Advisory Circular
AC119-3 & 135-1

Revision 7

5 April 2025

Air Operator Certification—Part 135 Operations

General

Civil Aviation Authority (CAA) Advisory Circulars (ACs) contain information about standards, practices, and procedures that the Director has found to be an **acceptable means of compliance** with the associated rule.

Consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices, or procedures are found to be acceptable they will be added to the appropriate AC.

Purpose

This AC describes an acceptable means of compliance with requirements relating to the certification of aircraft operators under Part 119 for air operations conducted in accordance with Part 135.

Related Rules

This AC relates specifically to Civil Aviation Rule Parts 119 and 135, but also refers to requirements in the operating rules of Parts 91, 92, 43, 12, 108, 145, and 141.

Change Notice

Revision 7:

- aligns this AC with redrafted rules under the Civil Aviation Act 2023 (CA Act 2023)
- adds advice on passenger safety briefings
- deletes rule references that have been reserved
- adds advice on rules, including rule 135.801, *Purpose,* rule 135.803*, Operator responsibilities,* rule 135.805, *Flight crew responsibilities,* rule 135.359*, Night Flight*
- deletes a sentence that incorrectly stated that the designated PIC did not have to occupy a crew member seat was deleted, as it contradicts rule 135.505(b)(3)(ii)
- changes the numbering to 119-3 &135-1
- adds a Version History, and
- makes stylistic updates to align with the current AC style.

Version History

History Log.

Revision No.	Effective Date	Summary of Changes
AC119-3, Rev 0	1 August 2000	Initial issue.
AC119-3, Rev 1	20 July 2001	Amended the landing and take-off charts on pages 47 and 48 and made minor editorial changes.
AC119-3, Rev 2	1 November 2001	Amended the landing and take-off charts on pages 43 and 44.
AC119-3, Rev 3	27 April 2007	Re-numbered from AC119-03 to AC119-3 as part of a project to standardise the numbering of all ACs.
AC119-3, Rev 4	22 December 2008	Included information related to mountain flying training for Part 135 operations.
AC119-3, Rev 5	10 September 2010	Updated to reflect a number of rule changes mainly in the operating rules of Part 91.
AC119-3, Rev 6	12 August 2011	Addressed mountain flying requirements, including: • amendments to the mountain flying requirements, and • alignment with licensing requirements for Terrain Awareness and Basic Mountain Flying and revised Mountain Flying Training Standards Guide.
AC119-3, Rev 7	5 April 2025	Aligns this AC with redrafted rules under the CA Act 2023. Adds advice on passenger safety briefings. Deletes rule references that have been reserved. Adds advice on rules, including rule 135.801, *Purpose,* rule 135.803*, Operator responsibilities, and* rule 135.805, *Flight crew responsibilities.* Deletes a sentence that incorrectly stated that the designated PIC did not have to occupy a crew member seat was deleted, as it contradicts rule 135.505(b)(3)(ii). Changes the numbering to 119-3 & 135-1. Adds a Version History. Changes to align with current AC style.

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Introduction

This AC includes detailed mountain flying training guidance to assist operators who conduct regular air operations into mountainous terrain and meet the Part 135 training and competency requirements for pilots to fly in such areas.

What is mountain flying?

Mountain flying is any technique involving the manoeuvring of an aircraft between, over, or around terrain or resultant weather that is, or that could be perceived as being, an obstacle to the aircraft flight path.

For many helicopters, the mountains are a frequent destination.

Although AIPNZ defines certain areas as mountainous zones, terrain affecting aircraft flight paths to varying degrees exists throughout the country.

It is the intention of this AC that its content and principles be applied to each operator's area of operation. Some content may not be relevant to an operator's area or operation, e.g. hypoxia, when operations do not involve flight at altitudes where hypoxia is typically an issue, and their programme would be modified to reflect such.

Mountain flying has four essential components:

- terrain
- weather
- aircraft
- pilot.

The training programme should reflect the combination and interaction of all four including the variables of:

- size/shape of terrain
- intensity/type of weather
- performance/loading/configuration of aircraft
- training/experience/decision making/ situational awareness of the pilot

as each applies to an operator’s area of operation and including any other variable peculiar to an operation.

Operators should be aware that this mountain flying programme does not duplicate areas covered by other theory or flight training. For example, principles of human factors, aircraft technical knowledge, performance, meteorology, navigation etc, all form an integral part of any mountain flying awareness programme. However, the individual operator’s programme should be designed to advance knowledge and techniques beyond the minimum standards.

Appendices D and E provide a guideline of basic minimum standard concepts and experiences necessary for continued survival through safe interaction with a mountainous environment. Where water, snow, remote strip, and advanced helicopter operations are involved, specific training to reflect such activities should be included in this programme.

Abbreviations

Abbreviations	
AOC	Air Operator Certificate
AAOC	Airline Air Operator Certificate
AFM	Aircraft flight manual
AIP	Advance Information Publication
ARA	Annual review of airworthiness
ASDA	accelerate/stop distance available
ATO	Air Transport Operation
ATS	Air Traffic Services
CTO	Commercial Transport Operation
CVR	Cockpit voice recorder
DG	Dangerous goods
FDR	Flight Data Recorder
FIS	Flight Information Service
GAAOC	General Aviation Air Operator Certificate
IFR	Instrument Flight Rules
LDA	landing distance available
MEA	Minimum En route Altitude
MEL	Minimum Equipment List
MORA	Minimum Off Route Altitude
MR	Maintenance Review
PIC	Pilot-in-command
SARTIME	Search and rescue time
SEIFR	Single engine aeroplane under IFR
TODA	take-off distance available
TORA	take-off run available
V_1 (vee one)	decision speed
V_{aca}	minimum control speed in flight
V_{er}	rotation speed
V_{2min}	minimum take-off safety speed

V_2	initial climb out speed
V_s	stalling speed or minimum steady flight speed in whatever configuration is being considered

Definitions

The operator should have an awareness of the following abbreviations when determining performance criteria for their aircraft:

Accelerate/stop distance available – as per Part 1.

