41062 Apply fundamentals of CRM, and Threat and Error Management of Human Factors for aviation organisations

Kaupae | Level	4
Whiwhinga | Credit	8
Whāinga | Purpose	This skill standard is primarily for those working in or preparing to work in the aviation industry.
	People credited with this skill standard are able to analyse and apply human factors principles, effective teamwork, and aviation industry safety models, such as Crew Resource Management (CRM), Threat and Error Management, and Software/Hardware/Environment/Liveware/(Liveware) (SHELL) to enhance operational safety, foster effective collaboration, and minimise human error in aviation organisation systems.
	This skill standard can be used in programmes leading to a range of aviation qualifications and micro-credentials that include minimising the risk of human error within aviation systems.

Hua o te ako me Paearu aromatawai | Learning outcomes and assessment criteria

Hua o te ako | Learning outcomes	Paearu aromatawai | Assessment criteria
1. Analyse and apply human factors principles and aviation industry safety models to enhance operational safety and manage risks within aviation systems.	a. Define the concept of 'multicrew' for single-pilot and of multicrew flight operations and explain their associated safety benefits and risks.
	b. Explain the development of Human Factors and current models to incident and accident reports.
	c. Explain CRM and its application to managing threats and errors.
	d. Explain the ultra safe concept utilising models and processes suited to aviation as a failure-intolerant industry.
	e. Explain the effects and countermeasures of stress on the Liveware component of the SHELL model.
	f. Explain the principles of Threat and Error Management and the application of countermeasures.

Hua o te ako	Learning outcomes	Paearu aromatawai	Assessment criteria
2. Explain and analyse factors that contribute to effective teamwork in an aviation environment to minimise the risk of human error in the aviation industry.	a. Explain how teamwork effectiveness is measured in the aviation industry and common practices which support effective teamwork.
	b. Explain barriers to effective teamwork.
	c. Analyse practices for effective teamwork in a specific operation in an aviation organisation.

Pārongo aromatawai me te taumata paearu | Assessment information and grade criteria

Assessment specifications:

All descriptions, analysis and demonstrations of knowledge are to be made in accordance with accepted industry standards and texts.

Models and principles must be applied to work in aviation organisation systems, to allow learners to test reasoning and reach conclusions.

Assessment must include the application of the stated models and principles when analysing incident and accident reports

This skill standard can be undertaken by those working in multicrew or single pilot environments, with crew in these contexts referring to not only pilots and cabin crew but also those involved in providing the services and support required to sustain an aviation enterprise.

Definitions:

Accepted industry standards refers to the recommended practices set by the International Civil Aviation Organization (ICAO) and the Civil Aviation Authority of New Zealand (CAA).

Ultra safe industry refers to the concept formulated and discussed by Prof. James Reason.

Ngā momo whiwhinga | *Grades available*

Achieved

Ihirangi waitohu | Indicative content

Multicrew

- The concept of 'multicrew' for single-pilot flight operations and associated safety benefits and risks.

- Multicrew flight operations and associated safety benefits and risks.

Human Factors and Crew Resource Management

- The development of Human Factors in aviation systems, including ergonomics (anthropometrics, engineering, physiology, psychology).

- The role of Human Factors in accidents.

- The emergence of Crew Resource Management and its application.

- The relationship to relevant sections of ICAO Annexes 1, 6, 8, 13, 14, and 19.

- Incident and accidents reports.

Ultra safe industry/failure-intolerant industry

- Information processing, including perception processes, basic physiology of sensors, attention, memory, and pattern recognition.

- Threats to decision-making.

- Systematic problem-solving models.

- Countermeasures to barriers preventing good Crew Resource Management.

- Examples of other ultra safe industries.

The SHELL model

- How human factors are defined within the SHELL model.

- The effects of stress on the individual Liveware component of the SHELL model.

- Management of stress as a countermeasure, including defence mechanisms, coping strategies, and stress management processes.

- Incident and accidents reports.

Threat and Error Management

- The principle theories behind Threat and Error Management.

- The definitions of threats, errors, incidents and accidents.

- The definitions of safety data, safety information and safety risk.

- Skill-based tools used as countermeasures.

- Situational awareness.

- Decision-making models.

- The role of Crew Resource Management in managing actual and potential threats and errors.

- Avoidance trapping and mitigating error.

- How cognitive processes influence information processing.

- Incident and accidents reports.

Teamwork

- Concepts of effective teamwork.

- Examples of poor teamwork.

- Conflict management.

- Accident events and limitations of the individual Liveware component when affected by concepts of conformance, lack of authority or leadership skills.

- Risky shift.

Rauemi | Resources

Where the following resources have been updated, please refer to the latest version:

- Civil Aviation Authority's Human Factors resources www.aviation.govt.nz/safety/safety-education-and-advice/human-factors/ and www.aviation.govt.nz/assets/publications/pilot-syllabus-assistance-archive/Subject_34_Human_factors.pdf.

- Civil Aviation Authority, *Threat and error management (TEM)* (www.aviation.govt.nz/assets/safety/human-factors/threat-and-error-management-TEM-awareness-material.pdf).

- David O'Hare and Stanley Roscoe, *Flightdeck Performance – The Human Factor (*Ames, Iowa: Iowa State University Press, 1990).

- Frank H Hawkins, and Harry W Orlady, *Human Factors in Flight*, 2nd ed (Hampshire: Ashgate Publishing, 1993).

- ICAO Annexes 1, 6, 8, 13, 14, and 19.

- Prof James Reason, *Human Error* (Cambridge: Cambridge University Press, 1990).

- Roger G Green, Helen Muir, Melanie James, David Gradwell, and Roger L Green, *Human Factors for Pilots*, 2nd ed (Hampshire: Ashgate Publishing, 1996).

Pārongo Whakaū Kounga | Quality assurance information

Ngā rōpū whakatau-paerewa | Standard Setting Body	Transport Industry Skills Board
Whakaritenga Rārangi Paetae Aromatawai | DASS classification	Service Sector > Aviation > Aviation - Core
Ko te tohutoro ki ngā Whakaritenga i te Whakamanatanga me te Whakaōritenga | CMR	0112

Hātepe | Process	**Putanga |** Version	**Rā whakaputa |** Review Date	**Rā whakamutunga mō te aromatawai |** Last date for assessment
Rēhitatanga | Registration	1	26 February 2026	N/A
Kōrero whakakapinga | Replacement information	This skill standard replaced unit standard 21836.		
Rā arotake | Planned review date	31 December 2030		

Please contact Transport Industry Skills Board at qualifications@transportisb.nz to suggest changes to the content of this skill standard.