**दक्षिण पश्चिम रेलवे**
**SOUTH WESTERN RAILWAY**

प्रधान कार्यालय
Headquarters Office,
संरक्षा विभाग ,हुब्बल्लि,
Safety Department, Hubballi.

सं/No. T.389 Safety Circulars/03/2023.

दिनांक / Dated: 28.02.2023.

**To All Concerned / SWR**

**Headquarters Safety Circular No.11**

**Sub:** DO's and DON'Ts for Safe Working of S&T Gears (copy enclosed).

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As Unusual Incident occurred in Hosadurga Road Station of Mysuru Division on 08.02.2023 wherein Point indication on Panel is defers at actual Point position in location.

DO's and DON'Ts for Safe Working of S&T Gears have been issued by the competent authority.

All concerned to follow the instructions strictly to avoid such incident in future.

**Encl:** Annexure 'I'.

Tiwari
28/2/23

**(आलोक तिवारी / ALOK TIWARI )**
**प्रधान मुख्य संरक्षा अधिकारी/Pr.Chief Safety Officer**

**Annexure – 'I'**

## DO'S AND DON'TS FOR SAFE WORKING OF S&T GEARS

### I. General

**Do's**

1. Take pride in providing safe & Reliable Signalling System.
2. Remember that you are vital and every action of yours has safety implications either directly / indirectly.
3. Check Station Working Rules (SWR) and ensure its correctness.
4. Ensure that completion drawings and plans are available and all the alterations incorporated.
5. Ensure that all S&T maintenance Registers/Cards are available and updated at station with standard format.
6. Ensure that S&T equipments like Point machines, Relays, LEDs, etc are replaced as per their codal life.
7. Ensure that alert Messages are coming for exceptions such as fire alarm SPAD closing/ opening of relay room etc.
8. Ask for failure memo and attend failure with proper disconnection. After restoring the failure issue restoration message to SM and also joint restoration message to all concerned with the duty SM.
9. Ensure proper disconnection and Reconnection of signalling gears at all time including failures.
10. Ensure that entries are correctly filled in all columns of disconnection and reconnection memo. Obtain signature of SM even if disconnection is not granted. Always have a book of disconnection notice in your possession.
11. Follow Maintenance schedules as given in Signal Engineering manual / G&SR of Zonal Railways.
12. Ensure double lock in relay room and sealing arrangements in all signalling system like Block Instruments, Panels etc.
13. Ensure the micro switch used for checking Relay room opening and closing is properly working.
14. Ensure that proper tools are available and Maintainers have proper knowledge of the gear, he has to attend.
15. In any case if a gear is not working safely, it should be suspended and replaced/attended at the earliest.
16. Ensure joint inspections of points and crossings done religiously with all correctness in readings and defects are promptly attended.
17. Be vigilant at all times, particularly while working with field gears.
18. Ensure that all safety features of signaling system like correct dropping of track relay with TSR, obstruction test and tack lock test of points, interlocking of advanced starter with block instruments, LC gates, correct adjustments of contact makers etc., are checked in every maintenance round.
19. Educate the traffic staffs in operation and usage of various S&T equipments to reduce failures due to wrong / careless operation. Provide reminder notices / instructions near concerned equipment.
20. Maintain all station records / log books.
21. Do take seriously feedback from the operating staff, especially about any unsafe functioning of any S&T gear, do have such cases, thoroughly investigated and also bring it to the notice of your seniors. You may be able to detect a potential safely hazard and save an accident.
22. Ensure that all the measuring instruments are in working condition.
23. Ensure availability of the safety equipment in your possession.
24. Use one socket for one appliance
25. Switch off the electric supply of fire affected areas.

26. Replace broken plugs and switches immediately
27. Switch off appliances after use and remove plugs from the socket
28. Use electrical wires, cables and materials of proper capacity and insulation
29. Use switches which clearly indicate "ON" & "OFF".
30. Use insulated wire for neutral and independent wire for earthing
31. Check sockets/plugs/wirings thoroughly if any overheating marks are seen.