Aircraft flight manual (AFM) – as per Part 1.

Altitude of the aerodrome means the pressure altitude of the aerodrome to the nearest 100 feet.

Ambient conditions mean conditions of air temperature, pressure, and humidity existing at any particular time and place.

Approved – as per Part 1.

Clearway – as per Part 1

Configuration – as per Part 1

Drift-down means a gradual descent by an aeroplane with one engine inoperative to an altitude at which it can comply with the one engine inoperative en route climb performance requirements.

Elevation of an aerodrome means the height of an aerodrome above mean sea level.

Gradient of climb means the ratio expressed in common units as a percentage.

Gross flight path means the flight path it is assumed an aeroplane will follow when flown in a particular configuration in accordance with specified procedures. The flight path is established from the aeroplane's certification performance data and can be accepted as the average fleet performance of the aeroplane type.

Landing distance available – as per Part 1.

Landing threshold means the beginning of that portion of the runway declared useable for landing.

Net flight path means the gross flight path of an aeroplane reduced by specified margins.

Pressure altitude – as per Part 1.

Route area means the en route obstacle clearance airspace requirements according to whether the flight is to be made under IFR or VFR.

Runway – as per Part 1

Stopway — as per Part 1.

Take-off distance available – as per Part 1.

Take-off run available – as per Part 1.

Take-off threshold means the beginning of that portion of the runway declared useable for take-off.

Visual reference means continuous reference to terrain (land or water).

Note: *See also the* Definition*s section under* Subpart K, Fatigue of Flight Crew*, for definitions specific to fatigue management.*

Subpart A — General

***Note**: Only rules requiring compliance guidance and informative/explanatory material are included in this section. Where the rule is self-explanatory, no information is given.*

Rule 135.1 – Purpose

Part 135 provides the operating requirements for helicopters and small aeroplanes. These rules are applied over and above Part 91, *General Operating and Flight Rules.*

Although the general rules address the pilot-in-command (PIC), a person, or an operator, in very general terms, all operations under this Part must be conducted under the authority of an air operator certificate (AOC) issued under Part 119. This in effect makes the operator responsible for all aspects of the operation, and operators should make this clear in their exposition.

To ensure operators comply with the rule requirements, CAA has developed rule checklists. To find the applicable checklist, go to the 'Forms' tab on the CAA website and click the filter for Part 135.

Two types of operation are covered – Air Transport Operations (ATO) and Commercial Transport Operations (CTO). Single engine aeroplane under IFR (SEIFR) passenger operations are not permitted under Part 135. The definitions of CTO and remote aerodrome are contained in Part 1, *Definitions and Abbreviations*.

Seating configuration in relation to this rule means the actual seating arrangements fitted to a particular aircraft. This will partly determine the rules that the aircraft will be operated under.

The certificated seating capacity on an aircraft is the maximum seating the aircraft type certificate permits. This will determine the rules that the aircraft will be maintained under.

Rule 135.3 – Definitions

In addition to the definitions for Part 135, operators should also check definitions in Part 1.

Rule 135.5 – Laws, regulations, and procedures

The holder of an AOC is responsible for ensuring all persons employed, engaged or contracted to perform activities in the air operation are familiar with the appropriate sections of the CA Act 2023, Civil Aviation Rules, and the operator's exposition. The exposition may take a systems approach but must contain sufficient detail when considering the size and complexity of the operation to enable the organisation's procedures to be understood, implemented, and maintained at all levels of the organisation.

Rule 135.7 – Procedure compliance

Each person performing the air operation must comply with the procedures documented in the AOC holder's (operator's) exposition. This particular rule may not require any specific procedure or statement in the exposition to ensure compliance, as this will be dependent on the structure and detail contained in the exposition. A statement of compliance is required by rules 119.81 and 119.125 to be in the Chief Executive's (CE's) statement.

Rule 135.9 – Crew member grace provisions

If a crew member completes a test, flight check, or assessment, that is required under Part 135, Subpart I, *Training*, or Subpart J, *Crew member competency requirements*, within 60 days before the date on which the test, flight check, or assessment is required, the crew member is deemed to have completed the test, flight check, or assessment on the date that it is required to be completed.

Rule 135.13 – Passenger training

This rule requires briefing or additional training in safety and emergency procedures for a CTO flight as appropriate. This should be included in the training and passenger briefing sections of the exposition.

The operator should conduct the passenger briefing before passengers enter the helicopter. Depending on the type of helicopter, a passenger seated in a crew seat, i.e. the front seat, may also need a tailored briefing, if they:

- are close enough to have access to controls and instruments, as they need to be warned not to touch them, or
- would need to help crew in an emergency, e.g. by helping to open doors or evacuate passengers.

In addition to the material covered in the section for all types of aircraft, briefings for helicopters need to cover:

- General
  - How to enter and exit the helicopter or aeroplane without assistance.
  - Use of harnesses.
  - Avoidance of tail rotor and up-hill slopes.
  - Use and location of first aid kit and fire extinguisher.
  - Control of loose items.
  - Opening and closing doors.
  - Emergency procedures including the emergency locator beacon.
  - Communications, between members of the crew, including utilising the aircraft intercom systems if available.
- Additional Training
  - Centre of gravity considerations.
  - Details for the carriage of animals.
  - Cargo hook operations.
  - Considerations for congested area or low height operations.

