



**NATIONAL VOCATIONAL STANDARD**

**RAILWAY CONSTRUCTION, MAINTENANCE, AND REPAIR  
MACHINE OPERATOR**

**LEVEL 4**

**REFERENCE CODE / 12UMS0277-4**

**OFFICIAL GAZETTE DATE-ISSUE / 29/1/2013 - 28543**

**(Repeated)**

**RAILWAY CONSTRUCTION, MAINTENANCE, AND REPAIR MACHINE OPERATOR  
(LEVEL 4) NATIONAL VOCATIONAL STANDARD**

<b>Occupation:</b>	<b>RAILROAD CONSTRUCTION MAINTENANCE AND REPAIR MACHINE OPERATOR</b>
<b>Level:</b>	<b>4<sup>1</sup></b>
<b>Reference Code:</b>	<b>12UMS0277-4</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> Occupational Qualification Level is determined as Level Three (4) in the octal (8) level matrix.

## TERMS, SYMBOLS AND ABBREVIATIONS

**MEETING:** Meeting of trains coming from different or opposite directions at a station in the sections where there's single line management,

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

**ELECTRIFICATION:** System made of power lines, substations and their control units for electrical management in the railway transportation systems,

**INJECTION PUMP:** Fuel regulator in diesel engines,

**INJECTOR:** The component injecting fuel to the cylinders in diesel engines,

**BRAKE FACTOR:** The brake weight required for each 100 tons of load to stop the train safely within the brake distance by the type, speed of trains and slope of rail line,

**BRAKE:** The mechanism for decelerating or stopping the vehicle,

**GAUGE:** Sabit tesislerle demiryolu araçları arasındaki emniyet mesafesini,

**DAILY TRAIN ANNOUNCEMENT:** The announcement of trains to operate during the day,

**LEVEL (GRADE) CROSSING SIGNALS:** The signals regulating the traffic on the level (grade) crossing,

**LEVEL (GRADE) CROSSING:** the section where railroad and highway cross each other at the same level,

**HYDRAULIC BATTERY:** Auxiliary component for pressure and flow rate boosting to hydraulic pump when required,

**HYDRAULIC:** The mechanism driven by liquid pressure,

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

**SUPPLY:** Supply,

**ISG (WHS):** Occupational Health & Safety,

**STATION:** Trafikle ilgili hizmetler ile yolcu ve yük taşınması yapmaya yarayan demiryolu ve tesislerinin bulunduğu yeri,

**SIGNAL:** All audio and visual signals of which meanings are predetermined and which are used for safe and sound regulation of traffic,

**CATENARY:** Electrification (high-tension) line,

**FIRECRACKER:** The signal placed on the rail to warn the railway cars vocally by cracking as a result of vehicle's wheel stepping on in cases of emergency,

**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,

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

**SELF-STARTER:** The mechanism starting the engine,

**GETTING AHEAD:** Among two trains going to the same direction, the train at the back getting ahead the train at the front at a station,

**PNEUMATIC:** Compressed air,

**RADIATOR:** Cooling component,

**BANKING LOCOMOTIVE:** Support locomotive,

**RAY:** specially profiled track superstructure component which provides an uninterrupted and smooth surface for vehicle wheels to roll and transmits load coming from wheels to culvert units,

**RISK:** Possibility of loss, injury or other unfavorable consequences that may occur due to dangers,

**BRAKE SHOE:** Brake shoe,

**TRAFFIC:** Railway traffic

**HOT:** Locomotive in working condition,

**SIGNALLING:** Demiryolu trafiği ve manevralarında emniyeti sağlamaya yönelik olarak kullanılan işaret sistemlerini,

**COOL:** Locomotive in not working condition,

**SHAFT:** The shaft transmitting the engine rotation and torque to the other components and to which component is attached its end,

**GEARBOX:** A group of gears transmitting the motion from the engine to the power train, providing for the required speed of vehicle,

**CHARGE:** Charging of batteries,

**BUFFER STOP:** The equipment for absorbing the forces in line with the rail and gently transmitting them to the frame,

**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,

**SPEED LIMIT NOTICE:** Speed limit model,

**SPEED LIMIT:** Temporary limits to be imposed to the speed in definite sections of the line in cases of fault,

**PRECIPITATION:** Deposit foreign materials,

**THERMOSTAT:** The component controlling the temperature at the requested values in a system,

**TRAFFIC SCHEDULE:** train's logbook,

**TRAFFIC CONTROLLER:** traffic controller who use systems and communication devices installed to ensure train traffic safety and management, conduct all train moves at a certain line section as planned, make decisions on train choice in cases not planned, to take provisional measures if the track is blocked,

