

BUS ENGINEERS

Engineer/ Engineering Manager

Job description: The Engineer monitors the performance of the bus fleet to ensure operational safety and reliability, identify bus system degradation, diagnose root causes and implement mitigation actions to reduce service downtime. He provides technical advice to bus maintenance team for fleet-wide engineering and maintenance based on in-depth knowledge of bus systems and engineering principles. He conducts engineering studies and sources for technology application to improve bus operations. The Engineering Manager reviews fleet performance audit data to establish fleet engineering and maintenance standards and commissions engineering studies and technology application projects.

Current Job Tasks	Future view of job tasks	Impact at task-level
1. Diagnose root cause of bus system degradation through ICE diagnostic tools and ICE based engineering knowledge; implement improved maintenance or future mitigation actions to slow down system degradation	<ul style="list-style-type: none"> EV technical knowledge and expertise will be required to diagnose EV-specific root problems Interpret bus health data collected from EV diagnostic tools and various sensors such as temperature and voltage sensors; implement improved maintenance or future mitigation actions to slow down system degradation 	
2. Provide technical advice to ICE bus maintenance team for complex issues and oversee the maintenance works in complicated cases	<ul style="list-style-type: none"> Fundamental differences in the system due to electrical based components such as batteries and electric drivetrain parts instead of mechanical components EV technical knowledge and expertise will be required as well as knowhows of operating high-level EV diagnostics tools 	
3. Conduct engineering studies for overall ICE equipment and vehicles; source for new technology application applicable to ICE maintenance work for increased efficiency and effectiveness	<ul style="list-style-type: none"> The fundamental system of an EV is different from conventional ICE based vehicles hence conducting of engineering studies and sourcing for technology application for each technology will be different to improve bus maintenance operations 	
4. Review fleet performance audit data to establish standards that are relevant and applicable in today's context	<ul style="list-style-type: none"> Consistent review of fleet performance audit will remain similar to ensure improvements of bus operations and maintenance standards matching with the advancement of technology 	



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:

- Bus Engine System Maintenance
- Bus Drivetrain System Maintenance
- Engineering Maintenance Management
- Bus Regulatory Compliance
- Workplace Facilities Safety Management
- Data and Statistical Analytics
- Internet of Things Application
- Robotics and Automation Application
- EV Dashboard Diagnostic
- Bus Battery System Maintenance
- Bus Electric Drivetrain System Maintenance
- Bus High Voltage System Maintenance



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:

- EV Bus Engineer

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 bus engineers






















Job tasks today	Job tasks in 5 years	Job skills in 5 years	Job task impact	Job role impact	Job role transition
1. Diagnose root cause of bus system degradation through ICE vehicle tools, diagnostic equipment and ICE based engineering knowledge; implement improved maintenance or future mitigation actions to slow down system degradation	 Utilize EV vehicle tools, diagnostics equipment and EV based engineering knowledge; implement improved maintenance or future mitigation actions to slow down system degradation	 Bus Engine System Maintenance  Bus Drivetrain System Maintenance  Engineering Maintenance Management  EV Dashboard Diagnostic  Bus Battery System Maintenance  Bus Electric Drivetrain System Maintenance	 Medium degree of impact	 Redesign	1. EV Bus Engineer
2. Provide technical advice to ICE bus maintenance team for complex issues and oversee the maintenance works in complicated cases	 Provide technical advice to EV bus maintenance team for complex issues and oversee the maintenance works in complicated cases	 Bus Regulatory Compliance  Workplace Facilities Safety Management  Bus Battery System Maintenance  Bus Electric Drivetrain System Maintenance			
3. Conduct engineering studies for overall ICE equipment and vehicles; source for new technology application applicable to ICE maintenance work for increased efficiency and effectiveness	 Conduct engineering studies for overall EV equipment and vehicles; source for new technology application applicable to EV maintenance work for increased efficiency and effectiveness	 Systems Engineering Thinking  Data and Statistical Analytics  Internet of Things Application			
4. Review fleet performance audit data to establish standards that are relevant and applicable in today's context	 Consistent review of fleet performance audit will remain similar to ensure improvements of bus operations and maintenance standards matching with the advancement of technology	 Bus Regulatory Compliance  Robotics and Automation Application			
Declining Functions	Diagnosis, provision of technical advice and conducting engineering studies of ICE vehicles and their components				
Emerging Functions	Diagnosis, provision of technical advice and conducting engineering studies of EV vehicles and their components				