- Any other additional considerations in relation to the kind of operation being conducted.

These are a sample of some activities where the passenger may require extra briefing or training for a commercial transport operation.

Pre-flight briefing

- Instructions on:
  - remaining in the seat unless given permission to move, and
  - not distracting the PIC during take-off, manoeuvring or landing.

Adjusting briefings to different types of helicopters

Safety procedures vary between helicopter models, so briefings should be in accordance with the model's RFM or equivalent operating manual. They may include instructions to:

- wait for staff to tell them to approach or leave the helicopter
- stay well clear of the helipad when the helicopter is arriving or departing
- approach and leave to the side or front in a crouched position, never by the rear of the helicopter
- wait until the rotors stop turning
- carry tools horizontally, below waist level, never upright, over the shoulder or above the head
- never throw items towards or out of a helicopter
- hold firmly onto hats and loose articles
- never reach up or dart after a hat or other object that might have blown off or away
- protect eyes against blown dust and particles by shielding them with a hand or by wearing sunglasses, safety glasses or safety goggles
- if sudden blindness occurs due to dust or a blowing object, stop and crouch lower or sit down and wait for assistance
- approach and leave by the downslope side for rotor clearance
- never feel the way toward or away from the helicopter, and
- protect hearing by wearing ear plugs or earmuffs.

Emergency landing on land (and water):

Passengers may need instructions on:

- establishing their position in relation to the exit
- when and how to exit
- when to release the seat belt
- helping others to evacuate well clear of the aircraft, and

- removing the first aid kit and other emergency equipment, if appropriate.

Emergency landing on water:

In addition to the instructions above, passengers will need instructions on inflating life jacket/s or preserver/s and life raft/s when clear of the helicopter.

Additional resources:

The CAA website pages on helicopter safety contain useful resources to display around the office or hangar or give to passengers:

https://www.aviation.govt.nz/safety/safety-education-and-advice/helicopter-safety/helicopter-resources/

Subpart B – Flight Operations

Rule 135.53 – Aircraft airworthiness

The intent of this rule is to:

(a) Limit ATO to aircraft issued with a standard category airworthiness certificate.

(b) Allow aircraft issued with a restricted category airworthiness certificate to conduct CTO– provided the aircraft flight manual (AFM) allows such an operation. Operators should note that the AFM limitation may prohibit the carriage of passengers.

Rule 135.55 – Common language

This rule is unlikely to affect an air operator under Part 135. However, if an air operator engages a foreign-speaking crew member, then this could be addressed in the initial training and competency assessment sections of the exposition.

Pilots who have an ICAO operational level 4, 5, or 6 English Language Proficiency credit acknowledged on their licence meet this rule requirement.

Rule 135.57 – Flight preparation and flight planning

The operator and the pilot have a responsibility to use reliable information to plan the flight.

Rule 135.57(a)

This rule encompasses many other Parts, all of which must be considered during the planning of a flight. These include:

(a) **Meteorological information and conditions** Part 135, Subpart C, *Operating Limitations and Weather Requirements*.

(b) **Use of aerodromes or landing sites** rule 135.77*, Use of aerodromes*.

(c) **Aircraft performance** Part 135, Subpart D, *Performance*

(d) **Weight and balance** Part 135, Subpart E*, Weight and Balance*.

(e) **The kind of operation** rule 119.15*, Operations specifications*.

(f) **Fatigue of flight crew** Part 135, Subpart K*, Fatigue of flight crew*.

(g) **Flight following system** rules 119.73, 119.121*, Flight following service*.

Rule 135.57(b)

The content of a VFR flight plan is contained in rule 91.307, *VFR flight plan*, and for an IFR flight plan, rule 91.407, *IFR flight plan*.

Rule 135.57(c)

This rule explains how multiple route segments are to be handled with respect to search and rescue time (SARTIME).

Rule 135.57(d)

Operators must ensure that if communications cannot be maintained, a SARTIME is included (in the case of an Air Traffic Services (ATS) flight plan) or, in the case of a flight following service, the time when communications are expected to be re-established with the flight following service.

Rule 135.57(f)

Apart from flights that proceed more than 50nm from shore, an operator is not required to submit a flight plan to an ATS unit provided the flight is under VFR, and is covered by a flight following service that meets the requirements of either rule 119.73(b), or rule 119.121(b) and the pilot maintains a listening watch on the appropriate ATS radio frequency for the area (according to the type of airspace or as published on the AIP FISCOM chart).

An operator's flight following system may identify a UNICOM unit as being the provider of the flight following service.

For operations more than 50nm from shore rule 91.307(a)(1) requires a flight plan to be submitted to an ATS Unit, and for flights over water, rule 135.87(d) requires an air transport flight to be conducted under IFR if the flight is to be more than 100nm from shore.

Rule 135.57(g)

The PIC must be informed of the contents of the flight plan if it has been submitted by someone other than that pilot.

Rule 135.59 – Emergency and survival equipment information

The intent of this rule is to require the operator to have available for immediate communication with rescue coordination centres (such as RCCNZ), information on the survival equipment carried on board each of its aircraft. The information will be provided within an ATS flight plan and should form a part of the flight following system required by rules 119.73 and 119.121, where a flight plan is not filed with an ATS unit.

