

Title	Demonstrate knowledge of human factors for an airline transport pilot licence		
Level	6	Credits	10

Purpose	People credited with this unit standard are able, for an airline transport pilot licence in accordance with Subject No 46, to demonstrate: general knowledge of human factors; knowledge of basic physiology and effects of flight; knowledge of flying and health; knowledge of aviation psychology; knowledge of ergonomics; and knowledge of first aid and survival.
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Classification	Aviation > Aircraft Operation
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Available grade	Achieved
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Guidance Information

- 1 This unit standard is aligned with the relevant parts of the prescribed syllabi of the Civil Aviation Authority of New Zealand (CAA) for Subject No 46 for an airline transport pilot licence. Credit will be awarded upon meeting the requirements of the CAA-approved assessment or examination.
- 2 An airline transport pilot licence permits the holder to conduct aircraft operations as pilot-in-command in an aircraft requiring a co-pilot.
- 3 Definitions, abbreviations, and acronyms used in this unit standard are to be found in:
 - a *Civil Aviation Rules Part 1* on the CAA website at <https://www.caa.govt.nz>, and
 - b *Aeronautical Information Publication (AIP)* published by Aeronautical Information Management (AIM), PO Box 294, Wellington 6140 or on the AIM website at <http://www.aip.net.nz>.
- 4 All references to the CAA refer specifically to the Civil Aviation Authority of New Zealand.
- 5 Industry standards and recommended practices are those set in place by the CAA.
- 6 Industry texts may include but are not limited to – aircraft flight manuals, CAA Rules, CAA Advisory Circulars, CAA Flight Test Standards Guides, operator exposition.
- 7 In the context of this unit standard the term *human factors* is about human performance and human limitations both in the air and on the ground. It encompasses the medical, psychological, ergonomic, and engineering aspects associated with air transport aircraft operations.

- 8 For the purpose of this unit standard, *knowledge* refers to knowledge, understanding, and application of the subject matter.
- 9 Industry requirements are that the candidate must meet the eligibility requirements of the Civil Aviation Act 1990 and the Civil Aviation Rules Part 61 for an airline transport pilot licence.

Outcomes and performance criteria

Outcome 1

Demonstrate general knowledge of human factors in accordance with Subject No 46.

Performance criteria

- 1.1 Airmanship, professionalism, and responsibility are stated, defined, and described in accordance with industry texts and standards.
- 1.2 Human factors models and programmes in flying are defined, described, and explained in accordance with industry texts and standards.
- Range models may include but are not limited to – SHEL (Software, Hardware, Environment, and Liveware).

Outcome 2

Demonstrate knowledge of basic physiology and effects of flight in accordance with Subject No 46.

Performance criteria

- 2.1 The components of the atmosphere are stated, described, and explained in accordance with industry texts and standards.
- 2.2 Circulation and the respiratory system are described in accordance with industry texts and standards.
- 2.3 Hypoxia and its effect on flying are defined and explained in accordance with industry texts and standards.
- Range includes but is not limited to – hypoxia onset, time of useful consciousness, oxygen paradox.
- 2.4 Hyperventilation is defined, explained, and described in accordance with industry texts and standards.
- 2.5 The effects of entrapped gases are defined explained and described in accordance with industry texts and standards.

- 2.6 Decompression sickness is defined, described, and explained in accordance with industry texts and standards.

Range includes but is not limited to – explosive decompression.

- 2.7 Vision and visual perception, and their effect on flying, are described and identified in accordance with industry texts and standards.

Range eye structure may include but is not limited to – lens, cornea, retina;
imitations of the eye may include but are not limited to – ability to discern objects at night, blind spot, colour perception, empty field myopia;
optometric terminology may include but is not limited to – long sightedness, short sightedness, presbyopia, astigmatism;
visual illusions may include but are not limited to – autokinesis, stroboscopic illumination illusion/flicker vertigo, break-off phenomenon.

- 2.8 Hearing and balance are described and explained in accordance with industry texts and standards.

Range may include but is not limited to – effect of prolonged exposure to noise, presbycusis.

