



**NATIONAL OCCUPATIONAL STANDARD**

**RAIL SYSTEMS SIGNALLING MAINTAINER AND REPAIRER  
LEVEL 5**

**REFERENCE CODE / 12UMS0235-5**

**OFFICIAL GAZETTE DATE-ISSUE / SEPTEMBER 5, 2012 - 28402  
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<b>Occupation:</b>	<b>RAIL SYSTEMS SIGNALLING MAINTAINER AND REPAIRER</b>
<b>Level:</b>	<b>5<sup>1</sup></b>
<b>Reference Code:</b>	<b>12UMS0235-5</b>
<b>Prepared By:</b>	<b>Turkish State Railways (TCDD) Development &amp; TCDD Personnel Solidarity and Assistance Foundation</b>
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<sup>1</sup> Vocational Qualification Level is determined as Level 5 in the octal (8) level matrix.

## TERMS, SYMBOLS AND ABBREVIATIONS

**3<sup>rd</sup> Rail:** Energy rail which transfers electric energy used in railway vehicles into vehicle through current collector.

**ACTIVE DEVICE:** XDSL, Multiplexer, SDH, and DWDM devices in communication systems.

**INTERLOCKING:** Signalling systems control unit.

**ANTENNA:** Electromagnetic signal receiver and buzzer for communication in the rail system cars.

**INTERFACE:** Electronic and electromechanical system for inter-communication of systems at the intersection of different signal systems.

**ATC (Automatic Train Control):** Automatic Train Control.

**ATO (Automatic Train Operation):** Automatic Train Operation.

**ATP (Automatic Train Protection):** Automatic Train Protection.

**ATS (Automatic Train Stop) :** Automatic Train Stop.

**ATS (Automatic Train Supervising):** Automatic Train Supervising.

**BALISE / BEACON:** Wayside equipment transmitting the fixed and variable data recordable in ATP, ATC systems to on vehicle system.

**BARRIER MOTOR:** Electric motor which ensures operating barrier handle in level crossing.

**BARRIER:** Automatic or manually-operated wooden, PVC or metal mechanism for opening and closing level crossings to on-road vehicles.

**BONDING:** Conductor which ensures electrical continuity in rail connection points.

**BTM (Balise Transmation Module):** Balise transmission module.

**TRACTION VEHICLE (TRACTIVE VEHICLE):** Locomotive and rail-car operated by driving power of in-built motor.

**DWARF SIGNAL:** Short signals placed at the exit of passing tracks.

**DETECTOR:** Device monitoring location of switch in the circuit-controlled switches.

**RAILWAY:** A pair of rails and whole facilities composing the rails on which series of tractive and hauled vehicles move.

**CIRCUIT-CONTROLLED SWITCH:** Block single switch of which positions are monitorable from traffic control center and station control desk.

**BLADE LOCK:** Mechanical gear lock-up preventing shooting by locking blades in switches.

**AXLE COUNTER:** The unit transmitting train's existence by counting axles to signalling system.

**AXLE:** Part of wheel set connecting two wheels, carrying loads like a beam and transmitting torque to wheel.

**DMI (Driver Machine Interface):** Driver Machine Interface.

**ELECTRICALLY LOCKED SWITCH:** Block switch equipped with electrical lock, manually-operated, of which positions are monitorable from traffic control center and station control desk.

**IMPEDANCE BOND:** Equipment providing continuity of traction return current in insulated track circuit.

**INDUCTIVE LOOP:** System providing communication with train and detection in the light rail systems.

**ETCS (European Train Control System) :** European Train Control System.

**EVC (European Vital Computer):** European Vital Computer.

**F/O SIGNAL:** Alpha-numeric signals reporting deviation rate and direction.

**F/O:** Fiber optic cable.

**GAUGE:** Safety distance between permanent facilities and railway cars.

**GSM-R (Global System for Mobile Communications - Railway):** Mobile communication system providing data transmission of audio and signalling system between the railway operational personnel.

**LEVEL (GRADE) CROSSING:** Section where the railway and highway intersect at same level.

**LEVEL CROSSING PROTECTION SYSTEM:** System reporting train's existence to on-road vehicles and pedestrians at the intersections of highway and railway.

**ISCO:** International Standard Classification of Occupations.

**OHS:** Occupational Health & Safety.

**STATION:** Location of railway and its facilities used for providing traffic services and passenger and goods transportation.

**INSULATED FISHPLATE:** Insulated fishplate.

**INSULATED SEAL:** Insulation of seal for preventing intermingling of two adjacent track circuits in track circuits.

**SHORT CIRCUIT:** Low resistance line parallel to load in a electric or electronic circuit.

**PERSONAL PROTECTIVE EQUIPMENT (PPE):** All kinds of tools, instruments, appliances and devices which are worn, put on or hold by the worker and which protect the worker from one or more hazards arising from the work and effect the health and safety of the worker, and which are designed to suit such purpose.

**CONTACT:** Part for cutting and supplying voltage in the electrical circuits.

**CONTROL PANEL:** Installation in which the personnel in charge regulates the switches by the approval of traffic controller to be obtained.

**SWITCH BLADE:** Moving part guiding the vehicles passing from one road to another by reclining on one of the facility rails according to the direction in the switches.

**SWITCH HEATER:** System which prevents freezing between reclining line and switch blade in switches.

**SWITCH CONTROL SYSTEMS:** System providing control of switches in signalling systems.

**SWITCH MOTOR:** Mechanism changing the position of the switch by remote control, locking it to the final destination and transmitting the switch's position information to the signalling system.

**SWITCH:** Railway facility providing railway cars to pass from one rail to another.

**SWITCHES ZONE:** Track-circuit section of railway between entry and exit signals on one side of the stations.

**OCCUPANCY:** Presence of train in block, station track or switches' region and this region's appearing occupied due to a failure.

**CONFORMITY LEVER:** Lever which ensures locking in switch control systems.

**CONFORMITY:** Locking of switch in conformity with standards.

**ODOMETER SENSOR:** Device measuring the train's instant speed.

**POLARITY CONTROL:** Control of voltage polarity in both tracks in the insulated track circuits, insulated seals.

**PROTOCOL PRINTER:** System continuously monitoring the operations of operator and system and printing out the related texts.

**TRACK CIRCUIT:** Unit transmitting the train's existence electrically to the signalling system.

**TRACK:** Special-profile railway superstructure member providing uninterrupted and smooth bearing surface for the railway car's wheels and transferring the loads from wheels to the support elements.

**RISK:** Potential of loss, injury or other damages to arise from hazards.

**RELAY:** Electromechanic keying element which works electromagnetically.

**SENSOR:** Electronic flow, weight, speed and capacity sensor.

**SIGNAL PHONE:** Phone providing the personnel of rail systems to communicate with the control/monitoring center.

**SIGNAL:** Railway traffic facility placed on steel pipe, console or bridges with two, three or four coloured built-in lights, regulating the railway traffic by giving various colour signals,

**SIGNALLING:** Signalling systems used for ensuring safety in the railway traffic and shuntings.

**ACTUATOR:** Arm transferring the driving and hauling power in the switch motor to the switch blade in the switch control systems.

**DANGER:** Potential of damage or injury likely to affect the worker or work place and likely to exist in the workplace or to be caused externally.

**WHEEL SENSOR:** Unit reporting the wheel's rotation speed to the on-vehicle equipment in the railway cars.

**TRAFFIC CONTROLLER:** Traffic manager who uses systems and communications systems aimed to ensure train traffic security and management, manages all train motions in a certain track section in a planned way, takes decisions about train choices in exceptional cases, and who takes temporary measures in case of a track block.

