

**SKILLS FRAMEWORK FOR PUBLIC TRANSPORT  
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE DOCUMENT**

<b>TSC Category</b>	Rail Systems Maintenance					
<b>TSC</b>	Supervisory Control and Data Acquisition System Maintenance					
<b>TSC Description</b>	Implement preventive and corrective maintenance activities of Supervisory Control and Data Acquisition system					
<b>TSC Proficiency Description</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>	<b>Level 6</b>
	<b>PTP-RSM-1037-1.1</b>	<b>PTP-RSM-2037-1.1</b>	<b>PTP-RSM-3037-1.1</b>	<b>PTP-RSM-4037-1.1</b>		
	Carry out scheduled preventive maintenance and on Supervisory Control and Data Acquisition (SCADA) system	Conduct corrective maintenance on Supervisory Control and Data Acquisition (SCADA) system	Troubleshoot faulty Supervisory Control and Data Acquisition (SCADA) system to locate faults and recommend rectification methods	Diagnose root causes of Supervisory Control and Data Acquisition (SCADA) system failure and review maintenance plans to prevent fault recurrence		
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• Operating principles and functions of SCADA system</li> <li>• Components of SCADA system that includes:                             <ul style="list-style-type: none"> <li>• Network</li> <li>• Server</li> <li>• Programmable Logic Controller (PLC)</li> <li>• Workstation</li> <li>• Overview Display System (ODS)</li> <li>• Remote Terminal Unit (RTU)</li> </ul> </li> <li>• Types and functions of components operating within SCADA system</li> <li>• Electrical wiring and network schematics</li> <li>• Types of software and hardware tools for carrying out preventive maintenance on SCADA system</li> <li>• Procedures for servicing SCADA system in accordance to organisational maintenance procedures, Work Instruction (WI) and/or</li> </ul>	<ul style="list-style-type: none"> <li>• Components of SCADA system that includes:                             <ul style="list-style-type: none"> <li>• Network</li> <li>• Server</li> <li>• Programmable Logic Controller (PLC)</li> <li>• Workstation</li> <li>• Overview Display System (ODS)</li> <li>• Remote Terminal Unit (RTU)</li> </ul> </li> <li>• Types and functions of components operating within SCADA system</li> <li>• Types of alarms, logs and status of SCADA system</li> <li>• Electrical wiring and network schematics</li> <li>• Types of software and hardware tools for carrying out corrective maintenance on SCADA system</li> <li>• Procedures to carry out corrective maintenance on SCADA system</li> <li>• Procedures to normalise software faults and replace Line</li> </ul>	<ul style="list-style-type: none"> <li>• SCADA system architecture</li> <li>• Types of common faults and malfunctions symptoms of SCADA system</li> <li>• Methods of detecting and locating faults and malfunctions in SCADA system</li> <li>• Procedures to normalise software faults and malfunctions on SCADA system</li> <li>• Types of troubleshooting techniques, equipment and tools</li> </ul>	<ul style="list-style-type: none"> <li>• Factors affecting SCADA system software and hardware performance</li> <li>• Failure investigation and prevention methods</li> <li>• Methods and tools for diagnostic analysis</li> <li>• Organisational maintenance procedures, Work Instructions (WI) and/or Original Equipment Manufacturer (OEM) technical recommendations</li> <li>• Types and methods of status checks on SCADA system</li> <li>• Functional relationships between SCADA system and the overall rail system</li> </ul>		

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	<p>Original Equipment Manufacturer (OEM) technical manuals</p> <ul style="list-style-type: none"> <li>Organisational maintenance documentation and fault reporting procedures</li> <li>Types and usage of Personal Protective Equipment (PPE) for SCADA system maintenance</li> </ul>	<p>Replacement Unit (LRU) on SCADA system</p> <ul style="list-style-type: none"> <li>Safety guidelines on use of tools and equipment for corrective maintenance on SCADA system</li> <li>Organisational maintenance documentation and fault reporting procedures</li> <li>Types and usage of Personal Protective Equipment (PPE) for SCADA system maintenance</li> </ul>				
<p><b>Abilities</b></p>	<ul style="list-style-type: none"> <li>Perform preparation work to conduct maintenance on SCADA system</li> <li>Follow organisational maintenance procedures, WI, and/or OEM technical manuals to carry out preventive maintenance on SCADA system</li> <li>Perform serviceability checks on SCADA system</li> <li>Adhere to safety guidelines and operating instructions for tools and equipment during maintenance work</li> <li>Record SCADA system maintenance activities and report occurrences of faults identified</li> </ul>	<ul style="list-style-type: none"> <li>Interpret work orders and prepare for corrective maintenance</li> <li>Normalise software faults on SCADA system</li> <li>Reinstate SCADA system and perform functional tests on software and hardware</li> <li>Interpret and respond to SCADA system alarm and status notifications</li> <li>Apply operating and safety measures in operating tools and equipment during maintenance work</li> <li>Record and collate documentation of SCADA system maintenance activities</li> </ul>	<ul style="list-style-type: none"> <li>Use troubleshooting tools, equipment and methods to locate and analyse causes of SCADA system faults</li> <li>Apply fault identification procedures to determine causes of SCADA system faults</li> <li>Perform system software reconfiguration and/or upgrades</li> <li>Recommend corrective actions for identified faults on SCADA system software and hardware</li> <li>Analyse maintenance work documented for SCADA system to identify possible workflow improvements</li> </ul>	<ul style="list-style-type: none"> <li>Establish structured failure investigation and specify functional testing requirements in SCADA system</li> <li>Perform fault tree analyses to diagnose root cause failure on SCADA system</li> <li>Propose new and/or enhanced maintenance procedures and/or WI in reference to OEM technical recommendations</li> <li>Monitor overall maintenance progress of SCADA system to determine system performance reliability and effectiveness</li> <li>Develop solutions by analysing diagnostic data to prevent faults and failures recurrence</li> <li>Develop troubleshooting, rectification, and fault analysis methods and techniques</li> </ul>		

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				<ul style="list-style-type: none"><li>• Develop test procedures for system performance checks</li><li>• Coordinate SCADA system maintenance with other rail systems maintenance needs</li></ul>		
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