**TRAIN CREW:** personnel who works on train,

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

**THIRD RAIL:** The power rail transmitting the electric power used in the railraod cars to the vehicle over current collector,

**RAILWAY CAR (HAULED VEHICLE):** Kendi tahrik gücü bulunmayan, bir cer aracı tarafından çekilerek veya itilerek hareket ettirilen, üzerinde yük veya yolcu taşımaya elverişli raylı sistem aracını,

**LINE:** Railway.

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## 1. INTRODUCTION

Railway Construction, Maintenance and Repair Machine Operator (level 4) National Vocational Standard was issued by Foundation of Turkish Railways Development and Cooperation & Solidarity with Turkish Railways Personnel assigned by Vocational Qualifications Agency in accordance with provisions of “Directive on Drawing National Occupational Standards” and “Directive on Procedures and Fundamentals of establishment, assignment and works of Committees under Vocational Qualifications Authority” published pursuant to 5544 numbered Law on Vocational Qualifications Agency and mentioned law.

Railway Construction, Maintenance and Repair Machine Operator (level 4) National Vocational Standard 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

Railway Construction, Maintenance and Repair Machine Operator (level 4) is a qualified person who operates railway maintenance and repair machine on the railway and performs railway construction, maintenance, and repair operations as well as periodical maintenance and basic repair operations of the machine by using any and all functions of it, within frame of OHS, environmental protection, and quality rules and methods.

Railway Construction, Maintenance and Repair Machine Operator (level 4) is responsible for correctness, timing, and quality of operations which s/he performs within her/his area of responsibility. In the performance of works, s/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.

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

**ISCO 08:** 8342 (Operators of machinery used in earthworks and similar works)

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

Labor Law No. 4857

Social Security and General Health Insurance Law No.5510

Law No. 6331 on Occupational Health and Security

Bylaw on Control of Packaging Wastes

Bylaw on the Control of Waste Oils

Bylaw on the General Principles of Waste Management

By Law on the Principles and Procedures of Occupational Health and Safety Trainings of Employees

By Law on the Authorities, Tasks, and Responsibilities of Scientists Relating to Electricity

Bylaw on Heavy Current Electrical Installations

Bylaw on the Works of Carrying by Hand

By Law on the Environmental Noise

By Law on the Safety and Health Markings

By Law on Preparation, Completion and Cleaning Works  
By Law on the Health and Safety Conditions when Working with Business Equipment  
By Law on the Health and Safety Measures to be Taken in Business Place Buildings and Extensions  
Bylaw on the Control of Solid Wastes  
By Law on the Safety and Health Measures in the Works with Chemical Substances  
By Law on the Usage of Personal Protective Equipment in the Business Places  
Bylaw on Safety of Machinery (2006/42/EC)  
By Law on the Protection of Employees from Dangers Caused by Explosive Environments  
Furthermore, it is essential to comply with applicable laws, bylaws, and other legislation regarding occupational health, security, and environment and to carry out relevant risk analysis.

#### **2.4. Other Legislation Related to the Occupation**

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

Government Labor Unions and Collective Bargaining Law No. 4688  
Law numbered 6356 on Trade Unions and Collective Bargaining Agreements  
Public servants Law No. 657  
Bylaw on Traffic Signs

Furthermore, it is essential to obey other legislation regarding the occupation.

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

Railway Construction, Maintenance and Repair Machine Operator (level 4) is under occupational disease risk as result of work environment and conditions. Almost all of works are performed in railway repair and maintenance vehicles. Railway maintenance and repair machine is illuminated and ventilated environment whose humidity and temperature are under control and which is free from dust, dirt, and other polluting factors. It is a profession that requires high concentration so a high sensitivity and care must be given to observance of OHS rules without any exception.

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

Railway Construction, Maintenance and Repair Machine Operator (level 4) must have health report and psychological-technical report indicating that his physical competence is fully meeting requirements of his assignment.



### 3. OCCUPATIONAL PROFILE

#### 3.1. Duties, Tasks and Performance Criteria

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
A	Applying occupational health and safety, fire and emergency rules	A.1	To apply legal and workplace rules regarding occupational health and safety.	A.1.1	Gets information from OHS official regarding regulations and directives on OHS.
				A.1.2	Wears appropriate working clothes provided by employer and uses personal protective equipment.
				A.1.3	Uses the emergency response tools such as first aid and eye wash, fire extinguisher.
				A.1.4	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 corporation's instructions.
				A.1.5	Applies the measures taken for maintaining the work place and equipment used neat and clean.
		A.2	To mitigate risk factors	A.2.1	Contributes to the activities related to determination of risks.
				A.2.2	Reports the available or potential risk factors he faces during the performance of work to the authorities.
				A.2.3	Participates in the activities for decreasing risk factors.
		A.3	To apply emergency procedures in case of emergency.	A.3.1	Carries out the activities of taking measures to determine the cases of emergency and eliminate them rapidly.
				A.3.2	Applies the exit and escape procedures in emergency cases.
				A.3.4	Informs the cases of emergency which are impossible to eliminate instantly to the authorities.
				A.3.4	Carries out the works described in the emergency procedure. Applies the exit or escape procedures in cases of emergency.