**TRAFFIC CONTROL CENTER:** Center where the system required for carrying out the traffic is located, operations related to traffic are carried out and controlled and the instructions are given.

**TRAIN DETECTION SYSTEMS:** System detecting the existence of moving cars and transmitting such data to the control/monitoring center by the signalling system in the rail systems.

**TRAIN:** Integrated rail system vehicle made of one or more traction vehicles and railway cars or one or more traction vehicles.

**TRAINGRAPH:** System continuously monitoring, recording in graphics and printing out the train operations in the traffic monitoring centers.

**REMOTE CONTROL SWITCH:** Switch controlled from the traffic control center, station control desk or control panel, manually-operated if required, featuring one electric engine, of which positions are monitorable from the control center and station control desk.

**VIDEOWALL:** Control/monitoring screen made of LCD, LED or DLP displays.

**RECLINING RAIL:** Facility rail onto which the switch blades recline,

**HIGH SIGNAL:** Signals on the main route built in 3-3.8 m high pipe posts with three or four lights or consoles or bridges where the field or gauge is not convenient.

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## **1. INTRODUCTION**

National occupational standard titled Rail Systems Signalling Maintainer and Repairer (Level 5) was issued by the Turkish State Railways (TCDD) Development & TCDD Personnel Solidarity and Assistance Foundation assigned as per the provisions of Vocational Qualifications Authority (VQA) Law No. 5544 and “Bylaw on Drawing up National Occupational Standards” and “Regulation on the Establishment, Duties and Operation Procedures and Principles of the Sector Committees of Vocational Qualification Authority” introduced pursuant to the aforementioned Law.

National occupational standard titled Rail system Signalling Maintainer and Repairer (Level 5) was assessed upon receiving the opinions of the related institutions and organizations in the sector, and approved by VQA Board of Directors upon examination of the VQA Transportation, Logistics and Communication Sector Committee.



## **2. INTRODUCTION OF THE OCCUPATION**

### **2.1. Definition of the Occupation**

Rail Systems Signalling Maintainer and Repairer (Level 5) is the qualified person in terms of knowledge and experience who ensures that the signalling facilities in his areas of responsibility are under constant supervision; manages periodic maintenance, troubleshooting, defect repair, assembly and disassembly, revision and project processes, testing and controlling of all equipment related to the system for commissioning in accordance with the technique. Rail Systems Signalling Maintainer and Repairer (Level 5) plans and organizes the processes he manages and ensures coordination between the units.

Rail Systems Signalling Maintainer and Repairer (Level 5) is responsible for the accuracy, timing and quality of the control, maintenance, assembly and disassembly works carried out under his supervision. In the performance of works, he works in accordance with the work instructions and informs the failures and defects outside his area of responsibility to the relevant persons in charge. He assesses the risks related to his occupation. Taking measures related to his own occupational safety and making contributions to the occupational safety of the other persons working with him are included in the responsibilities of the Rail Systems Signalling Maintainer and Repairer (Level 5).

### **2.2. Place of the Occupation in International Classification System**

**ISCO 08:** 3114 (Electronics Engineering Technicians)

### **2.3. Regulations on Health, Safety and Environment**

Labor Law No. 4857

Social Security and General Health Insurance Law No.5510

Regulation on Heavy and Dangerous Work

Communication on Vocational Training of Workers in Heavy and Dangerous Work

Regulation on Packaging Waste Control

Regulation on Waste Oils Control

Regulation on the General Principles of Waste Management

Regulation on Procedures and Principles of Occupational Health and Safety Trainings of the Employees

Regulation on Authorities, Duties and Responsibilities of Electrical Engineers

Regulation on Electrically Powered Current Facilities

Regulation on Manual Handling Works

Regulation on Noise

Regulation on Safety and Health Signs

Regulation on Preparation, Completion and Cleaning Works

Regulation on Conditions of Health and Safety in Using Work Equipment

Regulation on Health and Safety Measures to be taken in the Workplace Buildings and Additional Buildings

Regulation on Control of Solid Wastes

Regulation on Health and Security Measures for Working with Chemicals

Regulation on Use of Personal Protective Equipments in the Workplace

Machinery Safety Directive (2006/42/EC)

Regulation on Preventing the Personnel from the Hazards of the Explosive Environments

Regulation on Control of Hazardous Wastes  
Regulation on Vibration

Furthermore, it is essential to obey laws, statutory rules and regulations on occupational health and safety and environment; and to perform risk analysis regarding this issue.

#### **2.4. Other Legislation Regarding the Occupation**

Public Servants Law No. 657

Trade Unions Law No. 2821

Collective Bargaining Agreements, Strike and Lock-Out Law No. 2822

Highway Traffic Law No. 2918

Vocational Training Law No. 3308

Government Employee Unions and Collective Bargaining Law No. 4688

Decree Law Concerning Regulation of State Economic Enterprises Personnel System Law No. 399 and Repealing Some Articles of Decree Law No. 233

Regulation on Vocational and Technical Training

And it is essential to obey other current legislations, laws, statutory rules and by-laws related to occupation.

#### **2.5. Working Environment and Conditions**

Provided that they're not above the international standards; risk of exposure to smell, noise, humidity, vibration, excessive air flow, electric current and radiation may be included in the negative working conditions of the Rail Systems Signalling Maintainer and Repairer (Level 5). Working in shifts is in the question.

There are also damage and injury risks which require taking occupational health and safety measures while performing the work. Rail Systems Signalling Maintainer and Repairer (Level 5) cooperates with the employees carrying out different works and uses the appropriate personal protective equipment during his operations.

#### **2.6. Other Requirements Regarding the Occupation**

Rail Systems Signalling Maintainer and Repairer (Level 4) shall not have claustrophobia, fear of heights and be allergic to chemicals and shall have "Form of Initial Entrance and Periodical Medical Examination for Workers in Heavy and Dangerous Work" report.