**Don'ts**

1. Do not exceed the periodicity of maintenance of an S&T gear.
2. Don't work in haste. Be calm and composed while attending failures. Don't ever adopt short cut methods in attending failures.
3. Do not attend failure without getting a written message/failure memo and obtaining disconnection.
4. Don't infringe any gear or installation as per schedule of dimensions.
5. Do not attend to working S&T gears without disconnection as prescribed as per SEM.
6. In case you are unable to attend a failure **do not resort to shortcut methods** like tampering with WKR, TPR, ECPR, crank handle and LC gate interlocking etc., as these will have disastrous consequences (to be explained with help of relevant accident case studies.)
7. Do not give wrong particulars to your superior or test room after restoring a failure. Right reasons can ensure effective precautions
8. Do not open relay rooms, block instruments, and axle counter rooms without making proper entry in the relevant register for taking the SM's key.
9. Do not ignore repeated and frequent operations of reset facilities / cancellation facilities of axle counters / signals.
10. Do not bypass boom-locking arrangements of mechanical or electrical barriers. If they are not working attend to their basic cause.
11. Do not over energize track relays in any weather condition. Do not make initial adjustment of track relays in rainy season / nighttime.
12. Don't conduct any test in the face of an approaching train.
13. Don't use mobile phones while working on track.
14. Never have temporary or uninsulated joints on wiring
15. Don't lay wires under carpets, mats or doorways.
16. Don't place bare wire ends in a socket, use a three pin plug top
17. Do not connect fuse in the neutral circuits.
18. Do not replace fuse unless fault is detected

## II. Relay Room

**Do's:**

1. Ensure double locking arrangements in Relay Room (S & T and Operating depts).
2. Ensure entry in SM/s key register is made whenever SM's key is required to open the Relay Room with proper reason.
3. Ensure type, configuration and nomenclature while replacing relay.
4. Check for proper fuses in the relay rack and no fuse is bypassed
5. Check that each relay is properly plugged, clipped/bolted and sealed
6. Ensure proper tightening of cable terminals on racks.
7. Take full precautions while attending failures / any work inside the relay room.
8. Periodically check the tightness for the earth connections at MEEB, SEEB and all pin earth points.
9. Ensure proper opening and closing of relay room door through an electronic switch and also a message for opening and closing to the supervisor and officers concerned.

**Don'ts**

1. Do not tamper with the code pins of the relay while replacing
2. Don't keep extra material/ loose wires inside Relay Room
3. Do not leave any cable/ wire in hanging conditions.
4. Don't interfere with interlocking without taking proper disconnections.
5. Ensure tightness of terminals on K Rack.
6. Correct the wiring particulars written whenever any changes are made.

**III. EI**

**Do's:**

1. Diagnostic computer shall be connected to AC Power source with proper adapter/plug.
2. Before powering up the Electronic Interlocking equipment, ensure that there is no train entering into the section in both Up and Down Directions.
3. Check the SPD Health Indication i.e. whether indication glowing or not in EI-Relay Room & EI-IPS Room periodically.
4. Ensure the Maintenance Terminal PC is always ON and verify the Event Data Log Updates.
5. Download the backup of Event logs at regular intervals during AMC.
6. Periodically change over to STANDBY System by shutting Down the ACTIVE System Quarterly as per prescribed changeover procedure.
7. Observe all Electrostatic discharge precautions while handling any Printed Circuit Board or board component.
8. Front and back door of the EI systems should be always closed.
9. Ensure diagnostic status in "NORMAL" position before starting the system.

**Don'ts:**

1. Don't Use Radio equipment within the immediate vicinity of Electronic Interlocking systems as Radio transmissions can affect electronic equipment.
2. Don't Make Circuit Alterations or Repairs to the Electronic Interlocking system.
3. Don't Install or remove any printed circuit board with battery power applied to the system.
4. Don't try to Troubleshoot without training.
5. Don't switch off any of the EI-IPS modules when EI is in operation.
6. Don't remove Modules, Fuses or connectors when EI is in operation.
7. Don't forcibly Pick up any Relays in EI Room/Field.
8. Don't remove any EI Relays.
9. Don't touch the board components/ repair.
10. Don't change computer setting/Application data.
11. Don't disturb OFC cable or connector.
12. Don't switch OFF MT-PC/Loading any software/Files.
13. Don't use Removable Media/USB/DVD/CD in VDU & MT-PCs.
14. Don't attempt to repair any Electronic Interlocking system printed circuit board or peripheral device in the field.
15. Don't Reset the system when signalled.
16. Don't Force boards into the slots during insertion

**Dual VDU's**

**Do's:**

1. Ensure that one VDU is in working mode and other VDU is in standby mode.
2. Ensure that at least one successful changeover of the online system to standby system is done, as per prescribed periodicity.
3. Provide USB access lock software in both the systems to protect against virus.
4. Only one VDU should be switched off at a time whenever required.