Detailed requirements for emergency and survival equipment are contained in rules 135.363, below, and 91.523*, Emergency equipment*. This information could also form part of the emergency situation action plan required by rule 135.91, below. The information should be easily accessible to the provider of the flight following system who should not have to search to find it in the operator's exposition.

Rule 135.61 – Fuel

An operator's exposition must have a fuel policy which takes into account the relevant operating conditions for all flights. The variety and nature of CTOs requires a broad and simple approach to fuel planning and in-flight re-planning. Consideration, where applicable, should be given to:

(a) Normal aircraft fuel consumption – derived from the AFM or other manufacturer's data and corrected for the actual conditions of the flight.

(b) Unusable Fuel

(c) Expected meteorological conditions.

(d) Anticipated weights.

(e) ATS requirements and restrictions.

(f) The geographic location of the destination aerodrome, reserves, alternates and other relevant data.

(g) Contingencies. At the planning stage, not all factors that could have an influence on the fuel consumption to the destination can be foreseen. Therefore, contingency fuel is carried to compensate for items such as:

(i) Deviations of an individual aircraft from the expected fuel consumption data.

(ii) Deviations from forecast meteorological conditions.

(iii) Deviations from planned routes and or cruising levels/altitudes.

(h) Having considered all of the fuel contingencies for the particular operation, this data should be included into the flight planning procedures required by rule 135.57.

(i) The minimum fuel requirements for flight planning are contained in rule 91.305 for VFR operations and rule 91.403 for IFR operations. It should be noted that if a helicopter is operated on an air operation under VFR, the option of carrying less than a 20-minute fuel reserve is not permitted.

Rule 135.63 – Cockpit check

The operator must ensure that correct and appropriate cockpit checks are completed at the appropriate time. These checks could be, but are not limited to, pre-flight, pre- take-off, pre-landing, and emergency checks. The operator has the option of designing the checklists to suit the type of operation. Acceptable forms of checklists would be the AFM, mnemonic pattern, flip cards. Checks committed to memory would need to be included into the training and competency assessment programmes. The exposition should make it clear what checks are to be used, and any variation that the operator will allow.

Rule 135.65 – Passenger safety

Rule 135.65(a)(1) Influence of drugs or alcohol or behavioural characteristics likely to endanger the safety of the aircraft or occupants

Any passenger who appears to be in this condition is not permitted to board the aircraft. Guidance should be provided for ground and flight crew to deal with this situation.

Rule 135.65(a)(2) Disabled passengers

Part 1 defines a disabled passenger as any passenger whose physical, medical, or mental condition requires individual attention not normally extended to passengers during an air transport operation.

Where practical, disabled passengers should not be allocated, or occupy seats, where their presence could:

(a) Impede the crew in their duties.

(b) Obstruct access to emergency equipment.

(c) Impede the emergency evacuation of the aircraft.

Guidance should be provided for ground and flight crew on how best to evacuate disabled passengers in an emergency, as well as consideration of that passenger’s special requirements.

Rule 135.65(a)(3) Escorted passengers

An escorted passenger means any passenger requiring the personal attendance of an appointed escort~~,~~ during an air operation. The operator who intends to carry escorted passengers must establish procedures for the transportation of those passengers to ensure the safety of the aircraft and its other passengers. The procedure should establish the maximum number of escorted passengers that may be carried on a flight, and the ratio of escorts to passengers to establish adequate risk management.

Rule 135.65(b)

This rule allows for an exception, where the operation is conducted for the purpose of search and rescue or an air ambulance flight.

Rule 135.69 – Manipulation of controls

This prohibition could be satisfied by including the intent of this rule in the initial training programme, competency checks, and the passenger briefing, particularly if a pilot seat is occupied by a passenger.

Rule 135.71 – Flight recorder requirements

This rule places the responsibility on the flight crew for the use and conditions that apply when Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR) are required. Rule 135.71(b)(2),(3) and (4) may require maintenance instructions to ensure compliance with this part.

The CVR (as per rule 135.367, below) is only applicable to helicopters with a certificated seating capacity of 10 passenger seats or more, excluding any required pilot seat, and where the AFM requires two or more flight crew members.

The FDR (as per rule 135.369, below) is only applicable to helicopters with a certificated seating capacity of 10 passenger seats or more, excluding any crew member seat.

As all operations are conducted under the AOC the awareness of these requirements should form a part of the training and competency check programmes.

Rule 135.73 – Refuelling and defuelling operations

Requirements for fuelling are separated into the various fuel types:

- Class 3.1A fuel refers to AVGAS.
- Class 3.1C fuels include kerosene-based fuels such as Jet A1.
- Class 3.1D includes diesel products.

Rule 135.73(a)

This rule prohibits fuelling operations with Class 3.1A fuel~~)~~ when passengers are on board and/or moving on or off the aircraft.

Rule 135.73(b)

This rule permits fuelling operations with Class 3.1C fuel when there are passengers onboard and/or moving on or off the aircraft, and when one or more engines are running, provided procedures are established which consider all of the potential hazards to passenger safety and any other third party.

The procedures may include all or any of the following examples, though this is not an exhaustive list:

(a) One qualified person should remain at a specified location during fuelling operations with passengers on board. This person must be capable of handling emergency procedures concerning fire protection and firefighting, handling communications and initiating and directing an evacuation.

(b) Any conditions or limitations contained in the AFM would have to be observed.

(c) Crew, staff, and passengers should be warned that fuelling operations will take place.

(d) Fasten seat belt signs should be off.

(e) No smoking signs should be on.

(f) Interior lighting should be on to identify emergency exits.

(g) Passengers should be instructed to unfasten their seat belts.

(h) Sufficient qualified persons should be on board and prepared for an emergency evacuation.