## OCCUPATIONAL PROFILE

### 3.1. Duties, Tasks and Performance Criteria

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
A	To apply occupational health and safety, fire and emergency rules	A.1	To apply legal and workplace rules regarding occupational health and safety	A.1.1	Participates in trainings related to Occupational Health and Safety.
				A.1.2	Uses the work clothes and personal protective equipment suitable for the work performed.
				A.1.3	Supervises activities of determining deficiency, suitability for use and adequacy of expiry dates of personal protective equipment and replacing the inadequate with the new ones.
				A.1.4	Ensures availability of first aid, emergency medical intervention or personal protective equipment related to OHS as ready for use and operative.
				A.1.5	Contributes to the safety of work area and other employees by placing and protecting the warning signs related to the work in accordance with the company's instructions.
		A.2	To decrease risk factors	A.2.1	Contributes to the activities related to determination of risks.
				A.2.2	Contributes to the activities related to determination of risks by assessing the hazards and risks related to his work within the scope
				A.2.3	Contributes to the activities for decreasing risk factors.
		A.3	To apply emergency procedures in case of emergency	A.3.1	Coordinates the activities of taking measures to determine the cases of emergency and eliminate them rapidly.
				A.3.2	Informs the cases of emergency which are impossible to eliminate instantly to the authorities
				A.3.3	Carries out the works described in the emergency procedure.
				A.3.4	Applies the exit or escape procedures in cases of emergency.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
<b>B</b>	To fulfill the provisions of environmental protection legislation	<b>B.1</b>	To assess environmental hazards	<b>B.1.1</b>	Carries out environmental impact assessment related to the performed activities and assesses potential risks.
				<b>B.1.2</b>	Participates in periodic trainings for environmental protection requirements and practices.
				<b>B.1.3</b>	Carries out the activities related to elimination of determined <u>environmental hazard sources and risk factors.</u>
		<b>B.2</b>	To ensure environmental protection measures are applied	<b>B.2.1</b>	Ensures the measures are taken for the environmental impacts to occur during the performance of work processes in accordance with the company's instructions.
				<b>B.2.2</b>	Ensures that the wastes occurred during the performance of work <u>processes are disposed in accordance with the company's instructions.</u>
				<b>B.2.3</b>	Takes measures related to safe and healthy operation of device, equipment and tools used against negative environmental impacts to occur.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
C	To work in accordance with the quality management system regulations	C.1	To control the quality of works performed	C.1.1	Applies the quality assurance principles and methods in accordance with the company's instructions stated in the task forms.
				C.1.2	Ensures that the devices and tools used in the work processes are operated in accordance with the conditions described in the quality assurance rules and methods.
				C.1.3	Supervises the conformity of the tasks performed to the standards.
				C.1.4	Fills in the quality management system forms related to the work .
		C.2	To participate in the activities related to prevention of faults and defects determined in the processes	C.2.1	Informs the faults and defects determined during the works to the relevant chief/authority.
				C.2.2	Participates in the research and assessment activities related to determination of reasons for faults and defects.
				C.2.3	Submits his and his team's observations, ideas and suggestions for improvement of work processes and elimination of faults to the relevant authority in accordance with the company's rules and methods.
				C.2.4	Applies and ensures the application of the company's rules and methods related to the fault and defect repairs.
				C.2.5	Informs the faults and defects outside his authority or he fails to repair to the relevant authority.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
<b>D</b>	To make pre-work preparations	<b>D.1</b>	To make personal preparations	<b>D.1.1</b>	Carries out his personal care and cleaning in accordance with the rules determined by the workplace.
				<b>D.1.2</b>	Is present in the workplace at the time stated in the work legislation before the work starts.
				<b>D.1.3</b>	Carries out the tasks related to the control documents of work attendance (such as clock in, signing, etc.).
				<b>D.1.4</b>	Wears identification symbols and signs on his work clothes.
		<b>D.2</b>	To make personnel planning	<b>D.2.1</b>	Makes plans regarding equipments which are in accordance with the task to be performed.
				<b>D.2.2</b>	Carries out personnel distribution for teams in accordance with the quality of the task to be performed.
		<b>D.3</b>	To accept work	<b>D.3.1</b>	Takes the work schedule.
				<b>D.3.2</b>	Gathers information from the person who has assigned him in case of on-going works.
				<b>D.3.3</b>	<del>Discusses the work schedule with the employees included in the time of the works.</del>
				<b>D.3.4</b>	Obtains permission in works affecting other departments.
		<b>D.4</b>	To investigate the work area	<b>D.4.1</b>	Inspects the conformity of work area to the duty.
				<b>D.4.2</b>	Ensures that the negative aspects of the works are improved.
		<b>D.5</b>	To prepare the equipment and material for work	<b>D.5.1</b>	Chooses equipments and materials according to instructions.
				<b>D.5.2</b>	Prepares equipments and materials for work.
				<b>D.5.3</b>	Repairs the faults and defects of the defective equipment and material under his authority.
				<b>D.5.4</b>	Informs related authority/personnel for replacement/repair of defective equipment and material.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
E	To ensure that periodic maintenance is carried out (To be continued)	E.1	To make preparations before periodic maintenance	E.1.1	Reviews the records related to the system equipment to be maintained and obtains information from those concerned.
				E.1.2	Determines and ensures timely delivery of the spare parts and consumable materials required for maintenance.
				E.1.3	Ensures the preparation and adjustment of tools and appliances required for maintenance.
				E.1.4	Ensures that the measures of occupational health and safety are taken and applied before starting the maintenance work.
				E.1.5	Determines the completion period of work by considering the mean processing time required for maintenance.
				E.1.6	Obtains confirmation from relevant authority through appropriate communications means regarding that the line is closed to traffic before starting the work.
				E.1.7	If the line is fed by the third rail, determined the necessity of power cut in the third rail within the line during the work.
				E.1.8	Carries out grounding in the work area or ensures that it is carried out.
		E.2	To ensure that the periodic maintenance of the switch control system is carried out (To be continued)	E.2.1	Controls switch motor cables and connections.
				E.2.2	Controls switch cover closure connections and ensures their replacement.
				E.2.3	Controls switch blade lock and ensures that it is replaced. <sup>ii</sup>
				E.2.4	Controls that switch motor covers are closed and ensures that it is controlled.
				E.2.5	Controls grounding cable.
				E.2.6	Controls damages is switch by naked eye.

<sup>ii</sup> Applicable in national railway lines.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
E	To ensure that periodic maintenance is carried out (To be continued)	E.2	To ensure that the periodic maintenance of the switch control system is carried out (To be continued)	E.2.7	Controls all screws, connection points and moving parts and ensures that they are controlled.
				E.2.8	Controls damages in mechanical parts of motor and ensures that they are controlled.
				E.2.9	Controls protections and seals and ensures that they are controlled. <sup>III</sup>
				E.2.10	Controls contact lids and switch contacts and ensures that they are controlled.
				E.2.11	Controls switch motor's electric and mechanical operation and ensures that it is controlled.
				E.2.12	Controls hydraulic system and ensures that oil shortage is complemented.
				E.2.13	Controls interlocking of switch blades in both directions and ensures that it is controlled.
				E.2.14	When switch motor is not in conformity controls power cut of switch within standard time.
				E.2.15	Ensures lubrication of moving parts of switch motor, electrically locked switch detector and detectors.
				E.2.16	Controls the gap in switch blades according to standard values.
				E.2.17	Controls cables of switch heater and ensures they are controlled. <sup>IV</sup>
E.2.18	Controls connections in switch distribution boxes and ensures they are controlled.				
E.2.19	Controls heater resistance bars. <sup>V</sup>				

<sup>III</sup> Applicable in national railway lines.

<sup>IV</sup> Applicable in national railway lines.

<sup>V</sup> Applicable in national railway lines.



Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
<b>E</b>	To ensure that periodic maintenance is carried out (To be continued)	<b>E.2</b>	To ensure that the periodic maintenance of the switch control system is carried out	<b>E.2.20</b>	Controls functions of displays in control panel and ensures that they are controlled.
				<b>E.2.21</b>	Controls electrical connection points and ensures they are controlled.
				<b>E.2.22</b>	Controls synchronised operation of all switches.
				<b>E.2.23</b>	Controls switch heaters' sensors and functions in control panel and ensures that they are controlled. <sup>VI</sup>
				<b>E.2.24</b>	Controls isolation of heaters and ensures that it is controlled. <sup>VII</sup>
				<b>E.2.25</b>	Controls function of heater. <sup>VIII</sup>
				<b>E.2.26</b>	Carries out gauge measurements of switch devices.
				<b>E.2.27</b>	Ensures that torque adjustments of switch motor are made.
				<b>E.2.28</b>	Ensures that maintenance of switch local control panels is carried out.
				<b>E.2.29</b>	Controls switch local control panels and ensures that they are controlled.
				<b>E.2.30</b>	Informs his superior about failures or defects observed in switch superstructure.
				<b>E.2.31</b>	Removes defects or failures he observed during switch maintenance and ensures that they are removed.
				<b>E.2.33</b>	Ensures that switch control systems are maintained in accordance with maintenance instructions.