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
<b>B</b>	Working in accordance with environmental protection legislation	<b>B.1</b>	To determine environmental hazards	<b>B.1.1</b>	Contributes to evaluation of environmental impacts and potential dangers in connection with operations done
				<b>B.1.2</b>	Attends in periodical trainings regarding environmental protection requirements and applications.
				<b>B.1.3</b>	Contributes to studies on elimination of given environmental danger sources and risk factors
		<b>B.2</b>	To apply environmental protection measures	<b>B.2.1</b>	Takes measures against the environmental impacts to occur during the performance of work processes according to the directives.
				<b>B.2.2</b>	Ensures that the wastes occurred during the performance of work processes are disposed in accordance with the directives.
				<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.
		<b>B.3</b>	To be economical in consumption of operating assets	<b>B.3.1</b>	Uses the operating assets economically and efficiently.
				<b>B.3.2</b>	Carries out the required assessment and planning works for less and effective use of operating assets.

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
C	Working in accordance with the quality management system regulations.	C.1	To control the quality of works performed.	C.1.1	Carries out the corporation's quality assurance rules and procedures according to the instructions included in the transaction forms.
				C.1.2	Works in accordance with the conditions of the devices and tools used in the work processes defined in the quality assurance rules and procedures.
				C.1.3	Responsible for the accuracy, timing and quality of works performed.
				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 failures and defects detected during the processes.	C.2.1	Informs the failures and defects detected during the works to the superior/related authorized person.
				C.2.2	Participates to inspections and assessments regarding detection of reasons caused fault and failures within the scope of his assigned duties.
				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 corporation's rules and procedures.
				C.2.4	Applies/ensures that the company's rules and procedures related to the failure and defect repairs.
				C.2.5	Informs the failures and defects outside his authority or he fails to repair to the related authorized person.

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
D	Making preparations prior to work	D.1	To make personal preparations	D.1.1	Makes his self-care and cleaning
				D.1.2	Is present in the workplace at the time stated in the work legislation before the work starts.
				D.1.3	Makes required process for check documents regarding his status of attendance
				D.1.4	Wears overalls appropriate to the working rules of workplace and puts identification symbol and marks on his overalls and wears PPEs.
		D.2	To accept work	D.2.1	Takes work schedule
				D.2.2	Gets information from the person who delivers him an ongoing operation if it is an ongoing operation
				D.2.3	Negotiates the work plan with other workers in the team, for the works to be done as a team
		D.3	To investigate the work area	D.3.1	Obtains the confirmation that the power is cut off in the corporations with 3rd rail.
				D.3.2	Investigates the work area for continuous and proper performance of works.
				D.3.3	Contributes to the improvement of the negative aspects of the work area.
				D.3.4	Maintains the order according to the type of work and work method used.
				D.3.5	Keeps the non-conforming material area under control.
		D.4	To prepare the equipment and material he shall use for work	D.4.1	Selects and prepares the materials and equipment suitable for the work he shall perform.
				D.4.2	Controls that the material and equipment are operative.
				D.4.3	Makes the pre-work adjustments of tools and equipment according to the work.
				D.4.4	Repairs the faults and defects of the defective equipment and material under his/her authority.
				D.4.5	Informs the related authorities for replacement/repair of defective equipment and material beyond his/her authority.

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
E	Preparing railway machine for work (To be continued)	E.1	To make the cold maintenance and controls of machine	E.1.1	Cleans the dust and dirty on the machine.
				E.1.2	Controls whether there's oil or fuel leakage in the machine by walking around the machine.
				E.1.3	Controls whether there's any crack or break in the mechanical parts.
				E.1.4	Controls the engine, transmission, differential and hydraulic oil level and completes it with the new oil featuring the specifications stated in the catalogue.
				E.1.5	Controls the fuel quantity and completes the deficient fuel.
				E.1.6	Controls the grease of movable parts of the machine.
				E.1.7	Controls whether there's break or crack in the brake assembly and equipment.
				E.1.8	Makes the crack and tie controls of V-belts.
				E.1.9	Controls whether the shafts and connectors are cracked or broken.
				E.1.10	Discharges the precipitation accumulated in the tanks by opening drain valves on the main and auxiliary reservoirs manually.
				E.1.11	Controls the buffers, air hoses and valves.
				E.1.12	Makes the seepage, loss and leakage controls of hydraulic cylinders and hoses.
				E.1.13	Controls the functionality of machine work units.
				E.1.14	Controls the opening, closing functionality of doors and windows and whether they're cracked or broken.
				E.1.15	Controls the required stock materials in the machine.