(i) If the presence of fuel vapour is detected inside the aircraft, or any other hazard arises during the fuelling operation, the fuelling operation should be stopped immediately.

(j) The ground and area around the exits intended for emergency evacuation should be kept clear.

(k) Safe and rapid evacuation procedures should be provided.

Operators should also consider the aircraft size, number of persons involved, and the area where fuelling is taking place when developing procedures.

Despite this, due to the increased risks that accompany ‘hot refuelling’, operators should avoid it if possible. If hot refuelling must be done and passengers are on board, they should, if possible, be disembarked and escorted to a safe area to wait for the refuelling operation to finish.

The procedures governing the handling of fuel spills should meet the requirements of the Health and Safety at Work Act 2015, as per rule 91.15(1)*, Fuelling of aircraft.*

Rule 135.77 – Use of aerodromes

An operator must ensure that any air operation is made to and from an aerodrome/landing site that meets the standard of this rule and rule 91.127, *Use of aerodromes,* for heliports.

The operator should develop a procedure to assess aerodromes and landing areas to ensure that the landing area, including the approach and take-off areas, are suitable for the type and characteristics of the aircraft used, having regard to the performance data as required by Part 135 Subpart D. A record should be retained of any assessment undertaken.

The information derived from the aerodrome or landing area assessment could form part of the register required by rule 135.77(c). Where the aerodrome or landing places are published in the current AIPNZ, this would be the reference information used in the assessment. The results of the performance data assessment should be included in the flight planning process.

Note: *Operators should be aware that under some circumstances, Part 93,* Special Aerodrome Traffic Rules and Noise Abatement Procedures*, or other local bylaws, may apply and impose conditions or limitations on the use of aerodromes.*

Rule 135.77(d)

This rule specifies the minimum runway and runway strip width for VFR aeroplanes operating under Part 135. This standard should be used in conjunction with the information contained in AC139-6*, Aerodrome Design Requirements (All Aeroplanes Conducting Air Transport Operations, All Aeroplanes above 5700 kg MCTOW),* and AC139-7*, Aerodrome Standards and Requirements—Aeroplanes at or below 5700 kg MCTOW–Non Air Transport Operations*.

Rule 135.77(f)

This rule allows for a lesser runway width than normal and gives the conditions that would make this acceptable.

The 'runway' is the prepared surface for take-off and landing for an aeroplane.

In relation to this rule, the 'runway strip width' is a prepared surface surrounding the runway, and without irregularities and of sufficient strength that structural damage to an aeroplane should not occur in the event of an excursion into this area during take-off or landing.

Rule 135.81 – Operations of Single Engine Aircraft–IFR (SEIFR)

This rule prohibits IFR operations carrying passengers in a single engine aircraft operated under Part 135. Such operations come under Part 125.

Rule 135.83 – Restriction or suspension of operations

The persons authorised to restrict or suspend operations under this rule should have the capability included in their duties and responsibilities or job description. All staff should be aware of which persons hold this authorisation.

Rule 135.85 – Minimum height for VFR flights

The intent of this rule is to prohibit ATO below 500 feet. In this case it would be possible to show compliance with this prohibition through the training and competency checking programme.

However, the rule enables CTO below 500 feet where it is necessary for the conduct of the operation. This rule does not permit low flying by an aircraft on a CTO where bad weather is the sole reason for flying low. Where CTO are to be conducted below 500 feet, the PIC must:

- prepare a plan for the operation
- brief all persons involved in the operation, and
- take reasonable care to conduct the operation without creating a hazard to any person or property.

The plan should preferably be written, but may be in oral form. A written plan will be more helpful in the event of an investigation into the conduct of the low-level operation.

For compliance with this low flying provision, the CTO operator should provide the pilot with some guidelines to minimize the risk to aircraft, and third parties within at least a 500ft horizontal radius of the operation.

Rule 135.87 – Flights over water

Operators should be aware of the limitations and conditions attached to ATO or CTO flights over water.

If an operator intends to conduct operations over water, the requirements of this rule could form an addition to flight planning and passenger information procedures. If they intend to conduct flights over water, some additional instructions will be necessary. Rule 91.211*, Passenger briefings,* provides the basic standards for passenger briefings and includes, among other things, a demonstration on the use of life jackets.

Note: *Although the equipment requirements only become effective beyond 10nm gliding or autorotation distance from shore, the requirements of the Health and Safety at Work Act 2015 also apply to the aircraft as a place of work. The provision of suitable safety equipment would apply if the aircraft was planned to be operated at any distance over water beyond gliding/autorotation range of a suitable landing area.*

Operators also need to have a plan for the maintenance of safety equipment. Where necessary, the maintenance schedules for such equipment are to be included in the Approved Maintenance Programme.

Rule 135.91 – Emergency situation action plans

The intent of this rule is to provide action plans for handling emergency situations that management, ground staff, or flight crew become aware of. This rule requires plans to be developed for both in-air and on-ground emergencies, and to include provision for passing information to and from the PIC.

An operator needs to complete a risk management assessment of their particular operation. The risks to be identified may include:

(a) Pilot fails to make contact at a prearranged time. (Flight following system.)

(b) Pilot declares an in-flight emergency.

(c) Management or ground staff become aware of a situation in-flight of which the pilot needs to be advised.

(d) Accident or incident on take-off or landing.

(e) Emergency on ground. (Fire, refuelling spill etc.)

(f) Flight crew or passenger develops a medical condition.

