भारत सरकार – रेल मंत्रालय
Government of India –
Ministry of Railways
अनुसंधान अभिकल्प और मानक संगठन
Research Designs & Standards
Organization
लखनऊ–226011
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सत्यमेव जयते

अग्रणी RDSO
रेल अग्रदूत Transforming Railways
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tcasphase2@gmail.com

No. RDSO-SIG0TCAS(TAN)/1/2021 **Date:** 18.10.2021

1.	AM/Signal, Railway Board, New Delhi	सदस्य/संकेत, रेलवे बोर्ड, नईदिल्ली
2.	**The PCSTE**	**प्र सी.एस.टी.ई.,**
(i)	Central Rly., Mumbai, CST – 400001	मध्य रेलवे, मुम्बईसी.एस.टी.– 400 001
(ii)	Western Rly, Churchgate, Mumbai – 400020	पष्चिमरेलवे, चर्चगेट, मुम्बई– 400 020
(iii)	Eastern Rly., Fairlie Place, Kolkata 700001	पूर्वरेलवे, फेयरलीप्लेस, कोलकाता– 700 001
(iv)	South Eastern Rly., Garden Reach, Kolkata -700043	दक्षिणपूर्वरेलवे, गार्डनरीच, कोलकाता– 700 043
(v)	Northern Rly. Baroda House, New Delhi-110001	उत्तररेलवे, बड़ौदाहाउस, नईदिल्ली– 110 001
(vi)	North Eastern Rly., Gorakhpur- 273012	पूर्वोत्तररेलवे, गोरखपुर– 273 012
(vii)	North East Frontier Rly., Maligaon, Guwahati	पूर्वोत्तरसीमान्तरेलवे, मालीगांव, गुवाहाटी– 781 011
(viii)	Southern Rly. Park Town, Chennai – 600003	दक्षिणरेलवे, पार्कटाउन, चेन्नई– 600 003
(ix)	South Central Rly., Secunderabad – 500371	दक्षिण मध्य रेलवे, सिकन्दराबाद–500 371
(x)	East Central Railway, Hajipur	पूर्व मध्य रेलवे, हाजीपुर
(xi)	East Coast Railway, Rail Vihar BDA Rental Colony, Chandrasekharpur, Bhubneshwar	पूर्वतटीय रेलवे, रेलविहारबी.डी.ए. रेन्टलकालोनी, चन्द्रषेखरपुर, भुवनेष्वर–751023
(xii)	North Central Railway, Ganga Complex, Subedarganj, Allahabad.	उत्तर मध्य रेलवे, गंगाकमपलेक्स, सुबेदारगंज, इलाहाबाद
(xiii)	North Western Railway, Jaipur – 300206	उत्तरपष्चिमरेलवे, जयपुर–300206
(xiv)	South Western Railway, New Zonal HQs office, 1st Floor, West Block, Gadag Road, Hubli – 580020.	दक्षिणपष्चिमरेलवे, प्रथमतल, वेस्टब्लाक, गदगरोड, हुबली–580020
(xv)	West Central Railway, OSD Office, Jabalpur	पष्चिम मध्य रेलवे, ओ0एस0डी0 कार्यालय, जबलपुर
(xvi)	South East Central Railway, R.E. Office Complex, Bilaspur – 495004	दक्षिणपूर्व मध्य रेलवे, आर0ई0 ऑफिसकाम्पलेक्स, बिलासपुर– 495004
3.	The PCSTE, Metro Railway, 23-A, Jawaharlal Nehru Road, Kolkata – 700071	प्र सी.एस.टी.ई./मैट्रोरेलवे, 23–ए, जवाहरलालनेहरू रोड, कोलकाता– 71

Sub: Technical Advisory Note for System improvement regarding installation for Stationary KAVACH (Train Collision Avoidance System).

Ref.: TCAS specification RDSO/SPN/196/2012 ver 3.2

Vide reference above, the Technical Advisory Note no. RDSO-SIG0TCAS (TAN)/01/2021 ver 1.0 has been revised and issued with approval of competent authority as SIG0TCAS (TAN)/01/2021 ver 2.0 dated 11.10.2021 regarding installation for KAVACH (Train Collision Avoidance System) & shall be implemented in all the future works.