**Don'ts:**

1. Don't place any objects/container/eatables around embedded computer monitors.
2. Don't keep liquid or inflammable items close to VDU system.
3. Don't insert Pendrive /USB without authorization.
4. Don't install and keep antivirus software or unnecessary software and files in both VDUs.
5. Don't shutdown the VDU system at any time.

**CCIP**

**Do's**

1. Check that the Emergency Point Operation (EWN) button and Emergency Route Section (EUYN) buttons are sealed.
2. Check the entry in the concerned register and ensure that it is correctly maintained, get it sealed and ascertain the cause.
3. Check that all the counters are working properly and in accordance with entries in:
    a) EWN Counter Increments on each emergency point operation.
    b) EUYN Counter Increments on each emergency route section release.
    c) EUUYN Counter Increments on each emergency route release.
    d) OYN Counter Increments on each Emergency overlap release.
    e) COGGN Counter Increments on each calling-on signal clearance operation.
4. Check that, when SM's key is taken out, it shall not be possible to do any operation from the Control Panel. Also ensure that the signal can be put back to 'ON' in this condition without altering the route.
5. Check that the buzzer and 'Push button/buttons have been left pressed' indication is working.
6. Check that the panel indication for the flasher is working properly.
7. Check that adequate numbers of button collars are provided on the operating panel.

**Don'ts:**

1. Don't do any such operation on the panel, which interferes with the movement of trains.
2. When the point zone track circuit is showing occupied indication, do not try to operate the point with EWN button without ascertaining that track circuit portion is free from vehicles/obstruction.
3. For testing of points, do not operate the points without getting consent from outdoor staff on VHF set, mobile phone or group telephone.
4. Don't break any seal without getting a written memo and entry being made in the concerned register.
5. Don't do any maintenance work in the Relay Room during the train movement in the station yard.

**IV. IPS**

**Do's**

1. Ensure correct DC polarity to Inverter input
2. Always, load only up to rated current.

**Don'ts:**

1. Do not take out plugs of modules when working/IPS is on load.
2. Do not connect battery when modules are on.
3. Do not disturb battery under voltage cut-off setting
4. Do not remove input / output connectors when unit is on
5. Do not switch-off any of the modules of a group of DC-DC converters

6. Do not set unequal voltages of the DC-DC converters of the same group.
7. Do not Run AVR at no load.
8. Do not short output of transformer.

## V. Data logger

**Do's**

1. Ensure Data logger Time is synchronized to GPS clock. The Relay to Data logger, Data logger to NMDL software in S&T control and Data logger Simulation are validated.
2. Non operated relays in Data Logger simulation should be checked periodically.
3. Data logger reports to be analyzed for failures and both for predictive and preventive measures.
4. Ensure that alert Messages are coming for closing/ opening of relay room.
5. Install the CMU in a Dust free and cool environment.
6. Please ensure that the system is running, with the NMDL software, round the Clock.
7. Ensure from time to time that the system has enough free space in the 'C' Drive.
8. Regularly, at least once in 3 months, take a copy of the previous 3 Months database in a CD.

**Don'ts:**

1. Do not open Floppy's /CDs in the CMU.
2. Do not use the CMU for other software like Signal failures entry/Signal incidence software/AutoCAD etc. as the system setting required for NMDL Modules may be disturbed.
3. Do not install Games/Screensavers /wallpapers etc.
4. Do not Shutdown the system without proper closing of NMDL and other Modules.

## VI. Axle Counter

**Do's**

1. The Indoor equipment of the axle counting system shall be protected from unauthorized access.
2. Installation, Calibration and functional testing shall only be performed with the tools prescribed and by qualified staff.

**Don'ts:**

1. Train movements must not be performed over the assigned wheel detection equipment while calibrating Axle Counter.
2. Do not use the power supply provided to the axle counter for any other application.
3. Do not open the electronic junction box in the rainy season and should be covered to protect from moisture/rain.