The plan should contain sufficient information to ensure the appropriately-trained staff (Refer rules 119.53 and 119.103*, Personnel competency requirements*) know what to do, who to contact, and what details need to be recorded. A record of this training and competency checks should be included in the records required by rules 119.67 and 119.115*, Records—personnel*.

An emergency situation action plan could be contained within an exposition or in a separate manual for convenience. If it is to be a separate manual, it should be referenced in the operator's hierarchy of manuals that form the complete exposition.

The plans should be subject to regular-review to ensure their continued relevance.

Rule 135.93 – Operations over congested areas

The intent of this rule is to permit a helicopter CTO, such as a filming or survey operation, to operate below 1000ft over congested areas. It does not permit low flying over congested areas solely because of low cloud or other bad weather. The pilot must prepare a plan and brief all personnel and organisations involved. This rule is directed at the PIC, however the operation is conducted under the operator's Part 119 certificate. Under rule 119.77 or rule 119.123*, Establishment of operations procedures,* as applicable, the operator's exposition should include procedures for carrying out and recording details of these types of operations. The plan should be written. A copy of the plan and a chart of the flight areas should be kept and retained as an integral part of the daily flight record required by rules 135.93, 135.857 and 135.859. This in effect permits the operator to plan, perform and authorise the operation, without the need to notify CAA.

Rule 135.95 – Helicopter Sling Loads

Although the rule is directed at the PIC, the operation is conducted under the authority of the operator's Part 119 certificate, and under rule 119.123 as applicable. The limitations and conditions of this rule could be assured by including this as part of the training and competency check procedures.

This rule is addressed to the PIC and is in two parts. The first prohibits the carriage of a sling load while conducting an air transport operation. The second part permits the operator to carry passenger equipment in a sling load on commercial transport operations.

Note: *Although this rule makes provision for the carriage of passengers while carrying a sling load, the operation must be conducted in accordance with the operating limitations specified in the AFM as per rule 91.109*, Aircraft flight manual.*) These limitations may prohibit the carriage of passengers with a sling load.*

The rule provides for operations into remote areas where a quantity of equipment must accompany the passengers. This rule does not permit goods not associated with the passengers, such as fuel drums for the operator, or supplies for another client, to be carried.

Examples of operations that may require passenger equipment to be carried as a sling load could be rafting, kayaking groups, hunters, fishermen, trampers, surveyors, and others requiring access into remote areas.

The power margin referred to is intended to be sufficient to enable the helicopter to manoeuvre and to safely depart and clear any obstructions from an out of ground effect hover with the load attached.

Subpart C – Operating Limitations and Weather Requirements

Rule 135.151 – Purpose

Although this Subpart prescribes the rules governing VFR and IFR operations, and associated weather requirements, these are additional to the general requirements of Part 91, Subparts D and E.

Rule 135.153 – Meteorological Information

The intent of this rule is to allow an air operator the flexibility of obtaining accurate weather forecasting information for the area of operations intended. For example, some remote areas may be better served with information derived from general area forecasts and local observations.

Rule 135.153(a)

This rule allows a VFR operator to use meteorological information of sufficient reliability and accuracy, from a source acceptable to the air operator and PIC. This doesn't have to be a Part 174-certificated organisation although if aviation weather information was available for the area of operation a prudent operator would, nonetheless, make use of it especially for flights outside the local area (25nm) or night VFR operations. The information gathered during the preparation of the flight plan is required to be retained. Refer to rule 135.859(a) for more details.

Rule 135.153(b) and (c)

An IFR operator must use meteorological information provided for aeronautical purposes from an organisation certificated under Part 174.

Rule 135.155 – Meteorological conditions – VFR flight

The information gathered in rule 135.153 must be sufficient to ensure planned flights remain within the limitations of this rule and the prescribed minima of Part 91, Subpart D. It is recommended that the intent of this rule be addressed in an air operator's training and competency check programme. The limitations of this rule should be applied at the flight planning phase and reviewed en route.

It should be noted that all the conditions for helicopter VFR commercial transport operations described in rule 135.155(d) must be met, i.e. at night the helicopter must be:

- beneath the ceiling
- clear of cloud, and
- in continuous sight of the surface, and
- not above more than scattered cloud as well as having the cloud-base and visibility requirements detailed in rule 135.155(d)(4).

Furthermore, the minimum heights required in rule 91.311*, Minimum heights for VFR flights,* continue to apply, bad weather not being an acceptable reason for flying at low level.

Rule 135.157 – Meteorological conditions – IFR flight

Meteorological data for IFR operations must be provided by a Part 174 organisation. This should be addressed in the flight planning procedures, as per rule 135.57, and must ensure that the instrument procedure minima prescribed under Part 95*, Instrument Flight Procedures –*

Registration, can be complied with. It is recommended that the intent of this rule be addressed in an operator's training and competency check programme.

Rule 135.159 – Aerodrome operating minima – IFR flight

This is a mandatory limitation that includes the minima of Part 95. It is recommended that the intent of this rule be addressed in an operator's training and competency check programme.

Rule 135.161 – IFR departure limitations

The intent of this rule is to prohibit the departure of an IFR flight where the landing meteorological minimum for the departure aerodrome is below the authorised landing minimum for that aerodrome, unless for a multi-engine aircraft, there is a suitable alternative aerodrome within the applicable flying time limits in the rule.

Rule 135.163 – Reduced take-off minima

Where an operator intends to use reduced take-off minima, they need to include procedures to manage this in their exposition.

Rule 135.165 – IFR procedures

The operator's exposition should include procedures appropriate to the proposed IFR operations, including the training and competency checks required to conduct the operations.