DA: As Above

Signed by Pavan Kumar Gudavalleti
Date: 18-10-2021 11:37:26
Reason: Approved

(G. Pavan Kumar)
Executive Director/Tele-II
For Director General/Signal

Copy to:

i. CSTE(P)/SCR South Central Railway, Rail Nilayam, Secunderabad, Telangana-500025.

ii. Medha Servo Drives Pvt. Ltd., P-4/5 P-4/5B, Industrial Park, Nacharam, Hyderabad- 500076.

iii. Kernex Microsystems (India) Ltd. “Technopolis” Plot No.38 to 41, Hardware Technology Park, TSIIC Layout, Imarath Kanch, Raviryal , Maheswaram Mandal, R.R.(Dist), Hyderabad, Telegana-501510

iv. HBL Power Systems Limited, 8-2-601, Road No.10, Banjara Hills,Hyderabad-500034 (A.P.)

Government of India - Ministry of Railways
Research Designs and Standards Organisation

TECHNICAL ADVISORY NOTE			
Subject	**System Improvements regarding Installation and Maintenance for KAVACH**		
Document No.	**RDSO-SIG0TCAS(TAN)-1-2021**	**Version**	**2.0**
Date	**11.10.2021**	**Pages**	**07**

1. Scope:-

These guidelines are issued based on field experiences of KAVACH during the development project and 1200 KM project period in SCR. These guidelines shall be followed by the Zonal Railways and OEM during the installation and maintenance to improve the reliability of system.

2. RFID Tags:-

2.1 Installation of RFID Tag in sleeper: -

The RFID tag enclosure shall be good quality of FRP material and fitment clamp shall be made of stainless steel of grade 316 to avoid the corrosion and environmental effect.

Reason:

As the clamps are being used on sleepers, these are prone to different environmental conditions such as dampness, wetness, heating, UV-IR exposure, human excreta; it is proposed to use high quality metallic as well as non metallic material for fitment.

2.2 The duplicate RFID tag must be installed at a minimum distance of 3 to 5 meters between tags except for Signal foot tag.

Reason:

With this practice of installation, the direction will be set with reading of one set of duplicate tag.

2.3 Placement of adjustment tag/ junction tags:-

Adjustment tag shall be placed beyond 350 meter of Communication Mandatory Zone.

Reason:

This will remove the unnecessary EBs or SOS Messages (Fault code) as Onboard unit is not in communication mandatory zone i.e., minimum 1850m beyond the Last Stop Signal (Clause 6.8.3.1 a).

2.4 Distance between the two Normal Tags:-

The maximum distance between the two normal tags shall not be more than 1000m.

Reason:

To minimize the accumulated odometry error.

2.5 Provision of S-type Tags at the Block Section limits (Yard exits):-

S-type tags shall be provided at the Yard Exits not protected by signals like BSLB etc.,.

Reason:

To protect the Kavach equipped train not to enter into block section in shunt mode.

2.6 Provision of Normal-Tags in lieu of Signal Approach Tags:-

Normal Tags only can be linked. Hence, to ensure linking up to the nearest location to the approaching signal, Normal Tags shall be provided in lieu of Signal Approach Tag in future installations.

2.7 Marking of RFID Tag number and Type at the bottom:-

The tag number may be painted over the sleeper for easy recognition during maintenance. All RFID tags shall be marked at the side with tag number and tag type. The marking shall be as follows:-

RFID NO: Type : Location :

Reason:

To facilitate easy identification for re-installation of RFID Tags removed during PQRS works.

2.8 Replacement of RFID Tags after PQRS works need to be done accurately

Reason:

Wrong placement of RFID Tags may result in extension or reduction of communication mandatory zones or cause spurious EBs if they are placed on other lines.

3. Installation of stationary unit :-

3.1 **Numbering Scheme for Stationary unit:**-

The **first two digits** are allotted to each zonal railway as shown in the table below and Zonal railways may decide the **last three digits** for the stations. A proper record shall be maintained by the Zonal Railways to avoid repetition of number as station ID should be unique number.