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
E	Preparing railway machine for work	E.2	To make the hot maintenance and controls of machine	E.2.1	Plugs in the battery switch and supplies electricity to the system.
				E.2.2	Self starts and starts the engine.
				E.2.3	Measures the battery voltage and ampere; controls the conformity of values to the work.
				E.2.4	Controls the operability and values of engine, gearbox and power indicators; decides their conformity to the work.
				E.2.5	Brings the engine to the operating temperature.
				E.2.6	Controls the hydraulic system pressures and decides their conformity to the work.
				E.2.7	Controls whether there is oil leakage or not.
				E.2.8	Controls the air reservoir pressures and decides their conformity to the work.
				E.2.9	Controls the functionality of air system and whether there's loss or seepage.
				E.2.10	Controls the functionality of machine horn, interior and exterior lightings, emergency stop buttons.
				E.2.11	Controls the operation of engine fan.

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
F	Operating railway machine (To be continued)	F.1	To drive the machine while entering and exiting the work site (To be continued)	F.1.1	Informs the chief that the machine is available.
				F.1.2	Takes the daily train announcement of machine.
				F.1.3	Acts according to the directives of the authorized chief while driving.
				F.1.4	If the operator is driving himself, negotiates with the traffic officers and acts according to the traffic officer's directives.
				F.1.5	Takes the traffic schedule and other related models.
				F.1.6	Moves the machine by giving the movement signals stated in the instructions.
				F.1.7	Follows up and acts according to the audio and visual warning lights and signs and all kinds of gauges in the machine cab while driving the machine or operating with the machine..
				F.1.8	Acts till the signal or switches as capable of stopping at any moment.
				F.1.9	Visually inspects the conformity of switches and traffic signs.
				F.1.10	Ensures the traffic safety while driving.
				F.1.11	Provides the communication by using wireless, mobile phone, fixed phone and cellular phone.
				F.1.12	Confirms whether the communication is carried out properly or not.
				F.1.13	Carefully listens to the wireless talks while driving.
				F.1.14	Considers the speed limits and signs stated in the speed limit notice.
				F.1.15	Complies with the maximum speed limits stated for the machine and also drives the machine by obeying the speed limits in the region driven.

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
F	Operating railway machine (To be continued)	F.1	To drive the machine while entering and exiting the work site	F.1.16	(To be continued) Signals by blowing whistle at an appropriate distance before meeting with the train.
				F.1.17	Acts according to the written orders stated in the stopping notice given to himself.
				F.1.18	Obeys the speed limits of the traffic safety systems according to the signal notices.
				F.1.19	Obeys the highway traffic rules while driving on the highway with the vehicle which can be drivable both on the railway and highway.
		F.2	To obey the signs to be given from the trackside and on the track	F.2.1	Follows up and interprets the signals given by the personnel on the track or trackside.
				F.2.2	Obeys the signals, signs on the track and meanings of signals given by the personnel working on the track.
				F.2.3	Assesses whether the switch is arranged to the track which the machine should follow by following up the switch signs.
				F.2.4	Controls that the barrier arms are closed to the road vehicles while crossing the level (grade) crossing.
				F.2.5	Warns the road vehicle drivers and pedestrians by blowing whistle while approaching to the level (grade) crossing.
		F.3	To inform the problems detected	F.3.1	Informs the faults he observes in the machine, electrification and signaling area to the traffic controller.
				F.3.2	Informs the objects he observes within the highway clearance diagram to the traffic controller.
				F.3.3	Informs the fire and natural disasters to effect the railway traffic adversely to the traffic controller.
				F.3.4	Informs the faults he observes on the other tracks in the multi-track sections to the traffic controller.
				F.3.5	Informs and ensures that the cases of emergency to occur in the personnel are informed to the traffic controller.
F.3.6	Informs the track defects to effect the trains circulation to the traffic controller.				



Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
F	Operating railway machine (To be continued)	F.4	To secure the machine in cases of emergency	F.4.1	Informs the status to the traffic controller or neighboring stations by phone or wireless phone in cases of emergency.
				F.4.2	Erects the stop sign at an appropriate distance stated in the instructions according to the track slope.
				F.4.3	Attaches the firecrackers in the way and at intervals as of the stop sign as stated in the instructions.
				F.4.4	Informs how long the machine shall stop, the reason for stopping, whether it shall be moved on or not, km of the stopped location to the control office.
		F.5	To park the machine	F.5.1	The machine collects the work units in a safe manner.
				F.5.2	Takes the machine to the parking lot according to the directives by the authorities.
				F.5.3	Applies the hand brake.
				F.5.4	Supplies fuel.
				F.5.5	Carries out general cleaning of the machine.
				F.5.6	Removes the failures occurred in the machine by following the trouble shooting processes.
				F.5.7	Carries out the maintenances to be made by following the daily maintenance processes.
				F.5.8	Prepares the daily working report.
				F.5.9	Locks the machine doors.
				F.5.10	Cuts off the system power by disconnecting the battery switch.

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
F	Operating railway machine	F.6	To arrange the traffic schedule	F.6.1	Takes the forms related to the traffic given to himself and signs the received section.
				F.6.2	Writes down the required information accurately and legibly in the sections on the traffic schedule.
				F.6.3	Controls the information of departure-arrival stations.
				F.6.4	Writes down and signs the hours of transition from the stations.
				F.6.5	Writes down the actualized meetings and drawing aheads.
				F.6.6	Writes down the problems and actions occurred during circulation.
				F.6.7	Adds the other forms on which the transactions related to the traffic are recorded to the traffic schedule.
				F.6.8	Fills in the delivery section and submits the traffic schedule.

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
G	Accompanying with railway machine in the rolling stock	G.1	To prepare the machine for shipment	G.1.1	Attaches the safety hooks of the machine work units.
				G.1.2	Switches the machine to the railway car position.
				G.1.3	Fixes the tools and devices in the machine.
		G.2	To ensure that the machine is connected to the train	G.2.1	Ensures that the machine is mounted to the front of the last railway car of the stock.
				G.2.2	Ensures that banking locomotive is not mounted on back of the rolling stock.
				G.2.3	Warns the train personnel for the safe circulation of machine.
		G.3	To ensure machine's circulation safety	G.3.1	Be in communication with the train personnel.
				G.3.2	Informs the faults he observes during circulation to the train personnel by wireless phone, phone or sign.
				G.3.3	Controls the machine when the train stops at the stations by getting off the train.
				G.3.4	Ensures that the machine is not involved in the shunting at the stations.
G.3.5	Ensures that his machine is cut off from the stock once the train arrives the arrival station.				

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
H	Carrying out track construction, repair and maintenance works by using the track machine	H.1	To prepare the machine for work	H.1.1	Brings the machine to the starting point of work.
				H.1.2	Makes the machine available for work.
				H.1.3	Controls the work units of machine operating.
				H.1.4	Ensures that the security is provided in the work site.
				H.1.5	Makes the apparatus, equipment and tools available for work.
				H.1.6	Informs the relevant persons for replacement and repair of defective equipment and tools.
		H.2	To carry out track construction, maintenance and repair by using the machine	H.2.1	Starts the work by blowing a warning whistle.
				H.2.2	Continuously supervises his work and machine during the work.
				H.2.3	Takes care and measures for safe working of the other employees working around the machine.
				H.2.4	Follows the instructions to be given by the authorities for track repair.
				H.2.5	Carries on working according to the track geometry values given for the track.
				H.2.6	Stops working in case of an inconvenient situation during the course of work.
		H.3	To control the works performed by using the machine	H.3.1	Controls the road which is constructed at the end of the work.
				H.3.2	Takes measures for machine oriented problems by contacting with the authorities.
H.3.3	Collects the work units of machine safely and makes the machine available for circulation.				
H.3.4	Collects the equipment related to the machine.				

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
I	Carrying out periodic maintenances and remove simple failures of track machine (To be continued)	I.1	To carry out/ensure that weekly maintenance is carried out	I.1.1	Cleans the machine off oil and dust.
				I.1.2	Replaces the oils of which operating hours have expired with the new oils featuring the specifications stated in their catalogue.
				I.1.3	Replaces the filters of which operating hours have expired with the brand new filters featuring the specifications stated in their catalogue.
				I.1.4	Controls the oil levels in the transmission, differential and gearboxes; completes the oils with the new oils featuring the specifications stated in their catalogue.
				I.1.5	Visually inspects break, crack, wear of the mechanical parts, wheel and axle assembly.
				I.1.6	Controls the air leakages in the pneumatic system.
				I.1.7	Visually inspects the functionality of shafts and lubricates them with the new oil featuring the specifications stated in their catalogue.
				I.1.8	Lubricates the mechanical joints of the braking system with the new oil featuring the specifications stated in their catalogue.
				I.1.9	Visually inspects the bolts and screws the loose bolts and replaces the inclined or broken bolts.
		I.2	To carry out/ensure that monthly maintenance is carried out (To be continued)	I.2.1	Ensures that the hydraulic pumps and engines pressure are controlled.
				I.2.2	Cleans the cooling system of machine engine.
				I.2.3	Cleans the hydraulic oil cooling radiators.
				I.2.4	Controls the functionality of hydraulic oil thermostat.
				I.2.5	Controls whether there's oil leakage in the hydraulic system under pressure.
I.2.6	Makes the braking adjustments.				