Subpart D – Performance

Rule 135.201 – Purpose

The intent of this rule is to place the responsibility on the operator to produce performance charts, corrected for the limitations applicable to air operations being conducted, for use during flight planning.

Before the current rules, aeroplane performance criteria were specified in CASO 4. Two methods were employed:

(a) For aeroplanes below 5700 kg, the AFM contained performance charts (P-charts) that gave the operator the means of ensuring compliance with CASO 4.

(b) Group ratings provided a simple method for the operator of an aeroplane below 2270 kg to determine the runway requirements.

The P-charts are an acceptable means of compliance with this Subpart, however the group rating system is not. Since the introduction of the new rules, any AFM issued to an aeroplane at initial issue of the airworthiness certificate, will not be issued with a P-chart. However, if one is available, CAA may ask to see it. It should be noted that, for new aeroplane types being introduced to New Zealand, CAA will not be developing P-charts.

Alternatively, an operator could engage a suitable organisation to develop the appropriate performance charts, or an operator could develop their own P-charts following Appendix C of this AC.

The operator will need to establish for each aeroplane they intend to operate, the type certification basis and appropriate rules within this Subpart that apply to that aeroplane. The aircraft type data sheet for each aeroplane should identify the type certification airworthiness design standard.

Note: *Where the AFM does not contain the performance data that complies with the requirements of this Subpart, alternative data to provide the performance limitations may be accepted.*

This rule provides for type certification to an equivalent standard. Where it is not clear from the aeroplane type data information what the type certification basis is for the aeroplane, or when the requirements of this Subpart cannot be fully complied with, CAA should be consulted.

Generally, all aeroplanes operated under Part 135 will fall into the grouping of either the US Federal Aviation Regulations (FAR) Part 23 normal category, or its predecessor CAR 3, or equivalent British or European standards.

Note: *Information for the determination on the aeroplane certification basis can be found in AC21-1*, Product Certification - Type Acceptance Certificates, *Appendix 2, and in the applicable Type Acceptance Report if one has been published for the type.*

Note: *For the purposes of this AC, only the rules relating to those aeroplanes normally operated under Part 135 have been included. These aeroplanes will normally be those in Performance Group D and E as described in CASO 4. Aeroplanes falling into other certification categories will be addressed on an individual basis. Rules 135.229 through to 135.235 are not addressed.*

As an alternative to developing their own aeroplane P-charts, an operator can use the CAA P-charts, based on CASO 4, issued as part of the AFM prior to October 1995. The P-charts generally cover take-off and landing performance considerations, and in the case of multi engine aeroplanes, the en route single engine performance. Because the CAA P-charts tend to be conservative, if used as a part of the performance calculation, the full operational potential of the aeroplane may not be realised.

Operators should also refer to the Abbreviations and Definitions sections of this AC to develop an awareness of important factors to consider when determining performance criteria for their aircraft.

Rule 135.205 – Part 121 Subpart D compliance

This applies to multi-engine turbojet or turbofan aeroplanes if intended for use on Part 135 operations.

Rule 135.207 – General aeroplane performance

This rule applies to all aeroplanes operated under this Part. The information should be available for the flight planning and preparation phase of the operation.

Rule 135.207(2)(ii) Contaminated landing distance

The data considered acceptable to the Director, is the data provided by a competent regulatory authority and/or the manufacturer of the aeroplane.

Rule 135.209 – Take-off distance

This rule does not apply to those aeroplanes described in rule 135.201(c). For all other aeroplanes, the information should be available for the flight planning and preparation phase of the operation.

Rule 135.211 – Runway surface and slope correction factors

This rule applies to all aeroplanes. Unless specified in the AFM or other performance or operating manuals from the aeroplane manufacturer, the variables affecting the take-off and landing performance, and the associated factors to be applied to the aeroplane flight manual data, are specified in rule 135.211(2).

The operator may need to produce information for the corrections required. This could be satisfied by the production of correction charts for use in the flight planning and preparation phase of the operation.

Rule 135.213 – Net take-off flight path – aeroplanes under IFR

This rule applies to those aeroplanes described in rule 135.201(c)(2) and (3), but only for the conduct of IFR flights. The limitations contained in this rule will have to be calculated for each flight. The operator may need to produce information for these calculations. This could be satisfied by the production of correction charts to be used in the flight planning and preparation phase of the operation.

Rule 135.215 – Engine inoperative – gradient and stall corrections

This rule applies to all aeroplanes regardless of the certification standards. Unless specified in the AFM, or other performance or operating manuals from the aeroplane manufacturer, acceptable adjustments are to be made to assure adequate stall margins and gradient corrections by applying the factors in rule 135.215, Table 2.

Note: *The manufacturer's AFM data is not normally available to allow the corrections required by this rule to be applied. An operator should apply the corrections if the AFM data is available. Where no data is available compliance with rule 135.215 is not possible.*

Rule 135.217 – En route – critical engine inoperative

This rule applies to all multi-engine aeroplanes regardless of the certification standards. The high terrain or obstacle analysis required for showing compliance with rule 135.217 may be carried out in one of two ways:

(a) A detailed analysis of the route should be made using contour maps of the high terrain and plotting the highest points within the prescribed corridor's width along the route. The next step is to determine whether it is possible to maintain level flight with one engine inoperative, 1000 feet above the highest point of the crossing. If this is not possible, or if the associated weight penalties are unacceptable, a drift-down procedure should be worked out, based on engine failure at the most critical point, and being able to clear critical obstacles during the drift-down by at least 2000 feet. The minimum cruise altitude is determined by the intersection of the two drift-down paths, taking into account allowances for decision making (see Figure 1). This method is time-consuming and requires the availability of current detailed terrain maps.