Sl. No	Name of the Railway Zone	Allotted code	Sl. No	Name of the Railway Zone	Allotted code
1.	South Central Railway	00-02	**11.**	North Western Railway	30-32
2.	Northern Railway	03-05	**12.**	West Central Railway	33-35
3.	North Eastern Railway	06-08	**13.**	North Central Railway	36-38
4.	Northeast Frontier Railway	09-11	**14.**	South East Central Railway	39-41
5.	Eastern Railway	12-14	**15.**	East Coast Railway	42-44
6.	South Eastern Railway	15-17	**16.**	East Central railway	45-47
7.	Southern railway	18-20	**17.**	Metro Railway Kolkata	48
8.	Central railway	21-23	**18.**	Konkan Railway	49
9.	Western Railway	24-26	**19.**	RDSO, Lucknow	50
10.	South Western Railway	27-29	20	South Cost Railway	51-53
			21	IRISET SC	54

3.2 Kavach Wiring Diagram and configuration detail shall form part the S&T circuit diagrams issued by Zonal Headquarters and these documents shall be placed in all the relay rooms and shall be treated as part of station S&T documents.

Reason:

This will ensure that Kavach circuits are also altered whenever signal alterations are carried out by the Zonal Railways.

3.3 Zonal Railways shall ensure non-blanking of signal during signal aspect changing due to cascading feature.

3.4 Parallel Wiring of Relay Contacts read by Stationary unit shall be carried out.

Reason:

To minimize the failure of Movement Authority/out of correspondence of signal aspect at site and Loco OCIP, due to high contact resistance of relays, the parallel wiring of relay contacts.

3.5 **Unavailability of repeaters ECRs for inner Distant and Distant Signal of IB:-** If such IBs are available, the OFC need to be tapped at the signals and RIU can be installed or the aspects of these permissive signal can be deduced. Zonal Railways can choose either of these options.

3.6 Executing field units/SrDSTEs undertaking S&T work in TCAS territory should make appropriate TCAS modifications while carrying out activities like shifting of signals by few meters, shifting of turnout, closure of LCs, interlocking of LCs, insertion of Key locked points on loop lines, modification of PSR.

Reason:

To avoid spurious braking, non-correspondence of the Movement Authority/out of correspondence.

3.7 **Wiring of SM OCIP**:- 12 Core Signalling cable shall be used for button, counter & power supply. CAT-6 armoured or shielded twisted pair cables shall be used for communication portion.

3.8 **Diverse Path for routing of GSM and GPS Cables**:- The cables for one set of GSM/GPS Antenna shall be routed in one path and another set shall be routed in shortest diverse path to avoid failures due to cable cuts at a single location.

3.9 **Diverse path for wiring of RIU**:- In Auto-Section, IBS, Gate, RIU shall be connected to stationary Kavach with diverse path of OFC media only in redundant manner.

3.10 All the cable entry and exit at relay room and location box near tower shall be completely sealed to avoid rodent entry.

3.11 **Rodent proof OFC Patch cords** are to be provided at all Stations, IBS, LC and RIUs.

3.12 **Power Supply arrangement:**- The 110 volt DC supply from IPS room to Kavach rack at Interlocked Stations shall be provided with duplicated cable with suitable gauge (Min 10 Sq. mm) so as to ensure that voltage drop in cable shall not be more than 1.0

volt from integrated power supply (IPS). Each cable shall be protected with an individual isolator and fuse of suitable capacity. Existing 24V internal supply may be extended to additional relays for TCAS for better reliability and integrity.

Reason: *Duplicated cable is provided from IPS to Kavach to have redundancy of power supply connection to equipment and to prevent failure due to rat cut or any other damage.*

Cable voltage drop is restricted to 1 volt to avoid overloading of cable & also ensure correct AWG and quality wires.

3.13 Reliable Power supply such as mini IPS with backup of 8-10 hour shall be provided at mid-section, LC gates especially in Non-RE area section to avoid failure due to non-availability of power.

3.14 The DC-DC converters provided for stationary Kavach unit shall be systems along with segregation of cabling and termination for power supply up to DC-DC converters shall be in N+1 configuration. Additional DC-DC converters modules in existing IPS may be planned for STCAS/LC TCAS/ RIU as far as possible..

