

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

<b>TSC Category</b>	Rail Systems Maintenance					
<b>TSC</b>	Trainborne Automatic Train Control Equipment Maintenance					
<b>TSC Description</b>	Implement preventive and corrective maintenance activities of trainborne Automatic Train Control equipment					
<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-1042-1.1</b>	<b>PTP-RSM-2042-1.1</b>	<b>PTP-RSM-3042-1.1</b>	<b>PTP-RSM-4042-1.1</b>		
	Carry out scheduled preventive maintenance on trainborne Automatic Train Control (ATC) equipment	Conduct corrective maintenance on trainborne Automatic Train Control (ATC) equipment	Troubleshoot faulty trainborne Automatic Train Control (ATC) equipment to locate faults and recommend rectification methods	Diagnose root causes of trainborne Automatic Train Control (ATC) equipment failure and review maintenance plans to prevent fault recurrence		
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• Fundamentals of train movement control</li> <li>• Operating principles and functions of trainborne ATC equipment</li> <li>• Components of trainborne ATC equipment that includes: <ul style="list-style-type: none"> <li>• Automatic Train Protection (ATP) safety system modules</li> <li>• Automatic Train Operation (ATO) Controller modules</li> <li>• Undercarriage equipment</li> </ul> </li> <li>• Types of fault indicators and interpretation on the various systems and equipment</li> <li>• Procedures for servicing trainborne ATC equipment in accordance to organisational maintenance procedures, Work Instructions (WI) and/or Original Equipment Manufacturer (OEM) technical manuals</li> <li>• Types of software and hardware tools for</li> </ul>	<ul style="list-style-type: none"> <li>• Components of trainborne ATC equipment that includes: <ul style="list-style-type: none"> <li>• Automatic Train Protection (ATP) safety system modules</li> <li>• Automatic Train Operation (ATO) Controller modules</li> <li>• Undercarriage equipment</li> </ul> </li> <li>• Software application used on trainborne ATC equipment</li> <li>• Functions of trainborne ATC interface</li> <li>• Types of fault indicators and interpretation on the various systems and equipment</li> <li>• Common failures of trainborne ATC equipment and its components</li> <li>• Procedures to normalise software faults and replace Line Replacement Unit (LRU) on trainborne ATC</li> <li>• Procedures to dismantle, repair, replace, and re-</li> </ul>	<ul style="list-style-type: none"> <li>• Interpretation of Light-emitting Diodes (LEDs) alert systems on trainborne ATC equipment</li> <li>• Fundamentals of communication principles</li> <li>• Software application used on trainborne ATC equipment</li> <li>• Common fault symptoms in trainborne ATC equipment</li> <li>• Methods to locate faults on trainborne ATC equipment</li> <li>• Procedures to normalise faults on trainborne ATC equipment</li> <li>• Methods of power isolation</li> <li>• Safety guidelines for usage of tools and equipment to troubleshooting procedures on trainborne ATC equipment</li> <li>• Procedure for system or equipment software configuration and/or upgrade</li> </ul>	<ul style="list-style-type: none"> <li>• Factors affecting modules and equipment performance</li> <li>• Failure investigation and prevention methods</li> <li>• Methods and tools for diagnostic analysis</li> <li>• Electromagnetic Interference (EMI) and electromagnetic compatibility (EMC)</li> <li>• Organisational maintenance procedures, Work Instructions (WI) and/or Original Equipment Manufacturer (OEM) technical recommendations</li> <li>• Types and methods of functional and continuity tests on trainborne automatic train control (ATC) equipment</li> <li>• Develop test procedures for system performance checks</li> <li>• Functional relationships between trainborne ATC equipment, other signalling systems and the overall rail system</li> </ul>		

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	<p>carrying out preventive maintenance on trainborne ATC equipment</p> <ul style="list-style-type: none"> <li>• Concepts of fixed and moving block signalling</li> <li>• Safety guidelines on use of tools and equipment for preventive maintenance on trainborne ATC equipment</li> <li>• Types and usage of Personal Protective Equipment (PPE) for trainborne ATC equipment maintenance</li> <li>• Organisational maintenance documentation and fault reporting procedures</li> </ul>	<p>assemble trainborne ATC equipment</p> <ul style="list-style-type: none"> <li>• Methods of power isolation</li> <li>• Types of software and hardware tools for carrying out corrective maintenance on trainborne ATC equipment</li> <li>• Types and usage of Personal Protective Equipment (PPE) for trainborne ATC equipment maintenance</li> </ul>				
<b>Abilities</b>	<ul style="list-style-type: none"> <li>• Perform preparation work to conduct preventive maintenance on trainborne ATC equipment</li> <li>• Follow organisational maintenance procedures, WI and/or OEM technical manuals to carry out preventive maintenance on trainborne ATC equipment</li> <li>• Perform serviceability checks on trainborne ATC equipment</li> <li>• Adhere to safety guidelines and operating instructions for tools and equipment during maintenance activities</li> <li>• Record trainborne ATC equipment maintenance activities and report</li> </ul>	<ul style="list-style-type: none"> <li>• Interpret work orders and prepare for corrective maintenance</li> <li>• Apply power isolation procedures during trainborne ATC equipment maintenance</li> <li>• Normalise software faults on trainborne ATC equipment</li> <li>• Dismantle faulty trainborne ATC components for corrective maintenance</li> <li>• Carry out rectification, repair and/or replacement of faulty components</li> <li>• Reassemble and reinstate trainborne ATC equipment</li> <li>• Perform functional tests on trainborne ATC equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Use troubleshooting tools, equipment and methods to locate and analyse causes of trainborne ATC equipment faults</li> <li>• Apply fault identification procedures to determine causes of trainborne ATC equipment faults</li> <li>• Perform system software restoration and/or upgrade</li> <li>• Recommend corrective actions for identified faults on trainborne ATC equipment</li> <li>• Recommend power isolation processes during trainborne ATC equipment maintenance</li> <li>• Implement procedures on safe usage of tools and equipment during maintenance work</li> </ul>	<ul style="list-style-type: none"> <li>• Establish structured failure investigation and specify functional testing requirements</li> <li>• Apply failure investigation methods to diagnose root cause failure of trainborne ATC equipment</li> <li>• Review organisational trainborne ATC equipment maintenance procedures and/or WI</li> <li>• Propose new and/or enhance maintenance procedures and/or WI in reference to OEM recommendations</li> <li>• Monitor overall maintenance progress of trainborne ATC equipment to ascertain effectiveness of maintenance</li> </ul>		

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	occurrences of faults identified	<ul style="list-style-type: none"> <li>• Apply operating and safety measures in operating tools and equipment during maintenance work</li> <li>• Record and collate documentation of trainborne ATC equipment maintenance activities</li> </ul>	<ul style="list-style-type: none"> <li>• Analyse maintenance work documented for trainborne ATC equipment to identify possible workflow improvements</li> </ul>	<ul style="list-style-type: none"> <li>• Perform fault tree analyses on trainborne ATC equipment</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> <li>• Develop test procedures for system performance checks</li> <li>• Coordinate trainborne ATC equipment maintenance with other rail system maintenance needs</li> </ul>		
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