Table 21: 5-year skills impact for bus engineers

10-year skills impact analysis for bus engineers























Job tasks today	Job tasks in 10 years	Job skills in 10 years	Job task impact	Job role impact	Job role transition
1. Diagnose root cause of bus system degradation through ICE vehicle tools, diagnostic equipment and ICE based engineering knowledge; implement improved maintenance or future mitigation actions to slow down system degradation	 Utilize EV vehicle tools, diagnostics equipment and EV based engineering knowledge; implement improved maintenance or future mitigation actions to slow down system degradation with more EVs on the road	 Bus Engine System Maintenance  Bus Drivetrain System Maintenance  Engineering Maintenance Management  EV Dashboard Diagnostic  Bus Battery System Maintenance  Bus Electric Drivetrain System Maintenance	 Medium degree of impact	 Redesign	1. EV Bus Engineer
2. Provide technical advice to ICE bus maintenance team for complex issues and oversee the maintenance works in complicated cases	 Provide technical advice to EV bus maintenance team for complex issues and oversee the maintenance works in complicated cases	 Bus Regulatory Compliance  Workplace Facilities Safety Management  Bus Battery System Maintenance  Bus Electric Drivetrain System Maintenance			
3. Conduct engineering studies for overall ICE equipment and vehicles; source for new technology application applicable to ICE maintenance work for increased efficiency and effectiveness	 Conduct engineering studies for overall EV equipment and vehicles; source for new technology application applicable to EV maintenance work for increased efficiency and effectiveness	 Systems Engineering Thinking  Data and Statistical Analytics  Internet of Things Application  Robotics and Automation Application			
4. Review fleet performance audit data to establish standards that are relevant and applicable in today's context	 Consistent review of fleet performance audit will remain similar to ensure improvements of bus operations and maintenance standards matching with the advancement of technology	 Bus Regulatory Compliance  Robotics and Automation Application			
Declining Functions	Diagnosis, provision of technical advice and conducting engineering studies of ICE vehicles and their components				
Emerging Functions	Diagnosis, provision of technical advice and conducting engineering studies of EV vehicles and their components				

Table 22: 10-year skills impact for bus engineers

20-year skills impact analysis for bus engineers






















Job tasks today	Job tasks in 20 years	Job skills in 20 years	Job task impact	Job role impact	Job role transition
1. Diagnose root cause of bus system degradation through ICE vehicle tools, diagnostic equipment and ICE based engineering knowledge; implement improved maintenance or future mitigation actions to slow down system degradation	 Utilize AV vehicle tools, diagnostics equipment and AV based engineering knowledge; implement improved maintenance or future mitigation actions to slow down system degradation	 Bus Engine System Maintenance  Bus Drivetrain System Maintenance  Engineering Maintenance Management  EV Dashboard Diagnostic  Bus Battery System Maintenance  Bus Electric Drivetrain System Maintenance	 Medium degree of impact	 Redesign	1. EV Bus Engineer
2. Provide technical advice to ICE bus maintenance team for complex issues and oversee the maintenance works in complicated cases	 Provide technical advice to EV bus maintenance team for complex issues and oversee the maintenance works in complicated cases	 Bus Regulatory Compliance Workplace Facilities Safety Management  Bus Battery System Maintenance  Bus Electric Drivetrain System Maintenance			
3. Conduct engineering studies for overall ICE equipment and vehicles; source for new technology application applicable to ICE maintenance work for increased efficiency and effectiveness	 Conduct engineering studies for overall EV equipment and vehicles; source for new technology application applicable to EV maintenance work for increased efficiency and effectiveness	 Systems Engineering Thinking  Data and Statistical Analytics  Internet of Things Application  Robotics and Automation Application			
4. Review fleet performance audit data to establish standards that are relevant and applicable in today's context	 Consistent review of fleet performance audit will remain similar to ensure improvements of bus operations and maintenance standards matching with the advancement of technology	 Bus Regulatory Compliance  Robotics and Automation Application			
Declining Functions	Diagnosis, provision of technical advice and conducting engineering studies of ICE vehicles and their components				
Emerging Functions	Diagnosis, provision of technical advice and conducting engineering studies of EV vehicles and their components				

Table 23: 20-year skills impact for bus engineers