<sup>VI</sup> Applicable in national railway lines.

<sup>VII</sup> Applicable in national railway lines.

<sup>VIII</sup> Applicable in national railway lines.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
E	To ensure that periodic maintenance is carried out (To be continued)	E.3	To ensure maintenance of signals (To be continued)	E.3.1	Controls signal energy cables and connectors and ensures that they are controlled..
				E.3.2	Ensures cleaning of signal optic systems.
				E.3.3	Replaces lamps that need to be replaced and ensures their replacement.
				E.3.4	Controls grounding cables and ensures that they are controlled.
				E.3.5	Controls signal gates and ensures that they are controlled.
				E.3.6	Controls signal focusing.
				E.3.7	Controls sufficiency of amount of leds which are in operation in led signal displays.
				E.3.8	Controls impermeability of signal heads and connection boxes and ensures that it is controlled.
				E.3.9	Ensures cleaning of connection boxes and signal heads.
				E.3.10	Carries out signal display function tests of signals.
				E.3.11	Carries out voltage adjustment of filament signal lamps.
				E.3.12	Carried out gauge measurements of signals.
				E.3.13	Controls paints of signals and informs his superior about the ones that need to be painted.
				E.3.14	Controls signal visual range and informs his superior about conditions which hamper visibility.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
E	To ensure that periodic maintenance is carried out (To be continued)	E.3	To ensure maintenance of signals	E.3.15	Controls all screws, connection parts and moving parts.
				E.3.16	Controls legibility of signal numbers and their compatibility with numbering system.
				E.3.17	Recover failures observed during signal maintenance.
		E.4	To ensure maintenance of train detection systems (To be continued)	E.4.1	Carried out gauge measurements of track circuit boxes.
				E.4.2	Controls grounding connections of transceivers and ensures that they are controlled.
				E.4.3	Short circuits track circuit and controls its occupancy.
				E.4.4	Carries out polarity control in insulated seal.
				E.4.5	Controls track circuit voltage-current-phase-frequency values and makes due adjustments.
				E.4.6	Controls impedance bond connections and ensures that they are controlled. <sup>IX</sup>
				E.4.7	Controls connection bridges, insulation joints, connection boxes, connection ropes, grounding and rail return current joints and ensures that they are controlled.
				E.4.8	When track circuit is open, carries out measurement of rail voltage.
E.4.9	For a safe connection, controls all welded and screwed connections on lines and ensures that they are controlled.				
E.4.10	Carries out function tests of train detection systems.				
E.4.11	Removes failures he observed during maintenance of train detection systems (track circuits-axle counter systems) and ensures that they are removed.				

<sup>IX</sup> Applicable in national railway lines.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
E	To ensure that periodic maintenance is carried out (To be continued)	E.4	To ensure maintenance of train detection systems	E.4.12	Measures input voltage of axle counters and confirms that they are in the range of tolerance.
				E.4.13	Measures frequencies of wheel detection sensors and confirms that they are in the range of tolerance.
				E.4.14	Ensures internal and external cleaning of loop connection boxes.
				E.4.15	Ensures cleaning of electronic cards.
				E.4.16	Controls integrity of inductive loop.
				E.4.17	Carries out tests and measurement s of electronic cards in loop connection boxes.
				E.4.18	Obtains confirmation from control center regarding that train detection system which is maintained is not occupied.
		E.5	To ensure maintenance of level crossing protection systems (To be continued)	E.5.1	Ensures that surrounding of barrier driver is clean.
				E.5.2	Carries out measurement and maintenance of energy sources according to standards and ensures that they are carried out.
				E.5.3	Controls auditory and visual highway signal's bell and flashers.
				E.5.4	Controls grounding of auditory and visual highway signal and ensures that it is controlled.
				E.5.5	Controls barrier motors and levers and lamps on barrier lever.
				E.5.6	Controls passivity of level crossing after train passes by.

<sup>x</sup> Applicable in national railway lines.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
E	To ensure that periodic maintenance is carried out (To be continued)	E.5	To ensure maintenance of level crossing protection systems	E.5.7	Controls if crossing which became passive has become re-active since train has not left the region.
				E.5.8	Controls barrier gear and ensures that it is lubricated.
				E.5.9	Controls cable connections and their connection to rail and ensures that they are controlled.
				E.5.10	Controls paint of hardwares and informs his superior about those which need to be painted.
				E.5.11	Controls level crossing cabinet and ensures that it is controlled.
				E.5.12	Controls voltage adjustment of auditory and visual highway signal lamps.
				E.5.13	Replaces lamps that need to be replaced and ensures that they are replaced.
				E.5.14	Removes failures he observed during maintenance of level crossing maintenance and ensures that they are removed.
		E.6	To ensure maintenance of ATP and ATC on-vehicle equipments <sup>XI</sup>	E.6.1	Measures wheel's diameter and logs it into the system.
				E.6.2	Cleans DMI screen in accordance with standards and ensures that it is cleaned.
				E.6.3	Controls odometric sensors and ensures that they are controlled.
				E.6.4	Controls energy sources and batteries within the system and ensures that they are controlled.
				E.6.5	Controls EVC, DMI and antennas.
				E.6.6	Removes failures he observed during maintenance of ATP and ATC on-vehicle equipments and ensures that they are removed.

<sup>XI</sup> Applicable in national railway lines.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
E	To ensure that periodic maintenance is carried out (To be continued)	E.7	To carry out maintenance of ATS (automatic train stop), ATP and ATC wayside equipments and to ensure that it is carried out	E.7.1	Controls ATS (automatic train stop) ground magnets and balis/beacons (fixed, variable) .
				E.7.2	Controls line units.
				E.7.3	Controls ATS (automatic train stop) ground magnets and rail joints and ensures that they are controlled.
				E.7.4	Controls balis/beacons and ensures that they are controlled.
				E.7.5	Measures frequency and current values of ATS (automatic train stop) ground magnets and ensures that they are measured.
				E.7.6	Removes failures he observed during maintenance of ATS (automatic train stop), ATP and ATC wayside equipments and ensures that they are removed.
		E.8	To carry out maintenance of central and local control/supervision systems and their infrastructures and to ensure that it is carried out (To be continued)	E.8.1	Ensures cleaning of central and local control/supervision panels.
				E.8.2	Ensures cleaning of traingraph and protocol printers.
				E.8.3	Replaces toners, cartridges and ribbons of traingraphs and protocol printers and ensures that they are replaced.
				E.8.4	Ensures that system computers and peripheral accessories are cleaned.
				E.8.5	Controls operation of traingraph device and protocol registration device and ensures that their operation is controlled.
				E.8.6	Controls colors and warnings of objects in control/supervision panels and ensures that they are controlled.
				E.8.7	Controls all auditory and visual alarms within the system and ensures that they are controlled
				E.8.8	Controls control buttons and relays and ensures that they are controlled.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
E	To ensure that periodic maintenance is carried out (To be continued)	E.8	To carry out maintenance of central and local control/supervision systems and their infrastructures and to ensure that it is carried out	E.8.9	Controls data communications systems in control center and technical buildings and ensures that they are controlled.
				E.8.10	Controls air conditioning systems in technical buildings and informs relevant authorities about defects and failures.
				E.8.11	Removes failures he observed during maintenance of control/supervision systems and their infrastructures and ensures that they are removed.
				E.8.12	Supervises and maintains control center audio recording systems and ensures that they are carried out.
		E.9	To carry out maintenance of interlocking systems and to ensure that it is carried out	E.9.1	Controls cable connection points of interlocking units and ensures that they are controlled.
				E.9.2	Carries out tests and controls of interlocking systems.
				E.9.3	Tests units which ensure train-line communications and ensures that they are tested.
				E.9.4	Ensures that roofs, cabinets and connection components are cleaned.
				E.9.5	Controls notification leds and lamps and ensures that they are controlled.
				E.9.6	Removes failures he observed during maintenance of interlocking systems and ensures that they are removed.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
E	To ensure that periodic maintenance is carried out	E.10	To carry out maintenance of communications systems and their infrastructures and to ensure that it is carried out <sup>xii</sup>	E.10.1	Controls cable connections of signal system telephones.
				E.10.2	Controls grounding connection of signal system telephones and ensures that it is controlled.
				E.10.3	Controls lock mechanism of signal system's telephone cabinet and ensures that it is controlled.
				E.10.4	Controls central telephone system and ensures that it is controlled.
				E.10.5	Controls telephone sockets of signal system and ensures that they are controlled.
				E.10.6	Carries out equipment and function tests of signal system telephones.
				E.10.7	Removes failures he observed during maintenance of communications systems and their infrastructures and ensures that they are removed.
		E.11	To carry out maintenance of cables and cable distribution boxes and to ensure that it is carried out	E.11.1	Controls cable heads and ensures that they are controlled.
				E.11.2	Removes failures he observed during maintenance of cables and cable distribution boxes and ensures that they are removed.