- 2.9 Spatial orientation and its effects on flying are defined and explained in accordance with industry texts and standards.

Range anatomy and physiology of the ear may include but are not limited to – semicircular canals, vestibular sac/tubes;
spatial illusions may include but are not limited to – the leans, somatogravic illusion, somatogyral illusion, coriolis effect.

- 2.10 The effects of gravitational forces are explained in accordance with industry texts and standards.

- 2.11 Motion sickness and its treatments are explained and described in accordance with industry texts and standards.

- 2.12 Flight anxiety is explained and described in accordance with industry texts and standards.

Outcome 3

Demonstrate knowledge of flying and health in accordance with Subject No 46.

Performance criteria

- 3.1 Fitness to fly is described and identified in accordance with industry texts and standards.
- Range factors affecting pilot performance include but are not limited to – arterial disease, blood pressure, diet, exercise, obesity.
- 3.2 Alcohol and drugs and their effects on pilots and pilot performance are described and explained in accordance with industry texts and standards.
- 3.3 Blood donation and its effect on the pilot are described and explained in accordance with industry texts and standards.
- 3.4 Environmental hazards in flying, and their potential symptoms and effects are identified and described in accordance with industry texts and standards.
- Range hazards may include but are not limited to – carbon monoxide, fuel, chemical sprays, lubricating oils, hydraulic fluids.
- 3.5 The role of stress management in flying is defined, identified, and explained in accordance with industry texts and standards.
- Range environmental stressors may include but are not limited to – heat, cold, noise, vibration.
- 3.6 Sleep and fatigue (alertness management) and their effect on the pilot and pilot performance are described and explained in accordance with industry texts and standards.
- Range alertness management techniques may include but are not limited to – napping, caffeine consumption, alcohol consumption, taking sedatives;
relevant terms include but are not limited to – biological clock, circadian rhythm, circadian dysrhythmia, desynchronisation.
- 3.7 Ageing and its effect on the pilot are described in accordance with industry texts and standards.
- Range effects may include but are not limited to – sensitivity and acuity of the sensory systems, muscular strength, resilience and reaction times, sleep/wakefulness patterns.

Outcome 4

Demonstrate knowledge of aviation psychology in accordance with Subject No 46.

Performance criteria

- 4.1 Human information processing is described in accordance with industry texts and standards.
- Range may include but is not limited to – attention, sensory threshold, sensitivity, memory.
- 4.2 Situational awareness is defined, described, and explained in accordance with industry texts and standards.
- 4.3 The role of judgement and decision making in flying is described, identified, and explained in accordance with industry texts and standards.
- 4.4 The role of social psychology and flight deck management in flying are identified, defined, and explained in accordance with industry texts and standards.
- 4.5 The concept and practice of threat and error management in flying is explained and described in accordance with industry texts and standards.
- 4.6 The concept of culture in flying is identified and described in accordance with industry texts and standards.

Outcome 5

Demonstrate knowledge of ergonomics in accordance with Subject No 46.

Performance criteria

- 5.1 The effect of flight deck design is described and explained in accordance with industry texts and standards.
- 5.2 The effect of the design of controls is explained in accordance with industry texts and standards.
- Range may include but is not limited to – size, shape (recognition by touch), location, layout.
- 5.3 The design effects of instrumentation, displays, and alerts on flying is explained and described in accordance with industry texts and standards.
- Range may include but is not limited to – size, position, layout, visibility, legibility.
- 5.4 The role of documentation and procedures in flying is explained and described in accordance with industry texts and standards.

Outcome 6

Demonstrate knowledge of first aid and survival in accordance with Subject No 46.

Performance criteria

- 6.1 First aid is described in accordance with industry texts and standards.
- 6.2 The measures to optimise survival in aviation are stated and explained in accordance with industry texts and standards.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	21 January 2011	31 December 2011
Revision	2	15 April 2011	31 December 2018
Review	3	20 October 2016	31 December 2027
Review	4	28 September 2023	31 December 2027

Consent and Moderation Requirements (CMR) reference

0169

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.