3.15 It shall be ensured that the Kavach equipments are earthed with shortest path to common earth bus bar in Relay equipment room. It shall be also ensured that front and back doors of Kavach cabinet shall be earthed using copper braid.

3.16 All the connectors on trackside equipment (Stationary Kavach, RIU, Radio) shall be of M-12 type connector.

Reason:

This will ensure that failures on account of loose connections are avoided.

4. Communication

4.1 Proper Radio Survey shall be carried out before deciding up on the location and height of towers to avoid failure due to obstructions like buildings, terrain etc.

4.2 Adoption of 20m/15m tower shall be permitted at midsection interlocked LC gates/IBS to overcome the geographical limitations.

4.3 The mounting of all the antennae on the tower shall be at same level as far as possible..

4.4 RF Cable length optimization in towers using Radio Box fitted at tower to reduce the dB losses in RF cable.

4.5 RF coaxial cable for the two Radios shall be routed in the different path. The coaxial cable shall be minimum LMR-600 of Amphenol/ heliax. As connectors are open to environment, they shall be provided with weather proof sealing.

4.6 The Radio tower shall be provided with lightening arrester (Franklin rod) and connected to earth along with aviation lamp.

4.7 Cable joints shall not be permitted from location box to antennae. The patch cords used shall be of minimum length.

4.8 Weather proofing to be done at all the exposed connections and it shall be monitored on monthly basis.

4.9 Radio Modems shall be installed with Modified firmware (Version no. V1.1 RC3)

4.10 Dual OFC and dual power cable in diverse path shall be provided from Stationary unit to the location box near tower to avoid common mode failures.

4.11 The frequency pairs allotted for two adjacent stations shall be different. The loco time slots for the same station shall not be adjacent to each other (minimum one time slot gap shall be kept). Also slots, P2, P27, P41 and P65 shall be kept as reserved.

4.12 Radio Receive Signal Strength measurement to be carried out on quarterly basis to identify new shadow regions developed and facilitate attention.

4.13 RF Alignment to be done periodically means quarterly to avoid loss of RF packet.

5. Mapping Scheme of PSR, Gradient Data for Offset Problem

5.1. PSR/TSR and gradient data, which is the reference for speed supervision of the train is required to be provided with respect to the available kilometer stones/traction mast number.

5.2. Centre line of the station building shall be the reference point for the mapping scheme. The centre line shall be finalized as per the actual site condition and shall not be based on SIP or ESP.

5.3. All the locations of kilometer stones/traction mast number are to be mapped to the absolute locations based on the above reference point by carrying out survey using drone/Loco mounted camera.

5.4. Fractional distances shall be mapped to captured absolute locations during survey by using the principle of proportionality considering distance between the two adjacent kilometer stones/traction masts.

6. Onboard:

6.1. Locos shall be installed with Modified firmware of IPICO RFID reader (Version no. V1.b or upgrade version V 1.C).

Reason:

This will ensure that reliability improvements are incorporated in the RFID reader.

6.2. Loco antennae shall be installed with min 3dBi antennae and LMR 400 cable. The RF cable shall be routed through the shortest possible path.

Reason:

This will ensure that RF losses on Loco front to be minimum.

6.3. Braking parameters are to be fine-tuned in alignment with Railways operational requirements.

Reason:

This will ensure that the braking is not reducing the operational efficiency.

6.4. Maintenance to be done periodically including calibrating wheel dia.

Reason:

This will ensure that the odometer is working properly.

7. **General:**

7.1. A policy at Zonal Railway shall be issued to get the changes in SIP/Table of control/field relay interface circuit/location change of signal post /PSR/LC Gates/Gradient is reflected in Stationary Kavach circuit.

7.2. It shall be ensured that Zonal Railway SIP and Table of Control shall be adhered for deducing the signal aspects and Movement Authority in Kavach.

7.3. The Factory Acceptance Test (FAT) shall be verified by Railway official and Sample verification shall be done by minimum JS/SS officer during SAT (Site Acceptance Test)

7.4. The pre-installation and pre-commissioning checklist for concerned Kavach shall be thoroughly checked at the site at the minimum Assistant officers' level jointly with the executing OEM.

