

## RAIL TECHNICIANS

### Technician/ Senior Technician (Permanent Way and Civil Structure)

**Job description:** The Technician/ Senior Technician (Permanent Way and Civil Structure) performs preventive and corrective maintenance of civil structures, train tracks and/or third rail. The technician operates engineering trains to support rail track maintenance, conducts trouble shooting, fault analysis and repair of electrical and mechanical track equipment and systems, performs track-walk inspections and assists in the inspection and general maintenance of train stations and depot buildings. The technician operates various types of engineering work trains and train mounted equipment to aid in the maintenance of train tracks, train tunnels and various rail structures. The technician also supervises contractors and external stakeholders in ensuring adherence to work and safety standards.

Current Job Tasks	Future view of job tasks	Impact at task-level
1. Perform preventive maintenance on civil structures, train tracks and third rail through deploying engineering trains and train mounted equipment on rail tracks and performing track-walk inspections, and assist in conducting fault analyses by collecting and analysing data to identify root causes of failures	<ul style="list-style-type: none"> <li>Continue to interpret permanent way and civil structure health data collected from civil structure sensors and rail track monitoring equipment to identify potential failure modes.</li> <li>RPA can ensure that permanent way and civil structure systems data is collected and analysed via centralized systems which will reduce the need for human intervention such as track-walk inspections.</li> </ul>	
2. Perform corrective maintenance on train tracks and/or third rail through conducting repair of electrical and mechanical track equipment and systems	<ul style="list-style-type: none"> <li>Continue to perform repair work.</li> <li>Predictive technology such as condition monitoring and sensors can streamline the troubleshooting process and reduce manual effort.</li> </ul>	
3. Perform general maintenance on civil infrastructure, including train stations and depot buildings	<ul style="list-style-type: none"> <li>Continue to perform general maintenance works on civil infrastructure.</li> </ul>	
4. Supervise work of contractors and external stakeholders and ensure adherence to safety requirements and operating standards such as ISOs, Workplace Safety and Health Act, etc.	<ul style="list-style-type: none"> <li>Human intervention and judgment remain critical in overseeing operations and ensuring compliance.</li> <li>Digital tools such as ERP will generate standardized reports, conduct digital data logging and documentation as part of vendor and stakeholder management.</li> </ul>	



A MEDIUM proportion of the job tasks will be impacted by the key trend, thus minimising or changing the current job tasks

**MEDIUM degree of change**



#### Current/future skills

To take on adjacent/new job role(s) the skills below will observe these changes:

- Rail Track Maintenance
- Condition-Based Assets Monitoring Management
- Report Writing
- Rail Regulatory Compliance
- Vendor Management
- WSH Confined Spaces
- WSH Electrical Safety
- Problem Solving
- Data Usage and Implementation
- Internet of Things Application
- Robotics and Automation Application
- Sensor Monitoring Management



Within the next **5 - 20 years**, the job role(s) could potentially undergo

**REDESIGN**



#### Job Adjacency

The job holder could potentially take on adjacent job roles as:

- Technician/ Senior Technician (Rolling Stock/ Engineering Trains) – 86.5

#### Legend for job tasks & skills

- High impact
- Medium impact
- Low impact
- Declining skills
- Adjacent skills
- Emerging skills

#### Legend for job adjacency

Pivot score shows job fit between current to future job role derived from Faethm. The higher the score, the easier the transition. A pivot score of >75 is deemed as a good fit for the future role.

## 5-year skills impact analysis for rail technicians





















Job tasks today	Job tasks in 5 years	Job skills in 5 years	Job task impact	Job role impact	Job role transition
1. Perform preventive maintenance of trains and rail systems and assist in conducting fault analyses by collecting and analysing data to identify root causes of failures	 Continue to interpret system health data to identify potential failure modes, collected and analysed by RPA through centralized systems which will reduce the need for human intervention	 Track Access Management  Condition-Based Assets Monitoring Management  Robotics and Automatic Application  Data Usage and Implementation	 Medium degree of impact	 Redesign	1. Technician / Senior Technician (Permanent Way and Civil Structure)
2. Perform corrective maintenance through conducting repair and modifications of trains and rail systems	 Continue to perform repair work but predictive technology such as condition monitoring and sensors can streamline the troubleshooting process and reduce manual effort	 Problem Solving  Sensor Monitoring Management  Internet of Things Application			2. Technician/ Senior Technician (Power)
3. Prepare tools, vehicles and equipment required by ensuring they are in working order, obtain the maintenance schedule and retain a proper record of maintenance activities	 Continue to conduct visual checks on tools, vehicles and equipment to maintain working condition	 Equipment Maintenance and Housekeeping  Maintenance Scheduling  Report Writing			3. Technician / Senior Technician (Rolling Stock/ Engineering Trains)
4. Supervise work of contractors and external stakeholders and ensure adherence to safety requirements and operating standards	 Human intervention and judgment remain critical in overseeing operations and ensuring compliance but digital tools such as ERP will generate standardized reports, conduct digital data logging and documentation as part of vendor and stakeholder management	 Rail Regulatory Compliance  Vendor Management  Robotics and Automation Application  Internet of Things Application			4. Technician / Senior Technician (Mechanical and Electrical) 5. Rail operations control management
Declining Functions	Manual inspection, documentation, report generation, data entry				
Emerging Functions	Predictive maintenance, implementation of RPA applications, data analytics (i4.0)				