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
I	Carrying out periodic maintenances and remove simple failures of track machine	I.2	To carry out/ensure that monthly maintenance is carried out	I.2.7	Carries out the oil leakage controls of hydraulic cylinder, hydraulic hose and hydraulic valves.
				I.2.8	Ensures that the controls and maintenances of electrical and electronics systems are carried out.
		I.3	To carry out/ensure that annual maintenance is	I.3.1	carried out Ensures that the analysis of hydraulic oil is carried out and replaces the oil expired.
				I.3.2	Ensures that the maintenances of injection pump and injectors are carried out.
				I.3.3	Ensures that the hydraulic batteries are controlled.
				I.3.4	Controls the hydraulic and pneumatic system components.
				I.3.5	Ensures that the wheel measurements are made.
				I.3.6	Replaces the V-belts.
				I.3.7	Ensures that the hydraulic oil is filtered.
				I.3.8	Cleans the fuel and hydraulic oil tanks.
		I.4	To carry out/ensure that winter maintenance is carried out	I.4.1	Controls and ensures that the machine's radiators are operative.
				I.4.2	Cleans the pneumatic system.
				I.4.3	Adds alcohol and anti-freeze to the locations stated in the machine to prevent the water formed in the pneumatic system to freeze.
				I.4.4	Controls that the thermostat in the cooling system is operative and its conformity to winter conditions.
				I.4.5	Ensures that the maintenance and controls of batteries are carried out.
				I.4.6	Controls and ensures that the heater plugs are operative.
		I.5	To remove basic failures	I.5.1	Detects failure.
				I.5.2	Removes the basic failures by using the appropriate procedure and tools to be selected by the type of failure.
				I.5.3	Ensures that the failures he fails to remove are moved by informing the authorized person.
				I.5.4	Controls the failure removed.
				I.5.5	Ensures that the worn, broken and cracked parts of the machine are repaired.
I.5.6	Keeps the spare parts related to the high potential failures available in the machine.				

Tasks		Actions		Performance Criteria	
Code	Name	Code	Name	Code	Description
J	Carrying out end-of-work delivery procedures	J.1	To perform end-of-work controls	J.1.1	Controls if there is any incomplete work according to work order.
				J.1.2	Completes the incomplete work.
		J.2	To carry out the cleaning of equipment and work area at the end of work.	J.2.1	Leaves his workplace in a tidy and clean condition.
				J.2.2	Keep maintained the tools and equipment used in the work.
				J.2.3	At the end of work, he clears the material, equipment he uses.
				J.2.4	Takes care of while using materials which may damage the work health and safety and stores such materials in the determined places properly.
		J.3	To keep records of works done.	J.3.1	Records the works performed in the related forms.
				J.3.2	Records the consumed materials in the related forms.
		J.4	To report about the works done.	J.4.1	Prepares a report related to the works he performed.
				J.4.2	Reports to his closest superior about works he did.
				J.4.3	Gives information about the work to personnel to whom he will deliver the work in case of ongoing works.
		C	Carrying out professional development activities	K.1	To do works on individual professional development
K.1.2	Follows up new technologies.				
K.1.3	Participates in the trainings related to the mechanical processes of rail systems.				
K.2	To share professional knowledge and experiences			K.2.1	Transfers his/her knowledge to his/her colleagues.
				K.2.2	Shares the document related to his occupation with his colleagues.