7.5. The modification in the application logic, Kavach control table, RFID layout shall be controlled with version control software station wise to avoid human error.

7.6. The quality and integrity of the installation remains complete responsibility of the OEM. The firm must provide an OEM certificate regarding this before commissioning of any installation, any deficiency pointed out later, shall be done free of cost by OEM, this shall be confirmed by OEM before commissioning.

7.7. Typical drawing for fixing RFID scheme in Apron area (duly approved by track directorate) is enclosed as Annexure.

7.8. Continuous analysis as part of RAMS requirement for the lifecycle is to be done by OEMs and the details are to be shared to Railways and RDSO.

7.9. Initial and refresher training for Loco Inspectors/Pilots shall be ensured. Common group for Loco Operational staff, Maintenance and Firms shall be formed to discuss operational issues and arrive at solutions.

7.10. Equipment course shall be started by IRISET, IREEN, IRMEE and all ZRTIs/ETTCs/STTCs/DTTCs.

7.11. Maintenance procedure without affecting trains or with affecting trains is to be prescribed by Zonal Railways.

7.12. Computerized Test report using Maintenance Simulator shall be provided to facilitate Loco Shed level testing after Periodic Maintenance of Loco. Collection of health parameters (Modules, Radio and Tags) are to be ensured in NMS.

7.13. To avoid rework, new installations shall use tag data format suitable for LTE communication.

7.14. Inter Stationary unit communication channel on OFC shall be provided to avoid RIU duplication and reliability enhancement.

7.15. Provision of TCAS shall be included in all the estimates of S&T works in TCAS territory.

7.16. Identification of stations where no Mobile coverage shall be carried out through GPS based GSM/LTE Signal Strength measurement system and accordingly SIMs of service provider shall be allocated. eSIM shall be preferred over conventional SIMs.

7.17. A joint procedure order at zonal level for tag handling during p-way works shall be prepared and implemented to avoid failure due to missing tags etc.

gpkumar

(G. Pavan Kumar)
Exe Director/Tele-II
for Director General/Signal

Encl : As above

- For any issues related to this TAN (Technical Advisory Note) please contact RDSO, Lucknow (Rly phone- 032-42652, DOT-0522-2465750, Email: *tcasphase2@gmail.com*
- For continuous update on Kavach, please visit the intranet site: http://10.100.2.19/signal/policy/Indian%20Railway%20Automatc%20Train%20Protecton%20System%20(IRATP).htm

TRACK DESIGN DIRECTORATE-III

No. CT/SRC/S&T Date 01.06.2021

Sub: Approval of fitment of RFID Tags in CC apron area of station in TCAS installation station.

Ref: i. Signal Directorate's note no. RDSO-SIG0TCAS(GEN)/2/2020 dated 17.02.2021& 12.03.2021.

ii. This office note no. No. CT/SRC/S&T dated 31.03.2021

iii Signal Directorate's note no. RDSO-SIG0TCAS(GEN)/2/2020 dated 19.04.2021/04.05.2021.

iv. Joint minutes of meeting between Track, Track machine and Signal Dte of 27.08.2015 vide Note No. STS/E/TCAS/Tender/Part-VIII dated 27.08.2015 (copy enclosed)

With reference to above, a schematic drawing showing the fitment of RFID tags in CC Apron was sent by Signal Dte for examination and approval from Track Dte (ref-i). The drawing was examined and the deficiencies were communicated vide this office note under ref-ii.

In response, Signal Dte, submitted a revised drawing (ref-iii), which was examined by Track Dte (unit-III) and accordingly it is communicated that Track Design Dte has no objection to the proposed fixing arrangement of RFID tags in CC Apron area using mounting clamps, as shown in the drawing no. TCAS/2021_02_15 dated 14.04.2021 duly approved by ED/Tele-II on 04.05.2021 (submitted vide ref-iii), subject to fulfillment of conditions laid down in the joint minutes of meeting held on 27.08.2015 on similar subject as applicable (ref-iv). It should also be ensured that there is no infringement to Max. moving dimensions / IRSOD due to the proposed installation .