<sup>xii</sup> Applicable in national railway lines.



Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
F	To ensure that the defects are repaired (To be continued)	F.1	To make preparations before defect repair	F.1.1	Reviews the records related to the system equipment to be repaired and obtains information from those concerned.
				F.1.2	Determines and ensures timely delivery of the spare parts and consumable materials required for repair of the system equipment.
				F.1.3	Ensures the preparation and adjustment of tools and appliances required for repair of the system equipment.
				F.1.4	Takes occupational health and safety measures before starting repair work.
				F.1.5	Determines the completion period of work by considering the mean processing time required for repair.
				F.1.6	Before starting work, receives confirmation from his superior if the line is appropriate to work.
		F.2	To ensure that the defects of switch control system are repaired (To be continued)	F.2.1	Carries out due controls and determines the failure point and type.
				F.2.2	Replaces defective fuse within switch control systems and ensures that it is replaced.
				F.2.3	Replaces defective switches and ensures that they are replaced.
				F.2.4	Replaces defective electric motor and ensures that it is replaced.
				F.2.5	Determines failure in cables feeding switch control systems and removes it.
				F.2.6	Carries out adjustment of switch actuators.
				F.2.7	Ensures adjustment of conformity levers of the switch.
				F.2.8	Informs relevant unit regarding failure arising from line superstructure.
				F.2.9	Determines failures arising from hydraulic systems.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
F	To ensure that the defects are repaired (To be continued)	F.2	To ensure that the defects of switch control systems are repaired	F.2.10	Adjusts switch conformity contacts and ensures that they are adjusted.
				F.2.11	Ensures cleaning of foreign objects determined between switch reclining line and switch blade.
				F.2.12	Controls adjustments of motor switches, locked and circuit controlled switches in accordance with standards indicated in maintenance instructions and ensures that they are controlled.
				F.2.13	Repairs defects of switch local control panels.
				F.2.14	Replaces defective mechanical parts within switch motor.
				F.2.15	Tests operation of switch mechanically and electrically.
		F.2.16	Closes switch motor covers and ensures that they are closed.		
		F.3	To ensure that the defects of signals are repaired	F.3.1	Carries out due controls and determines point and type of failure.
				F.3.2	Replaces defective lamp and ensures that it is replaced.
				F.3.3	Adjusts lamp voltages and ensures that they are adjusted.
				F.3.4	Replaces defective equipments (relay, card, transformer, fuse, etc.) and ensures that they are replaced.
				F.3.5	Troubleshoots failure in cables feeding signals and removes them..
				F.3.6	Closes signal covers and ensures that they are closed.
F.3.7	Tests signal upon after troubleshooting.				

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
F	To ensure that the defects are repaired (To be continued)	F.4	To ensure that the defects of train detection systems are repaired (To be continued)	F.4.1	Carries out due controls and determines point and type of failure.
				F.4.2	Replaces defective equipments and fuses and ensures that they are replaced.
				F.4.3	Measures output voltages of equipments.
				F.4.4	Controls feeding devices of equipments and loops and ensures that they are controlled.
				F.4.5	Troubleshoots failure in bonding connections.
				F.4.6	Controls rail connections and ensures that they are controlled.
				F.4.7	Tests insulation of insulated seals.
				F.4.8	Informs relevant authorities regarding replacement of defective isolated splints.
				F.4.9	Measures rail circuit feeding voltage and ensures that it is measured.
				F.4.10	Informs relevant authority about rail breakdown.
				F.4.11	Measures transmitter input and output voltages and ensures that they are measured.
				F.4.12	Replaces defective transmitter and ensures that it is replaced.
				F.4.13	Measures receiver input and output voltages and ensures that they are measured.
				F.4.14	Replaces defective receiver and ensures that it is replaced.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
F	To ensure that the defects are repaired (To be continued)	F.4	To ensure that the defects of train detection systems are repaired	F.4.15	Troubleshoots failures of cables within wheel detection systems.
				F.4.16	Replaces defective wheel detection sensors and ensures that they are replaced.
				F.4.17	Resets axle counter system.
				F.4.18	Controls integrity of inductive loop and troubleshoots failure.
				F.4.19	Closes device boxes and ensures that they are closed.
		F.5	To ensure that the defects of level crossing protection systems are repaired (To be continued) <sup>xiii</sup>	F.5.1	Carries out due controls and determines point and type of failure.
				F.5.2	Replaces defective fuses within level crossing protection system and ensures that they are replaced.
				F.5.3	Repairs the defect of level crossing interlocking system.
				F.5.4	Replaces defective energy sources within level crossing and ensures that they are replaced
				F.5.5	Repairs failure of flashers within illuminated track signal.
				F.5.6	Adjusts lamp voltages.
				F.5.7	Repairs failure of rings within high railroad signal and ensures that it is repaired.

<sup>xiii</sup> Applicable in national railway lines.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
F	To ensure that the defects are repaired (To be continued)	F.5	To ensure that the defects of level crossing protection systems are repaired	F.5.8	Replaces barrier lever and ensures that it is replaced.
				F.5.9	Replaces defective contacts within barrier driver and ensures that they are replaced.
				F.5.10	Repairs failure of electric motor of barrier driver and ensures that it is repaired.
				F.5.11	Replaces electric motor of barrier driver and ensures that it is replaced.
				F.5.12	Replaces defective lamps on barrier lever and ensures that they are replaced.
				F.5.13	Repairs defects of level crossing failure detection system and ensures that they are repaired.
				F.5.14	Closes device boxes and ensures that they are closed.
		F.6	To ensure that the defects of ATP and ATC on-vehicle equipments are repaired <sup>XIV</sup>	F.6.1	Carries out due controls and determines point and type of failure.
				F.6.2	Replaces defective energy sources and modules within ATP and ATC on-vehicle systems and ensures that they are replaced.
				F.6.3	Replaces ETCS DMI device and ensures that it is replaced.
				F.6.4	Replaces fuses within ATP and ATC on-vehicle systems and ensures that they are replaced.
				F.6.5	Replaces odometric sensors, BTM and antennas and ensures that they are replaced.
				F.6.6	Replaces ETCS DMI speaker and ensures that it is replaced.
				F.6.7	Closes device boxes and ensures that they are closed.

