for logging complaints. Railways may utilize these for reporting their issues to concerned OEMs.
24. OEMs have been advised to give onsite training to staff as per requirement of Railway.
25. Implement effective Installation and Commissioning procedures as per PCCL. All columns of the PCCL should be filled in and only then signed.
26. Person signing the PCCL should be different from installer so that additional check is enforced.

This is not exhaustive and will be updated based on feedback and suggestions from Zonal Railways.

For any issues related to this TAN (technical advisory note) please contact Director/Signal-VII at RDSO, Lucknow (Rly phone- 032-42659, DOT-0522-2465751, Email: edsig@rdso.railnet.gov.in)