Table 12: 5-year skills impact for rail technicians

## 10-year skills impact analysis for rail engineers



















Job tasks today	Job tasks in 10 years	Job skills in 10 years	Job task impact	Job role impact	Job role transition
1. Perform preventive maintenance of trains and rail systems and assist in conducting fault analyses by collecting and analysing data to identify root causes of failures	 Continue to interpret system health data to identify potential failure modes, collected and analysed by RPA through centralized systems which will reduce the need for human intervention	 Track Access Management  Condition-Based Assets Monitoring Management  Robotics and Automation Application  Data Usage and Implementation	 Medium degree of impact	 Redesign	1. Technician / Senior Technician (Permanent Way and Civil Structure) 2. Technician/ Senior Technician (Power) 3. Technician / Senior Technician (Rolling Stock/ Engineering Trains) 4. Technician / Senior Technician (Mechanical and Electrical) 5. Rail operations control management
2. Perform corrective maintenance through conducting repair and modifications of trains and rail systems	 Continue to perform repair work but predictive technology such as condition monitoring and sensors can streamline the troubleshooting process and reduce manual effort	 Problem Solving  Sensor Monitoring Management  Internet of Things Application			
3. Prepare tools, vehicles and equipment required by ensuring they are in working order, obtain the maintenance schedule and retain a proper record of maintenance activities	 RPA will automate tasks such as equipment maintenance, maintenance scheduling and report writing, with the ability to store information on centralised systems to ensure accessibility	 Equipment Maintenance and Housekeeping  Maintenance Scheduling  Report Writing  Robotics and Automation Application			
4. Supervise work of contractors and external stakeholders and ensure adherence to safety requirements and operating standards	 Human intervention and judgment remain critical in overseeing operations and ensuring compliance but digital tools such as ERP will generate standardized reports, conduct digital data logging and documentation as part of vendor and stakeholder management	 Rail Regulatory Compliance  Vendor Management  Robotics and Automation Application  Internet of Things Application			
Declining Functions	Manual inspection, documentation, report generation, data entry				
Emerging Functions	Predictive maintenance, implementation of RPA applications, data analytics (i4.0)				

Table 13: 10-year skills impact for rail technicians

## 20-year skills impact analysis for rail engineers

















Job tasks today	Job tasks in 20 years	Job skills in 20 years	Job task impact	Job role impact	Job role transition
1. Perform preventive maintenance of trains and rail systems and assist in conducting fault analyses by collecting and analysing data to identify root causes of failures	 Continue to interpret system health data to identify potential failure modes, collected and analysed by RPA through centralized systems which will reduce the need for human intervention	 Track Access Management  Condition-Based Assets Monitoring Management  Robotics and Automation Application  Data Usage and Implementation	 Medium degree of impact	 Redesign	1. Technician / Senior Technician (Permanent Way and Civil Structure) 2. Technician/ Senior Technician (Power) 3. Technician / Senior Technician (Rolling Stock/ Engineering Trains) 4. Technician / Senior Technician (Mechanical and Electrical) 5. Rail operations control management
2. Perform corrective maintenance through conducting repair and modifications of trains and rail systems	 Continue to perform repair work but predictive technology such as condition monitoring and sensors can streamline the troubleshooting process and reduce manual effort	 Problem Solving  Sensor Monitoring Management  Internet of Things Application			
3. Prepare tools, vehicles and equipment required by ensuring they are in working order, obtain the maintenance schedule and retain a proper record of maintenance activities	 RPA will automate tasks such as equipment maintenance, maintenance scheduling and report writing, with the ability to store information on centralised systems to ensure accessibility	 Equipment Maintenance and Housekeeping  Maintenance Scheduling  Report Writing  Robotics and Automation Application			
4. Supervise work of contractors and external stakeholders and ensure adherence to safety requirements and operating standards	 Human intervention and judgment remain critical in overseeing operations and ensuring compliance but digital tools such as ERP will generate standardized reports, conduct digital data logging and documentation as part of vendor and stakeholder management	 Rail Regulatory Compliance  Vendor Management  Robotics and Automation Application  Internet of Things Application			
Declining Functions	Manual inspection, documentation, report generation, data entry				
Emerging Functions	Predictive maintenance, implementation of RPA applications, data analytics (i4.0)				

Table 14: 20-year skills impact for rail technicians