<sup>XIV</sup> Applicable in national railway lines.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
F	To ensure that the defects are repaired (To be continued)	F.7	To ensure that the defects of ATS (automatic train stop), ATP and ATC on-vehicle equipments are repaired	F.7.1	Carries out due controls and determines point and type of failure.
				F.7.2	Replaces ATS (automatic train stop) ground magnets and ensures that they are replaced.
				F.7.3	Replaces balis/beacons and ensures that they are replaced.
				F.7.4	Replaces fuse of ATS (automatic train stop) ground magnet and ensures that it is replaced.
				F.7.5	Repairs cable defect of ATS (automatic train stop) ground magnets and ensures that it is repaired.
				F.7.6	Repairs cable defects of balis/beacons and ensures that they are repaired.
				F.7.7	Replaces ATS (automatic train stop) control cards and ensures that they are replaced.
				F.7.8	Closes device boxes and ensures that they are closed.
		F.8	To ensure that the defects of central and local control/supervision systems and their infrastructures are repaired (To be continued)	F.8.1	Carries out due controls and determines point and type of failure.
				F.8.2	Repairs defects of central and local control/supervision panels and ensures that they are repaired.
				F.8.3	Replaces projection lamps and ensures that they are replaced.
				F.8.4	Replaces traingraph and protocol printers and ensures that they are replaced.
				F.8.5	Replaces defective modules within system and ensures that they are replaced.
				F.8.6	Replaces operator consoles and ensures that they are replaced.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
F	To ensure that the defects are repaired (To be continued)	F.8	To ensure that the defects of central and local control/supervision systems and their infrastructures are repaired	F.8.7	Repairs defects of operator telephone systems and ensures that they are repaired.
				F.8.8	Replaces computer equipments such as keyboard, mouse, etc. and ensures that they are replaced.
				F.8.9	Repairs defects of information frame system and ensures that they are repaired.
				F.8.10	Replaces RTU modules and ensures that they are replaced.
				F.8.11	Replaces defective fuses and ensures that they are replaced.
				F.8.12	Controls system registration device and informs relevant authority about the defect.
				F.8.13	Determines defect of diagnosis system and repairs it.
				F.8.14	Controls if device boxes are closed.
		F.9	To ensure that the defects of interlocking systems are repaired	F.9.1	Carries out due controls and determines point and type of failure.
				F.9.2	Replaces fuse within interlocking system.
				F.9.3	Replaces defective relay, relay group or electronic module within interlocking system and ensures that they are replaced.
				F.9.4	Repairs failure within train-track communications systems.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
F	To ensure that the defects are repaired	F.10	To ensure that the defects of communications systems an their infrastructures are repaired <sup>xv</sup>	F.10.1	Carries out due controls and determines point and type of failure.
				F.10.2	Repairs defect of signal telephones and ensures that it is repaired.
				F.10.3	Replaces fuses within signal telephones and ensures they are replaced.
				F.10.4	Replaces defective electronic equipments and ensures that they are replaced.
				F.10.5	Closes device boxes and ensures that they are closed.
		F.11	To ensure that the defects of cable and cable distribution boxes are repaired	F.11.1	Carries out due controls and determines point and type of failure.
				F.11.2	Informs relevant authorities upon determining defects of F/O cables within signaling systems.
				F.11.3	Determines defects of signal cables and ensures that they are repaired.
				F.11.4	Determines active communications devices and informs relevant authorities.

<sup>xv</sup> Applicable in national railway lines.



Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
G	To carry out assembly and disassembly (To be continued)	G.1	To make preparations before assembly/disassembly	G.1.1	Examines projects of system equipment which will be assembled and disassembled and receives information from relevant authorities.
				G.1.2	Reads assembly and disassembly instruction.
				G.1.3	Determines and supplies the spare parts and consumable materials required for assembly/disassembly.
				G.1.4	Ensures the preparation and adjustment of tools and appliances required for assembly/disassembly.
				G.1.5	Ensures that the measures of occupational health and safety are taken and applied before starting the assembly/diassembly work.
				G.1.6	Determines the completion period of work by considering the mean processing time required for assembly/disassembly.
				G.1.7	Obtains confirmation from relevant authority through appropriate communications means regarding that the line is closed to traffic before starting the work
		G.2	To carry out assembly and disassembly of switch control systems	G.2.1	Ensures that the switch motor is assembled and disassembled properly.
				G.2.2	Ensures that the electrical interlocking switch systems are assembled and disassembled properly.
				G.2.3	Ensures that the detector switch systems are assembled and disassembled properly.
				G.2.4	Ensures that the switch local control panels are assembled and disassembled properly.
				G.2.5	Controls if assembly and disassembly works are carried out completely and properly.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
G	To carry out assembly and disassembly (To be continued)	G.3	To carry out assembly and disassembly of signals and to ensure that it is carried out	G.3.1	Controls amount, accuracy, dimension, fracture, crack, paint failure, etc. of assembly parts according to spare part list.
				G.3.2	Ensures that the high signals are assembled and disassembled properly.
				G.3.3	Ensures that the dwarf signals are assembled and disassembled properly.
				G.3.4	Ensures that F/O signals are assembled and disassembled properly.
				G.3.5	Controls if assembly and disassembly works are carried out completely and properly.
				G.3.6	Ensures that end of line signals are assembled and disassembled in accordance with the project.
		G.4	To carry out assembly and disassembly of train detection systems and to ensure that it is carried out	G.4.1	Controls amount, accuracy, dimension, fracture, crack, paint failure, etc. of assembly parts according to spare part list.
				G.4.2	Ensures that the receivers are assembled and disassembled properly.
				G.4.3	Ensures that the transmitter devices are assembled and disassembled properly.
				G.4.4	Ensures that the axle counters are assembled and disassembled properly.
				G.4.5	Ensures that the loop cables are assembled and disassembled in accordance with the project.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
G	To carry out assembly and disassembly (To be continued)	G.5	To carry out assembly and disassembly of level crossing protection systems and to ensure that it is carried out <sup>xvi</sup>	G.5.1	Controls amount, accuracy, dimension, fracture, crack, paint failure, etc. of assembly parts according to spare part list.
				G.5.2	Ensures that the illuminated track signals are assembled and disassembled properly.
				G.5.3	Ensures that the barrier drivers are assembled and disassembled properly.
				G.5.4	Ensures that the level crossing cabinet is assembled and disassembled properly.
				G.5.5	Controls if assembly and disassembly works are carried out completely and properly.
		G.6	To carry out assembly and disassembly of ATP and ATC on-vehicle equipments and to ensure that it is carried out <sup>xvii</sup>	G.6.1	Controls amount, accuracy, dimension, fracture, crack, paint failure, etc. of assembly parts according to spare part list.
				G.6.2	Carries out assembly and disassembly of ETCS DMI properly.
				G.6.3	Carries out assembly and disassembly of wheel sensors properly.
				G.6.4	Carries out assembly and disassembly of balis/beacon antennas properly.

<sup>xvi</sup> Applicable in national railway lines.