DA: As above

01/6/2021

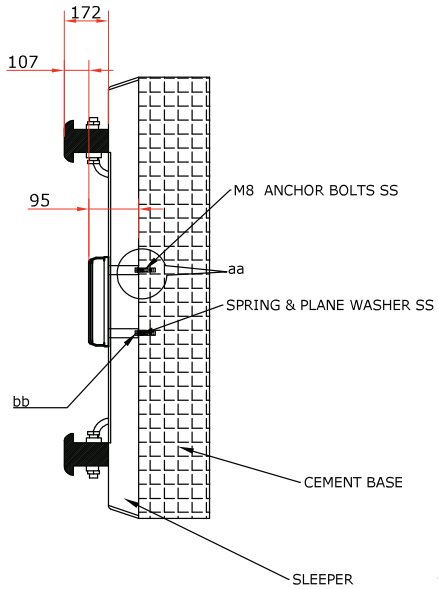
(M.K. Singh)
ADE/Track/S&F

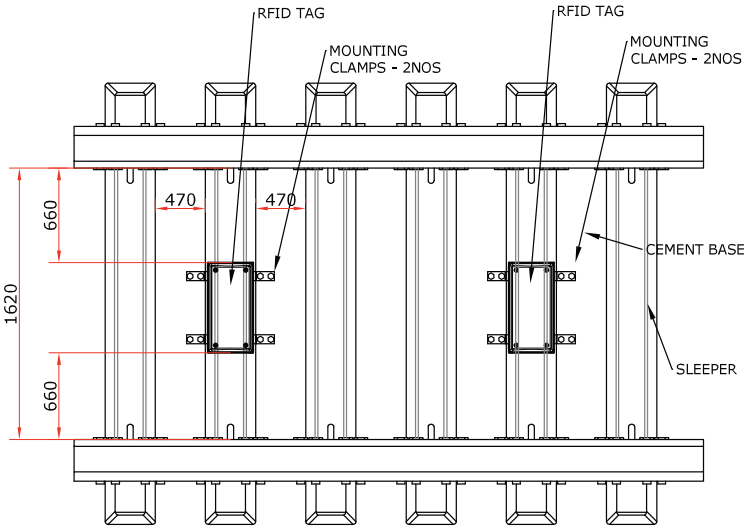
Director/Track-IV 01.6.2021

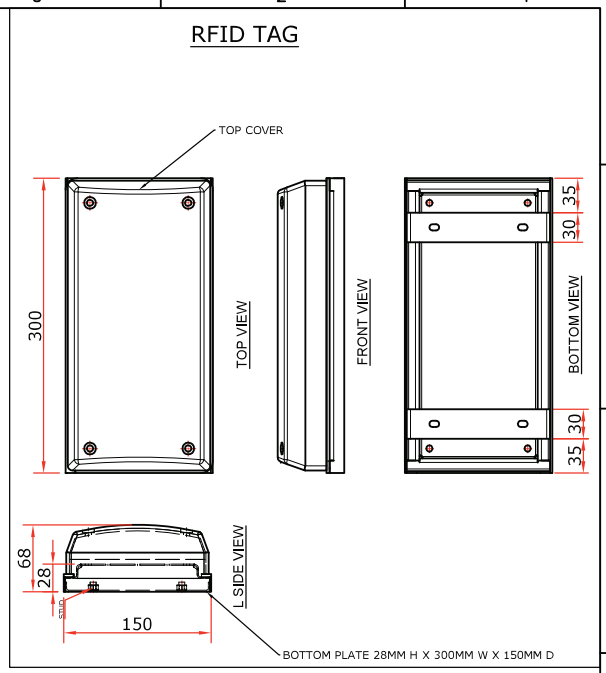
ED/Track-III 01/06/21

ED/Tele-II

245





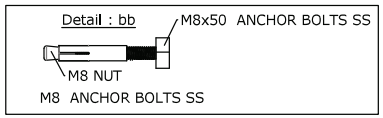


NOTE:-

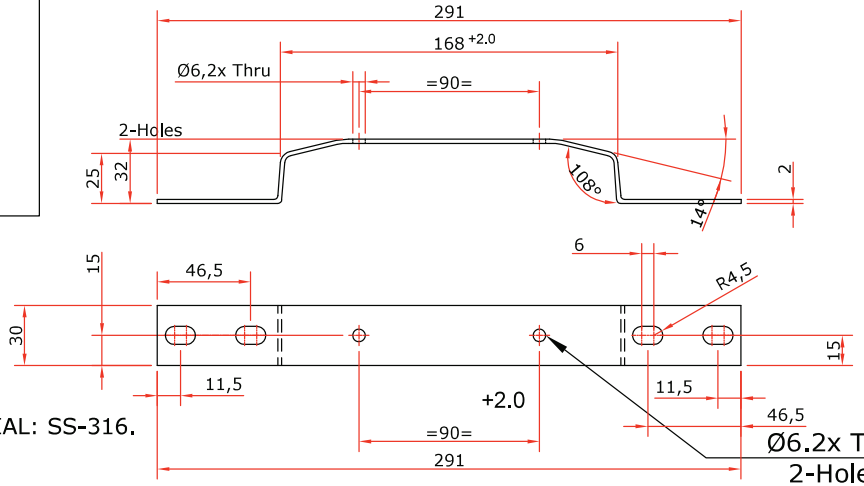
1.14mm drill bit is required for a M8 Anchor bolt.
2.Drill depth 55mm required.
3.Water sealing shall be provided on the bolts after fixing and tightening the bolts

L SIDE VIEW

Note: Bolt Height will be adjusted as per site conditions

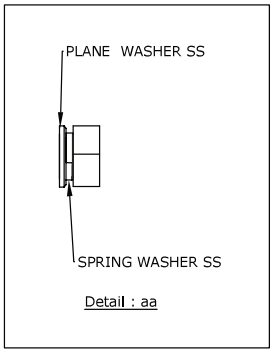


MOUNTING CLAMPS



NOTE:-

1) SHEET MATERIAL: SS-316.
2) QTY : 2No.



Pavan Kumar Gudavalleti
Digitally signed by Pavan Kumar Gudavalleti
Date: 2021.05.04 11:40:25 +05'30'

RDSO DRAWING No SDO/S&T/TCAS/008

Date (DDMMYY)	TITLE: RFID tag assembly, fixing arrangement for CC Apron		
14-04-2021	Product Code:TCAS	Drg No.TCAS/2021_02_15	

498144/2021/O/o ED/Tele-II/RDSO

549708/2021/O/o ED/TRACK DESIGN-3/RDSO

Original Copy 1 of 3 (Signal Dte)

Research Designs & Standards Organization

No. STS/E/TCAS/Tender/Part-VIII **Date : 27.08.2015**

Sub: Development of Train Collision Avoidance System (TCAS) : RFID Fixing Arrangement for use in Secunderabad – Vikarabad – Wadi (excluding) – Bidar section of SC Railway

Ref: (i) Signal Directorate Note No STS/E/TCAS/Tender/Part-V dated 16.05.2014 & 10.09.2014
(ii) Joint Meeting between Track, Track Machine and Signal Directorates of RDSO on 03.07.2015 & 27.08.2015

1.0 Through notes under reference, it has been advised by Signal directorate that the RFID Tags are to be installed on track in connection with TCAS. These RFID tags shall be fixed at the centre of PSC Sleepers and emit RF signal only when corresponding type of RFID Antenna is in vicinity (Normally underneath a Locomotive). The normal spacing of RFID tags will be about 1 Km, which may get reduced in vicinity of stations.

2.0 The typical drawings proposed by signal directorate for RFID Fixing on PSC Sleepers were studied. For fixing the RFID installation, following shall be ensured:

2.1 No holes shall be drilled in the Sleepers and the arrangement of fixing must be through clamps only. Due care shall be taken that damage/ puncturing to PSC sleepers is not caused.

2.2 In order to avoid vandalism, the nut-bolts shall be planned on the side face of the sleeper at bottom end, which shall get covered by crib ballast. The projection below the sleeper shall be restricted only to strip thickness and nut bolts shall be fixed on side of sleeper, so that working of BCM is not affected.