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

1. Bulb
2. Wrench Sets (screw wrench, open-end wrench set, allen wrench set)
3. Patch cable
4. Multimeter
5. Hammer
6. Band
7. Bolt
8. Hammer
9. Flash lamp
10. Manuals
11. Filter and filter tool
12. Grease pump
13. Grease fitting
14. Soldering iron set
15. Hydraulic unions
16. Funnel
17. Communication tools (wireless phone, phone, cellular phone, GSMR)
18. First Aid Kit
19. Sign flags
20. Sign board
21. Insulating tape
22. Cable
23. Pen
24. Firecracker
25. Personal protective equipment
26. Test light
27. Lever jack
28. Control Switch
29. Switch Lever
30. Measuring tape
31. Pliers
32. Battery
33. Portable lamp
34. Tool box
35. Chalk
36. Wire brush
37. Fixing block
38. Screwdriver set
39. Cotton waste
40. V-Belt
41. Sledge Hammer
42. Lubricator
43. Fire Extinguisher
44. Spare hose
45. Sandpaper



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

1. Knowledge on emergency case
2. Analytical thinking skills
3. Analytical thinking and ratiocination skills
4. Knowledge on tools, apparatus and equipment
5. Basic first-aid knowledge
6. Traction knowledge
7. Knowledge on railway signs
8. Knowledge on railway traffic rules and instructions
9. Ability of working in a team or an organization
10. Manual skill
11. Knowledge on general occupational health & safety
12. Visual skill
13. Observation skills
14. Knowledge on the works site operation procedures
15. Decision making skills
16. Knowledge on mechanical equipment
17. Distance measuring skills
18. Professional electric-electronics knowledge
19. Professional hydraulic knowledge
20. Knowledge on vocational mathematics
21. Professional mechanics knowledge
22. Professional pneumatic knowledge
23. Knowledge on occupational and technological advancements
24. Knowledge of vocational terms
25. Knowledge on engine
26. Skill of learning and being able to share what he learned
27. Problem solving skills
28. Oral and written communication skills
29. Knowledge on basic labor legislation
30. Knowledge on facilities
31. Knowledge on railroad construction, maintenance, and repair

### **3.4. Attitudes and Behaviors**

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. To be sensitive about the changes to occur during procedures
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. Being enthusiastic about research for occupational development
12. To be planned and organized
13. To be sensitive to issues of risk and hazard factors

14. Knowing his/her responsibilities and fulfilling the same
15. To comply with instructions and guidelines
16. To inform relevant people of dangerous situations
17. Taking care of cleanness, tidiness, and order of workplace
18. To share information at shift changes in efficient, open, and correct manner
19. To be open to change and to adapt to changing conditions
20. Informing concerned people about the malfunctions which are not under his/her authority
21. Using railway machines within their limits and capacities

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

Testing and assessment for certification with respect to national qualifications based on Railway Construction Maintenance and Repair Machine Operator (Level 4) Vocational 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: Institutions participated in the Occupational Standard Preparation Process**

İsa APAYDIN	Deputy General Manager, TCDD
Murat ŞENEKEN	Education and Training Department Head, TCDD
Yavuz KIRAN	General Manager of TCDD Foundation

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

Fatma Ülker YETGİN	Project Coordinator
Pınar DEMİREKLER	Quality Process Manager
Mehmet EKTAŞ	Branch Manager (Education and Training Department, TCDD)
Feyzi SIVACI	Branch Manager (Education and Training Department, TCDD)
Ekrem ARSLAN	Office Chief (Education and Training Department, TCDD)
Tulgay GEÇGEL	Moderator (MoE Ciğdemtepe Technical and Industrial Vocational High school)

#### **2. Technical Work Group Members**

Mustafa KORUCU	Occupation Group Coordinator (Deputy Manager of Railway Dept., TCDD)
Ali ÖZTÜRK	Occupation Group Coordinator (Deputy Manager of Railway Dept., TCDD)
Salih MISIR	TCDD Railway Mechanical Workshop Deputy Manager
Nuri BEKMEZCİ	TCDD, Engineer
Hasan VAROL	TCDD, Machinist
Yusuf CORA	TCDD, Machinist
Yasin ÇELİK	TCDD, Machinist

#### **3. People, Institutions, and Organizations Asked for Opinion:**

Ministry of Labor and Social Security  
MoE Occupational and Technical Education Directorate General  
MoE Life-Time Learning Directorate General  
Innovation and Education Technologies Directorate General  
Ministry of Science Industry and Technology  
Ministry of Transportation maritime and Communication  
Turkish Labor Institution (ISKUR)  
Turkish Statistical Institute (TUIK)  
Board of Higher Education (YOK)  
State Personnel Administration  
Small and Medium Industry Development and Supporting Administration (KOSGEB)  
Confederation of Revolutionary Trade Unions of Turkey (DISK)  
HAK-IS Trade Union Confederation

