

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

TSC Category	Maintenance Management					
TSC	Condition-based Assets Monitoring Management					
TSC Description	Formulate and implement condition-based maintenance procedures to enhance organisation maintenance regimes and operational reliability					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	PTP-MAI-1025-1.1	PTP-MAI-2025-1.1	PTP-MAI-3025-1.1	PTP-MAI-4025-1.1	PTP-MAI-5025-1.1	
	Carry out routine inspections using condition-based monitoring methods on systems, equipment and components	Support the implementation of condition-based monitoring procedures	Implement condition-based monitoring procedures to determine conditions and identify variances in systems, equipment and components	Develop condition-based monitoring regime to analyse, diagnose and mitigate systematic deterioration of systems, equipment and components	Review current and historical performance of systems, equipment and components to determine requirements of condition-based monitoring regime	
Knowledge	<ul style="list-style-type: none"> Types and signs of observable wear and tears, stress signatures, and fault indicators Types of sampling and measurement methods and techniques Tolerance limits of components and systems Tools, gauges and instruments for measurement Organisational and/or original equipment manufacturer (OEM) guidelines, schedules and intervals for measurement sampling Organisational standards for documentation and reporting procedures 	<ul style="list-style-type: none"> Methods to obtain process parameters sampling data Types and functionalities of monitoring instruments, equipment and sensors Procedure to set up and configure monitoring equipment, instrument and sensors Equipment calibration methods Organisational procedures and/or original equipment manufacturer (OEM) guidelines, schedules and intervals for condition-based monitoring Organisational standards for documentation and reporting procedures 	<ul style="list-style-type: none"> Methods to obtain process parameters sampling data Types, functionalities and applications of different types of monitoring instruments, equipment and sensors Procedure to set up and configure monitoring equipment Types and causes of sampling data errors and rectification methods Data interpretation and statistical analysis techniques Types of abnormal performance and signs of faulty operational systems, equipment and components Tolerance limits and critical failure indexes of systems, equipment and components Instrumentation and control methods Organisational condition-based monitoring procedures 	<ul style="list-style-type: none"> Types of applied techniques to obtain process parameters sampling data Variable operational and/or environmental factors related to abnormal performances and sampling data errors Data interpretation and statistical analysis techniques Tolerance limits and critical failure indexes of systems, equipment and components Instrumentation and control Root cause analysis methods and processes Organisational condition-based monitoring procedures and implementation schedules Organisational standard operating procedures (SOPs) on monitoring operations and regime Engineering concepts and principles of system 	<ul style="list-style-type: none"> Engineering concepts and principles Condition-based monitoring concepts and principles Asset life-cycle management plans Requirements of data acquisition system relevant to condition-based monitoring applications Commercially viable diagnostic techniques, tools and equipment Variable operational and/or environmental factors and limitations of data generated from condition-based monitoring techniques Types of training programmes and certification requirements for maintenance personnel Organisational and original equipment manufacturer (OEM) quality standards 	

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			and implementation schedules	monitoring and predictive maintenance	<ul style="list-style-type: none"> Organisational maintenance regime and strategies 	
Abilities	<ul style="list-style-type: none"> Carry out visual inspection of systems, equipment and components Carry out scheduled sampling and measurement of systems, equipment and components at pre-determined intervals Adopt safe handling and operating procedure of tools and equipment Record observations, measurement and readings and highlight variances 	<ul style="list-style-type: none"> Prepare systems, equipment and components for condition-based monitoring implementation at pre-determined schedules Assist to set up condition-based monitoring equipment and/or mount sensors for continuous data collection Collect spot readings of data to identify potential errors due to equipment set-up and/or configuration errors Assist with equipment calibration Carry out established condition-based monitoring procedures during routine operations and/or maintenance of systems, equipment and components Collate reports and record data samples collected and highlight variances 	<ul style="list-style-type: none"> Set up, configure and calibrate monitoring equipment with pre-defined monitoring parameters Ensure collected samples or measurement data within pre-defined monitoring parameters Identify measurements and readings indicative of development of potential faults and/or failure of systems, equipment and components Collate and document readings and data samples and report variances 	<ul style="list-style-type: none"> Define operating and condition safety limits of systems, equipment and components Identify continuous monitoring methods or periodic monitoring cycles methods for condition-based monitoring applications Set effective quantitative and qualitative process parameters Develop condition-based monitoring regimes and implementation methodologies Analyse data collected from various condition-based monitoring sources Assess data against historic data, performance trends and systems, equipment and components specifications to verify data integrity Apply root cause analysis methodologies to identify principal causes of indicative and developing faults and recommend corrective maintenance measures Review and recommend preventive and/or predictive maintenance procedures to existing monitoring regime Record and store information to maintain 	<ul style="list-style-type: none"> Conduct audit on implementation and operational plans for condition-based monitoring regimes Establish prioritisation of condition-based monitoring regime for assets based on cost benefits and asset life-cycle management plans Audit parameters for systems, equipment and components operating and condition safety limits Establish resource requirements and manpower capabilities to operationalise condition-based monitoring regimes Audit data sample ranges to verify systems, equipment and components conditions for mitigation requirements Review organisational monitoring regimes to incorporate procedural enhancements 	

				the integrity of the sample or data		
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