Australian Government

# TLIK0006 Identify new and emerging technologies in the rail industry

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**Release: 1**

# TLIK0006 Identify new and emerging technologies in the rail industry

## Modification History

| Release | Comments |
|---|---|
| 1 | This unit of competency was first released in TLI Transport and Logistics Training Package Release 18.0. |

## Application

This unit describes the performance outcomes, skills and knowledge required to investigate and report on new and emerging technologies in the rail industry.

It requires the ability to investigate and interpret information on the benefits of key technological advancements in rolling stock design and maintenance, digital control systems and rail operation energy efficiency. It also includes the ability to investigate other new and emerging rail technologies to improve rail operations and passenger safety.

The unit applies to those who wish to prepare for entry level employment and/or further study in the rail transport industry. Completion of this unit does not provide competency to undertake any regulated, licensed, accredited, safety-critical or role-specific work activities in the rail industry.

## Licensing/Regulatory Information

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite unit(s)

Not applicable.

## Competency field(s)

N/A

## Unit sector(s)

Rail Sector.

## Elements and Performance Criteria

| **Elements** | **Performance criteria** |
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| Elements describe the essential outcomes. | | Performance criteria describe the performance needed to demonstrate achievement of the element. | |
|---|---|---|---|
| **1** | Identify technologies supporting safe rail operations | 1.1 | Identify technologies used to support safe rail operations across the globe |
| | | 1.2 | Describe the purpose of these technologies in improving the safe management and movement of rail services. |
| | | 1.3 | Identify examples of technologies used currently in the Australian rail context. |
| | | 1.4 | Describe the benefits of these technologies to Australian rail operators and customers |
| | | 1.5 | Identify technologies that improve passenger safety and accessibility. |
| | | 1.6 | Describe how technologies supporting monitoring, communication and control reduce operational risk |
| **2** | Identify technologies supporting sustainability | 2.1 | Identify technologies that improve energy efficiency of rolling stock and mobile assets |
| | | 2.2 | Identify technologies supporting decarbonisation |
| | | 2.3 | Identify technology innovations supporting sustainable infrastructure |
| | | 2.4 | Describe environmental benefits associated with emerging technologies |
| 3 | Identify emerging rail technologies | 3.1 | Identify examples of emerging technologies in domestic and international rail contexts |
| | | 3.2 | Describe potential applications of one emerging technology in the Australian context |
| | | 3.3 | Describe potential benefits and challenges associated with emerging technologies |
| | | 3.4 | Identify technologies supporting future workforce capability |
| 4 | Report on new and emerging rail technologies | 4.1 | Collate information and prepare draft report |

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| | | | |
|---|---|---|---|
| | | 4.2 | Review draft report to identify areas requiring further information or improvement |
| | | 4.3 | Amend draft report and finalise for submission |

## Foundation Skills

For information regarding essential foundation skills and the unit relationship to the ACSF and DigComp (3.0), refer to the TLI Training Package Companion Volume Foundation Skills.

| L | R | W | OC | N |
|---|---|---|---|---|
| 2 | 3 | 3 | 3 | 2 |

| Digital Skills (Ref to DigComp 3.0) |
|---|
| **Basic: CS3.4.04:** Represent simple sequences symbolically, interpret simple symbolic sequences, and give basic instructions to a computer to perform simple tasks |
| **Basic: CS5.1.03**: Identify common technical issues and follow instructions to help to solve them. |
| **Int: CS3.2.07:** Modify or transform digital textual, numeric or visual representations to effectively and accurately convey the meaning of data and information. |

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# Assessment Requirements for TLIK0006 Identify new and emerging technologies in the rail industry

## Performance Evidence

Evidence required to demonstrate competence in this unit must satisfy all of the requirements of the elements and performance criteria on at least one occasion.

Evidence must demonstrate the ability to:

- identify technologies that support the safe and efficient operation of rail networks in Australia and internationally
- identify technologies that improve:
  - rail operations
  - operational and passenger safety
  - energy efficiency and sustainability
  - customer experience
  - workforce capability
- describe how monitoring, communication and control technologies reduce operational risk
- describe the purpose and potential benefits of at least **three (3)** technologies currently used within Australian rail networks
- investigate and describe at least **two (2)** emerging technologies that have the potential to influence future rail operations, including their potential applications, benefits and challenges
- use technologies to research and collate information from credible sources and prepare a report using rail industry terminology
- review report and implement improvement strategies
- communicate researched information in a written, oral or visual format

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- Rail technology terminology and its correct use
- Train control and signalling technology such as:
  - basic function and benefits of communication-based train control (CBTC)
  - interface with computer-based interlocking (CBI).
  - ETCS-based automatic train protection

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- ARTC Advanced Train Management System (ATMS)
- Monitoring and communication technology that reduces operational risk
  - e.g. condition monitoring, CCTV, digital train radio, level crossing protection
- Passenger safety and accessibility technology
  - e.g. platform screen doors, real-time passenger information, help points, accessible boarding, driver assist and collision avoidance
- Energy efficiency and decarbonisation technology:
  - regenerative braking
  - energy optimisation and driver advisory systems
  - hybrid diesel-electric and battery propulsion
  - alternative fuels (e.g. hydrogen, renewable diesel)
  - renewable energy for traction power
- Sustainable infrastructure:
  - e.g. alternative sleeper materials (recycled plastic/composite), sustainable station design
- Environmental benefits of rail technology:
  - lower emissions
  - energy use
  - noise
  - resource use
- Emerging light rail technology
  - e.g. trackless trams, catenary-free/wireless power supply, active pantographs, mechatronic switches
- Emerging heavy rail technology
  - e.g. automated and driverless trains, artificial intelligence (AI) and predictive maintenance, connected trains (Internet of Things), Maglev, high-speed rail (HSR) advantages and disadvantages
- Challenges of adopting new technology
  - e.g. cost, compatibility with existing systems, workforce skills, cyber security, public acceptance
- Workforce capability technology
  - e.g. train/tram driver simulators, virtual and augmented reality training, digital maintenance tools
- Online research techniques, including checking source credibility and referencing
- Report structure
- Document review: purpose and benefits; review types (self, peer, trainer); review tools (spelling and grammar check)
- Finalising a report: acting on feedback, version control, submission requirements

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## Assessment Conditions

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the task being performed and the needs of the candidate.

Both practical skills and knowledge must be assessed in a simulated assessment environment. Students must have access to:

- suitable learning environment such as a classroom equipped with data projector and screen
- computer hardware/software with access to the internet
- relevant template to document report information
- personal protective equipment (PPE) for simulations

## Unit Mapping Information

| Previous Code and Title | Equivalence | Comments |
|---|---|---|
| | Newly created | This unit has been created to address a skill or task required by industry that is not covered by an existing unit of competency |

## Links

Companion volumes, including implementation guides, are found on the national training register - https://training.gov.au/training/details/TLI.

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