Confederation of Turkish Tradesmen and Craftsmen (TESK)  
Confederation of Turkish Trade Unions (TURK-IS)  
Turkish Confederation of Employer Associations (TİSK)  
Turkish Union of Chambers and Exchange Commodities (TOBB)  
Turkish Exporters Assembly (TIM)  
Ankara Chamber of Industry (ASO)  
Ankara Chamber of Trade (ATO)  
Istanbul Chamber of Commerce (ITO)  
Aegean Region Chamber of Industry (EBSO)  
İstanbul Transportation Inc.  
Bursa Rail Operation Center (BURULAS)  
Eskişehir Light Rail System Corporation (ESTRAM)  
Ankara Subway  
İzmir subway Inc.  
Antalya Metropolitan Municipality  
Konya Metropolitan Municipality  
Turkish Construction Industrialists Employers' Union (INTES)  
Yapıray  
Rhomberg Kalebozan Railway Construction Ind. & Trade Inc.  
Alarko Group of Companies  
Yüksel Project Corporation  
Olmuksa  
Petkim  
Tüpraş  
Eti Mining Enterprise  
Iskenderun Steel & Iron Plant Enterprise (ISDEMİR)  
Eregli Steel & Iron Plant Enterprise (ERDEMİR)  
MKE – Machinery and Chemistry Institution  
Sumer Holding (Iron&Steel)  
Yıldız Entegre (Tügsaş)  
Railway Logistics Engineering Industry & Trade Ltd.  
Kayseray  
Turkish Transportation Sector Public Workers Trade Union (TUS)  
Union of United Transport Workers (BTS) Bursa  
Transportation Active Public Servants Trade Union Faal-Sen (UFS)  
Union of Public Employees Related To Independent Transport Services, (BUS)  
Transportation Workers Hak Trade Union (Ulasim-Hak-Sen)  
Transportation Workers Trade Union (Ulasim-Bir-Sen)

Transportation and Railway Workers Hak Trade Union (Udem Hak-Sen)  
Association of Railway Vocational School Graduates  
Association of Railway Machinists and Revisors  
Association of Railroad Construction and Operation Personnel Solidarity and Assistance  
Association of Railway Clerks  
Association of Railway Train Professionals  
Association of Railway Transportation  
Association of Rail Transportation Systems  
Turkish State Railways (TCDD) Railway Department  
Turkish State Railways (TCDD) Traction Division  
Turkish State Railways (TCDD) Premises Department  
Turkish State Railways (TCDD) Personnel and Administrative Affairs Department  
Turkish State Railways (TCDD) Traffic Department  
Turkish State Railways (TCDD) Ankara Training Center  
Turkish State Railways (TCDD) Eskisehir Training Center  
Turkish State Railways (TCDD) Sivas Training Center  
Turkish Locomotive and Motor Industry Corporation  
Turkey Railway Machinery Industry Corporation  
Turkish Railway Car Industry Corporation  
Central Technical and Industrial Vocational High School  
Anatolian Technical and Industrial Vocational High School  
Ataturk Anatolian Industrial Vocational High School  
Haydarpaşa Technical and Industrial Vocational High School  
Fatih Anatolian Vocational High School  
Gazi Anatolian Vocational High School  
Sht. Kemal Ozalper Anatolian Vocational High School  
Anatolian University Porsuk Vocational School  
Erzincan University Refahiye Vocational High School Rail Systems Programme

#### 4. Sector Committee Members and Experts

Prof. Dr. Mustafa KARAŞAHİN,	President (Board of Higher Education)
Şeyhamit Ünal SARIBAŞ,	Vice President (Ministry of Education)
Aykut KARAKAVAK,	Member (Ministry of Labor and Social Security)
Edip TÜRKAY,	Member (Ministry of Energy and Natural Resources)
Damla Ebru ESEN,	Member (Ministry of Industry and Trade)
Burak ERDEM,	Member ( Turkish Confederation of Employer Associations)
Mehmet KARABÜBER,	Member (HAK Trade Unions Confederation)
Hakan BEZGİNLİ,	Member (Turkish Union of Chambers and Exchange Commodities -TOBB)

Nizamettin ATEŞ,	Member (Confederation of Turkish Tradesmen and Craftsmen - TESK)
Dilek TORUN,	Member (Occupational Qualification Authority)
Firuzan SİLAHŞÖR,	Department Head (Vocational Qualification Authority)
Fatma GÖKMEN,	Sector Committee Repr., (Administration of Disabled and Elderly Services)

#### **5. Executive Board**

Bayram AKBAŞ	President (Repr.of Ministry of Labor and social Security)
Doç. Dr. Ömer AÇIKGÖZ	Vice President (Ministry of Education)
Prof. Dr. Mahmut ÖZER	Representative of Council of Higher Education
Bendevi PALANDÖKEN	Member (Professional Associations)
Mustafa DEMİR	Member (Employer Unions Confederations)
Dr. Osman YILDIZ	Member (Trade Unions Confederations)