However, for developmental work of TCAS in Secunderabad – Vikarabad – Wadi (excluding) – Bidar section of SC Railway, as the material had already been manufactured and used for installation to expedite the progress, the clamps of alternative design, which may have nut & bolts on bottom, may also be used as the material had already been manufactured and used for installation.

2.3 The fixing arrangements shall be strong enough to withstand impact during normal ballast unloading.

2.4 The RFID tags shall be fixed at the centre of the PSC Sleeper. The topmost portion of the Fixing Arrangement, when installed, should not be more than 75 mm above top surface of PSC Sleeper at centre. The installation would be done in such a way that the width of the RFID Fixing Arrangement along the length of the PSC Sleeper does not exceed 380 mm.

3.0 While deciding the location for RFID installation following aspects shall be kept in view:

3.1 RFID tags & fixtures shall be avoided in turnout portion in general. In any case, these shall not be located in switch portion of turnout i.e. from Actual Toe of Switch (ATS) to heel of switch.

3.2 The installation of RFID Tag & fixture should be avoided at locations susceptible to ballast accumulation at the centre of sleeper such as level crossing etc. This aspect needs to be taken care at the time of survey itself.

3.3 The performance of RFID tag may get degraded during RFID Fixture getting submerged in water. Therefore, installation should be done considering this fact.

27-08-15 21/8/15 27/8/15 27.08.15 27/8/15 27.8 27.08.15

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4.0 Following issues are clarified:

4.1 The RFID Technologies being used in Track Recording Cars and Train Collision Avoidance System (TCAS) are different and non-interfering to each other.

4.2 During working of Rail Grinding Machine (RGM), the temperature of Rail at grinding location might go upto 350^0 C whereas the RFID arrangement on track is suitable up to 85^0 Celsius. These RFID tags in Fixtures are installed at the centre of sleeper away from Rail. On the basis of an experiment conducted, no short term functional deterioration in RFID was observed after normal functioning of RGM. RFID tags of same temperature endurance are provided for the purpose of Track Monitoring through Track Recording Cars (TRC) also. As such, there is no need to remove RFID tags for RGM working.

4.3 In case of mobile flash butt welding of rails, the rail temperature may increase to 800 - 900° C and sometimes hot splinters may also hit the fixture with pressure. So RFID tag installation should be planned well away from Rail Joints. In case of subsequent need of welding on account of in-service failure/ defect removals of rail/welds in vicinity of RFID location (about 5 sleepers on either side of RFID Tags), the removal of RFID will be necessary before undertaking mobile flash butt welding. In such cases, Track Staff would inform Signal staff in advance so that Signal staff can attend the site for removal & re-fixing of RFID as required.

4.4 The RFID tags and fixtures will not affect the machine maintenance of track in any way and their performance is not likely to get affected due to working of track tamping machine, DGS, ballast regulators etc. The fixture with side bolts is also not likely to affect the working of Ballast cleaning machine, as cutter chain will not obstruct the same. So, their removal will not be required for working of Ballast cleaning machine. However, initially, the BCM work at locations having RFID tags shall be done under supervision of signal staff, which shall be reviewed subsequently based on actual field experience.

4.5 In case of complete track renewal work requiring replacement of sleepers on which RFID fixtures are installed, Signal staff shall be advised in advance so that they can attend the site for removal & re-fixing.

4.6 TCAS RFID tags do not control conventional Lineside Railway Signals i.e. absence or damage or deterioration of RFID tags does not cause these Lineside Railway Signals to exhibit aspects more restrictive than they otherwise do so in accordance with signal interlocking. Absence or damage or deterioration of RFID tags of TCAS RFID tags would, however, render non-availability of supervision provided by TCAS. However, Loco Pilot can still run the train without any route-specific speed restrictions by selecting "Staff Responsible" in which the train is completely run under staff (Loco Pilot) responsibility. Therefore, in order to avoid undue adverse effect on train operations, TCAS trains shall be run under "Staff Responsible" Mode until RFID tags & fixtures restoration is completed.

This is issued with the approval of ED/Signal/RDSO, ED/Track/RDSO and ED/Track Machine/RDSO

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