<sup>xvii</sup> Applicable in national railway lines.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
G	To carry out assembly and disassembly (To be continued)	G.7	To carry out assembly and disassembly of ATS (automatic train stop), ATP and ATC on-vehicle equipments and to ensure that it is carried out	G.7.1	Controls amount, accuracy, dimension, fracture, crack, paint failure, etc. of assembly parts according to spare part list.
				G.7.2	Ensures that ATS (automatic train stop) ground magnets are assembled and disassembled properly.
				G.7.3	Ensures that fixed balis/beacons are assembled and disassembled properly.
				G.7.4	Ensures that variable balis/beacons are assembled and disassembled properly.
				G.7.5	Controls if assembly and disassembly works are carried out completely and properly.
		G.8	To carry out assembly and disassembly of central and local control / supervision systems and to ensure that it is carried out	G.8.1	Controls amount, accuracy, dimension, fracture, crack, paint failure, etc. of assembly parts according to spare part list.
				G.8.2	Ensures that videowall system is assembled and disassembled properly.
				G.8.3	Ensures that mosaic panel is assembled and disassembled properly.
				G.8.4	Ensures that system equipments are assembled and disassembled properly.
				G.8.5	Ensures that information transmission system is assembled and disassembled properly.
				G.8.6	Ensures that all printers are assembled and disassembled properly.
				G.8.7	Controls if assembly and disassembly works are carried out completely and properly.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
G	To carry out assembly and disassembly	G.9	To carry out assembly and disassembly of interlocking systems and to ensure that it is carried out	G.9.1	Controls amount, accuracy, dimension, fracture, crack, paint failure, etc. of assembly parts according to spare part list.
				G.9.2	Ensures that devices within interlocking system are assembled and disassembled properly.
				G.9.3	Ensures that roofs within interlocking system are assembled and disassembled properly.
				G.9.4	Controls if assembly and disassembly works are carried out completely and properly.
		G.10	To carry out assembly and disassembly of communications systems and their infrastructures and to ensure that it is carried out <sup>xviii</sup>	G.10.1	Controls amount, accuracy, dimension, fracture, crack, paint failure, etc. of assembly parts according to spare part list.
				G.10.2	Ensures that central telephone system is assembled and disassembled properly.
				G.10.3	Ensures that signal telephones are assembled and disassembled properly.
				G.10.4	Ensures that telephone sockets are assembled and disassembled properly.
				G.10.5	Controls if assembly and disassembly works are carried out completely and properly.
		G.11	To carry out assembly and disassembly of cable distribution boxes and to ensure that it is carried out	G.11.1	Controls amount, accuracy, dimension, fracture, crack, paint failure, etc. of assembly parts according to spare part list.
				G.11.2	Ensures that all distribution boxes are assembled and disassembled properly.
				G.11.3	Controls if assembly and disassembly works are carried out completely and properly.

<sup>xviii</sup> Applicable in national railway lines.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
<b>H</b>	To carry out office activities	<b>H.1</b>	To keep the scores and prepare the remunerations of the employees	<b>H.1.1</b>	Controls the work attendance of the employees.
				<b>H.1.2</b>	Prepares/ensures the preparation of the scores of the employees.
				<b>H.1.3</b>	Prepares/ensures the preparation of remunerations of the employees.
		<b>H.2</b>	To carry out correspondences and archive of office	<b>H.2.1</b>	Files all the correspondences of the workplace in accordance with the procedure.
				<b>H.2.2</b>	Carries out filing works.
		<b>H.3</b>	To carry out material procedures	<b>H.3.1</b>	Makes material requirements planning regarding consumable, spare and fixed materials and demands necessary ones.
				<b>H.3.2</b>	Follows up current material stocks.
				<b>H.3.3</b>	Prepares debit ticket for inventory stocks received.
				<b>H.3.4</b>	Arranges delivery record for consumable materials.
		<b>H.3.5</b>	Submits the delivery and debit records to the relevant department.		
		<b>H.3.6</b>	Follows up the materials used.		

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
I	To carry out end of job delivery tasks	I.1	To carry out final checks	I.1.1	Controls if there are remaining works in accordance with work instruction.
				I.1.2	If there are remaining works, completed them.
		I.2	To carry out equipment and work area cleaning by the end of work	I.2.1	Leaves working area tidy and clean.
				I.2.2	Maintains devices and tools he used by the end of work.
				I.2.3	Replaces materials, devices and tools he used.
				I.2.4	Pays attention to the use of materials that may damage occupational safety and stores them in predetermined places accordingly.
		I.3	To keep records of works done	I.3.1	Keeps records of works done in relevant forms and digital media.
				I.3.2	Keeps records of consumable materials in relevant forms and digital media.
		I.4	To provide information about works done	I.4.1	Prepares report about works done.
				I.4.2	Informs his superior about works he did.
				I.4.3	Informs personnel to whom he will hand in the work about on-going works.

Duties		Tasks		Performance Criteria	
Code	Title	Code	Title	Code	Description
<b>J</b>	To carry out occupational development activities	<b>J.1</b>	To carry out training planning and organization works	<b>J.1.1</b>	Gathers information from relevant authorities about training needs and evaluates them.
				<b>J.1.2</b>	Evaluates periodic and one-off trainings in terms of time planning.
		<b>J.2</b>	To carry out activities regarding individual occupational development	<b>J.2.1</b>	Carries out due research activities regarding occupational and individual development.
				<b>J.2.2</b>	Follows up new technologies and developments.
		<b>J.3</b>	To provide occupational training to his subordinates and other employees	<b>J.3.1</b>	Shares his knowledge and experiences with his colleagues.
				<b>J.3.2</b>	Implements restricted level of information and training about occupation.



### **3.2. Tools, Appliances and Equipments Used**

1. Open end wrench set
2. Battery tester
3. Allen wrench set
4. Multimeter
5. Balisemeter
6. Battery hydrometer
7. Bonding welding machine
8. Pipe wrench
9. Suitcase generator
10. Hammer
11. Steel measuring tape
12. Blade lock
13. Flat screwdriver set
14. Echometer
15. Flash lamp
16. Gloves
17. Safety tape
18. Phasemeter
19. Camera
20. Frequency meter
21. General purpose programming device
22. Grease pump
23. Soldering iron
24. Communication devices (radio, field telephone, cell phone, attendant telephone, GSM-R phone)
25. Smock
26. Insulating tape
27. Cable peeling pliers
28. Needle pliers
29. Pickaxe
30. Personal protective equipment
31. Caliper
32. Skeleton key
33. Shovel
34. Socket set
35. Switch lever
36. Switch pin driver
37. Leverage
38. Drill set
39. Megger
40. Ladder
41. Micrometer
42. Oscilloscope

43. OTDR test device
44. Pabuç sıkma pensi
45. Pulleys
46. Clamp meter
47. Pliers
48. PMallet
49. Blow torch and flame gun set
50. Rail drilling device
51. RLC meter
52. High visibility jacket
53. Piston ring pliers
54. Feeler gage
55. Signal binocle
56. Signalisation project
57. Spiral grinding and grinder
58. Bubble device
59. Shunting device
60. Tablet PC
61. Tool box
62. Swab
63. Grounding measurement megger
64. Torque meter
65. Warning and work lamps
66. Vacuum soldering iron
67. Oil feeder
68. Flush cutter
69. Box-end wrench set
70. Phillips head screw driver
71. High voltage gloves
72. High voltage pliers

### **3.3. Knowledge & Skills**

1. Knowledge on emergency situation
2. Analytical thinking skills
3. Fault analysis and evaluation knowledge
4. Basic first-aid knowledge
5. Computer skills
6. Knowledge of determining escape and standby points during works
7. Inspection skills
8. Circuit diagram reading skills
9. Hardware knowledge
10. Team management skill
11. Safe work skill and knowledge with hand tools
12. Manual skill