## VII. USFBI

**Do's**

1. Connectors for PCBs are to be plugged in or out after switching off the power supply.
2. Replacement of components or modules is to be done only with spares supplied/prescribed by the manufacturer.
3. Avoid force while plugging in/out a PCB.
4. Relay Testing Should Not Be Performed Involving Forced pick-up' or drop while the equipment is ON.

**Don'ts:**

1. No attempt is to be made to operate the equipment when Battery Voltage ranging below 19.2 V and above 28.8 V DC.

2. Do not RESET in case of "Link Failure" or Supply failure.
3. Do not do arbitrary grounding with any Common terminal inside.
4. Do not do Relay Testing involving forced pick-up or drop while the Equipment is "ON".
5. Standard restrictions against mishandling and opening of block instruments are applicable to UFSBI also.

## VIII. Electrical Point Machine

**Do's**

1. All switches shall be tested frequently for correct settings.
2. Do point test for Normal maintenance from the operating panel/VDU by the SMs only.
3. Test points from the panel/VDU only when NO train over that point.
4. Attend panel LED indication immediately when no movement of trains or when yard is Free. A proper disconnection to be taken when it is complicated.
5. Point machine shall always be kept in locked condition unless otherwise essential.
6. Disconnect both incoming and outgoing supply whenever point is disconnected.
7. Operate point manually using specific crank handle.

**Don'ts**

1. Don't extract crank handle without disconnection when required.
2. Don't adjust lock and detection slides without proper disconnection notice.
3. Do not short any electrical contacts manually under any circumstances.
4. Do not disturb the pre-setting of the detection contacts at site.

## IX. DC Track circuits

**Do's**

1. Ensure proper connection between power feed and track, relay and track and also between adjoining rails, through jumpers and rail bonds.
2. Adjustment of TR Voltage with prior disconnection notice only.
3. Replacement of Glued joints with prior disconnection notice
4. Do Track shunt testing only after verifying NO signals are cleared.
5. Do replacement/periodical over hauling of TR relay only with prior disconnection only.
6. Do Replacement of Transverse bonds with prior disconnection only.
7. Ensure that the track relays disconnected at both Feed end and relay end while doing any work.
8. During wet weather proper voltages on rail shall be ensured.
9. Do ensure that the track circuit can be properly shunted at different points in the track.
10. Disconnect Track circuits when particular track is occupied more than 24 Hrs continuously.
11. Disconnect Track circuit when noticed any abnormality like rail fracture, glued joint defect etc.

**Don'ts:**

1. Don't over energize track relays.
2. Don't adjustment of TR voltage level without proper disconnection notice
3. Don't replace TR without prior disconnection notice.
4. Don't keep the track circuit in working condition only on battery charger.
5. Don't use common feed/ track feed battery charger for different Track circuits.

## X. Color Light Signals

**Do's**

1. Testing of signals/Routing signals with OR without disconnection shall be done from the panel/VDU only when no Train approaching that signal.
2. Maintain all aspects of signals indication are lit properly on panel/VDU.
3. Disconnection of panel/VDU operation shall be given immediately whenever wrong signal indication noticed.
4. Disconnect signals when defective.

**Don'ts:**

1. Don't leave loose wires on input terminals of LED Signal lighting unit this may cause false operation.
2. Don't try to test signals/Routing signals from location box in any occasion without disconnection.
3. Don't forget to keep signal to restrictive aspect when caution imposed in station section.
4. Don't try to interchange connections of LED Signal lighting units.
5. Don't try to give direct supply to the LED Signal lighting units without proper installation.
6. Do not try to open the unit as it is sealed for environmental protection.

## XI. VRLA Batteries

**Do's**

1. Avoid sources of heat or cooling directed on to the batteries.
2. Check that the physical condition of batteries is good i.e. there are no cracks, bulges and heating marks on it.
3. The battery room and location boxes should be kept well ventilated and free from water, oil and dirt.
4. Since the voltage to be measured requires an accuracy of 0.05V. Do not exceed the charging voltage above 2.30V per cell maximum per cell.

**Don'ts**

1. Do not attempt to replace the battery without disconnection.
2. Do not boost charge the batteries for more than 12 hours.

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