13. Electricity knowledge
14. Electrical train operating knowledge
15. Electronics knowledge
16. Visual inspection knowledge and skill
17. Occupational health and safety knowledge
18. Knowledge on workplace procedures
19. Knowledge on quality control principles
20. Decision making skills
21. Crisis management skills
22. Knowledge on materials
23. Mathematics knowledge
24. Distance measuring skills
25. Knowledge on occupational communications
26. Knowledge on occupational legislation
27. Foreign language skills at occupational level
28. Knowledge of vocational terms
29. Knowledge of vocational and technical drawing
30. Skill of learning and being able to share what s/he learned
31. Knowledge on measuring and control
32. Planning, coordination, and orientation skills
33. Problem solving skills
34. Knowledge of rail systems signs
35. Knowledge of rail systems traffic
36. Knowledge of signalling
37. Oral and verbal communications skills
38. Overcoming stress skill
39. Knowledge on basic information technologies
40. Knowledge of basic physics
41. Knowledge of basic mechanics
42. Knowledge of railway superstructure

### **3.4. Attitudes and Behaviours**

1. Being cold blooded and calm under emergency and stressful situations
2. Informing superiors properly and in time
3. Making decisions within knowledge and experience
4. Using her/his time effectively and efficiently in accordance with work orders
5. Adopting regulations set forth in environmental, quality, and OHS legislation
6. Sharing experience with associates
7. Being sensitive on possible changes which may arise during operation
8. Being sensitive on use and recovery of resources
9. Behaving in accordance with hierarchical structure of workplace
10. Ensuring his/her own safety and safety of other people
11. Determining negative environmental effects

12. Being planned and organized
13. Being sensitive on risk factors
14. Knowing his/her responsibilities and fulfilling the same
15. Taking care of process quality
16. Obeying instructions and guidelines accordingly
17. Informing relevant people of dangerous situations
18. Sensing and assessing dangerous situations carefully
19. Taking care of cleanness, tidiness, and order of workplace
20. Sharing information effectively, clearly and accurately during shift changes
21. Being innovative and open to occupational developments
22. Informing concerned people about the malfunctions which are not under his/her authority

#### **4. TESTING, ASSESSMENT AND CERTIFICATION**

Testing and assessment for certification with respect to national qualifications based on Rail Systems Signalling Maintainer and Repairer (Level 4) Occupational Standard shall be held in written and/or oral forms, theoretically and practically, in testing and assessment centers where required conditions are met.

Testing and assessment method and practice principles shall be detailed with national qualifications to be drawn up pursuant to this occupational standard. Activities regarding testing, assessment and certification shall be conducted within the framework of Vocational Qualification Authority, Testing and Certification Regulation.

**Annex: Those participated in the Occupational Standard Preparation Process**

**1. Professional Standards Team of Institution Preparing Professional Standard:**

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Yavuz KIRAN	General Manager of TCDD Foundation
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Pınar DEMİREKLER	Quality Process Manager
Mehmet EKTAŞ	Branch Manager (Education and Training Department, TCDD)
Feyzi SIVACI	Branch Manager (Education and Training Department, TCDD), moderator
Ekrem ARSLAN	Office Chief (Education and Training Department, TCDD)

**2. Technical Work Group Members:**

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İbrahim ALÇI	Technical Chief, TCDD
Erhan KOR	TCDD Premises Surveyor
Mehmet AYDIN	TCDD Premises Surveyor
Erol SAKAR	TCDD Deputy Education Manager

**3. People, Institutions, and Organisations Asked for Opinion:**

Alarko Group of Companies  
Anatolian Technical and Industrial Vocational High School  
Anatolian University Porsuk Vocational School  
Ankara Chamber of Industry (ASO)  
Ankara Chamber of Trade (ATO)  
Ankaray  
Antalya Metropolitan Municipality  
Ataturk Anatolian Industrial Vocational High School  
Independent Transportation Services Public Workers Trade Union (BUS)  
Ministry of Science Industry and Technology  
United Transportation Workers Trade Union (BTS)

Ministry of Labor and Social Security  
Association of Railway Machinists and Revisors  
Association of Railway Train Professionals  
Demiryolu Lojistik Müh.San.Tic.Ltd.Şti.  
Association of Railway Public Servants  
Association of Railway Vocational School Graduates  
Association of Railway Transportation  
State Personnel Administration  
Confederation of Revolutionary Trade Unions of Turkey (DISK)  
Aegean Region Chamber of Industry (EBSO)  
Eregli Steel & Iron Plant Enterprise (ERDEMİR)  
Erzincan University Refahiye Vocational High School Rail Systems Programme  
Eskisehir Light Rail System Enterprise (ESTRAM)  
Eti Mining Enterprise  
Fatih Anatolian Vocational High School  
Gazi Anatolian Vocational High School  
HAK-IS Trade Union Confederation  
Haydarpasa Anatolian Technical Vocational High School  
Iskenderun Steel & Iron Plant Enterprise (ISDEMİR)  
Istanbul Chamber of Trade (ITO)  
Istanbul Transportation Incorporated  
Izmir Metro A. Ş  
Kayseray  
Konya Metropolitan Municipality  
Small and Medium Industry Development Organization (KOSGEB)  
MoE Life-Time Learning Directorate General  
MoE Occupational and Technical Education Directorate General  
MoE Innovation and Education Technologies Directorate General  
Central Technical and Industrial Vocational High School  
Mechanical and Chemical Industry Corporation (MKE)  
Olmuksa  
Petkim  
Association of Rail Transportation Systems  
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Turkish State Railways (TCDD) Ankara Training Center

Turkish State Railways (TCDD) Traction Division

Turkish State Railways (TCDD) Eskisehir Training Center

Turkish State Railways (TCDD) Personnel and Administrative Affairs Department

Turkish State Railways (TCDD) Sivas Training Center

Turkish State Railways (TCDD) Premises Department

Turkish State Railways (TCDD) Traffic Department

Turkish State Railways (TCDD) Railway Department

Tüpraş

Turkey Railway Machinery Industry Corporation

Confederation of Turkish Tradesmen and Craftsmen (TESK)

Turkish Exporters Assembly (TIM)

The Turkish Employers Association of Construction Industries (INTES)

Turkish Statistical Institute (TUIK)

Turkish Labor Institution (ISKUR)

Confederation of Turkish Trade Unions (TURK-IS)

Turkish Confederation of Employer Associations (TISK)

Turkish Locomotive and Motor Industry Corporation

Turkish Union of Chambers and Exchange Commodities (TOBB)

Turkish Transportation Sector Public Workers Trade Union (TUS-Turk-Ulasim Sen)

Turkish Railway Car Industry Corporation

Transportation Workers Trade Union (Ulasim-Bir-Sen)

Transportation Workers Right Trade Union (Ulasim-Hak-Sen)

Transportation Sector Public Servants Trade Union (UCMS)

Transportation Active Public Servants Trade Union Faal-Sen (UFS)

Transportation and Railway Workers Right Trade Union (Udem-Hak-Sen)

Ministry of Transportation Maritime Affairs and Communications

Yapıray

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Rail System Signalling Maintainer and Repairer (Level 5) National Occupational Standard	12UMS0235-5 / 18.07.2012 / 00 Reference Code / Approval Date / Rev. No
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## 5. Executive Board

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Prof. Dr. Oguz BORAT, Rep.of Ministry of Education	Deputy President
Doç.Dr. Omer ACIKGOZ, Rep. of Board of Higher Education)	Member
Prof Dr. Yucel ALTUNBASAK, Rep. of Professional Associations	Member
Celal KOLOGLU, Rep. of Employer Assoc. Conf.	Member
Dr. Osman YILDIZ, Rep. of Trade Union Confederations	Member