(b) Alternatively, the published minimum flight altitudes (Minimum En route Altitude, MEA, or Minimum Off Route Altitude, MORA) may be used for determining whether one-engine-inoperative level flight is feasible at the minimum flight altitude, or if it is necessary to use the published minimum flight altitudes as the basis for the drift-down construction (see Figure 1, below). This procedure avoids a detailed high terrain contour analysis but may have higher penalties than taking the actual terrain profile into account as in paragraph (a) above.

An acceptable means of compliance ~~A~~ for rule 135.217 would be the use of MORA and MEA provided that the aeroplane meets the navigational equipment requirements for the route.

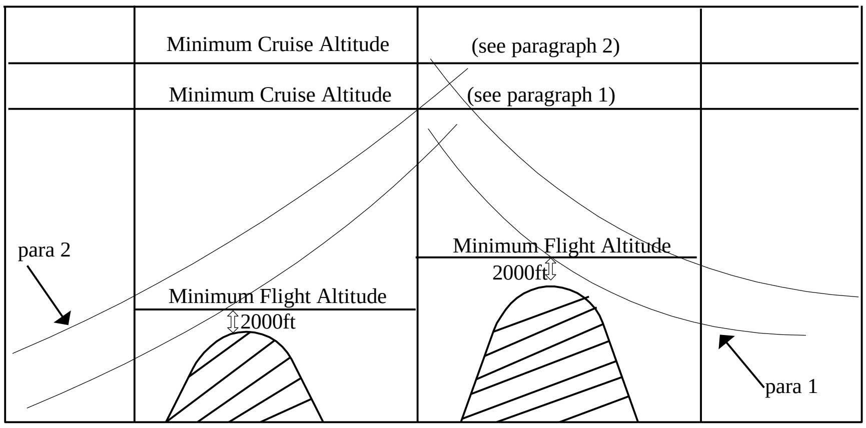

Figure 1

Note: *MEA or MORA normally provides the required 2000 ft obstacle clearance for drift-down. However, at and below 6000 ft altitude, MEA and MORA cannot be used directly as only 1000 ft, clearance is ensured.*

Rule 135.219 – En route – 90-minute limitation

This rule applies to all multi-engine aeroplanes regardless of the certification standards. This is in effect a prohibition and should be included in the route or flight planning process. Aeroplanes with three or more engines could be more than 90 minutes away from a suitable aerodrome if the conditions of rule 135.219(c) are met.

Rule 135.221 – Landing–climb – destination and alternative aerodromes

This rule applies to all aeroplanes regardless of the certification standards. This is in effect a prohibition and should be included in the assessment of the route or as part of the flight planning procedure.

Rule 135.223 – Landing distance – dry runway

This rule only applies to aeroplanes described in rule 135.201(c)(2) and (3), and should be included in the assessment of the route or as part of the flight planning procedure.

Rule 135.225 – Landing distance – wet and contaminated runways

This only applies to aeroplanes described in rule 135.201(c)(2) and (3), and should be included in the assessment of the route or as part of the flight planning procedure.

Rule 135.225(a)(2)(ii)

The contaminated landing distance is the same as the wet landing distance, when the aircraft flight manual does not contain contaminated landing distance data. If the aircraft flight manual does contain contaminated landing distance data, then this data must be used.

Rule 135.227 – Steep approach and short landing techniques

This rule applies to all aeroplanes regardless of the certification standards. It provides for steep approach and short landing techniques. However, it imposes limitations that will be detailed in the AFM. If the AFM does not contain limitations or procedures for these techniques, the rule in effect becomes a prohibition and steep approach and short landings techniques cannot be applied.

If an operator is able to take advantage of this rule, then these techniques should be included in the route flight planning procedure.

Subpart E – Weight and Balance

Rule 135.301 – Purpose

The intent of this rule is to prescribe the rules governing the control of loading, and weight and balance of an aircraft. The rules in this subpart are in addition to those prescribed in Part 91. The requirements of Part 91, particularly rules 91.213 and 91.215, should also be considered.

Weight and balance options for air operations are fully explained in AC119-4*, Passenger, Crew and Baggage Weights.*

Rule 135.303 – Goods, passenger, and baggage weights

This rule requires the operator to establish the actual weight of crew members, passengers and goods.

The rule permits the weight of passengers to be established by one of three methods:

(a) Passenger actual weights.

(b) Standard passenger weight that has been determined by the operator (acceptable methods described in AC119-4) and detailed in the exposition. See AC119-4 for standard weights for adults, children and infants.

(c) A weight that has been declared by the passenger plus an additional allowance of 4 kg.

The rule permits the weight of crew members to be established by one of two methods:

(a) Actual weight of each crew member

(b) A standard crew member weight that has been determined by the operator (acceptable survey methods are described in AC119-4) and detailed in the exposition.

Note: *Passenger weights do not include any carry-on baggage, and as stated in rule 135.303(a), the actual weight of goods and baggage must be established.*

The provision for carry-on baggage in rule 91.213*, Carry-on baggage,* applies conditions for stowage. This may require assessment in respect of smaller aircraft where stowage for carry-on baggage in the cabin is not available. The total weight of goods and baggage must be determined by using:

(a) The actual weight of the goods and baggage.

(b) For CTO operating from a remote aerodrome where it is not practicable to establish the actual weight of the goods and baggage, pre-established procedures to enable the PIC to assess the weight of those goods and baggage.

The operator is required to have weight and balance procedures to cover situations where a passenger or crew member is clearly greater than either the declared weight or the standard exposition weight if one of those options is used.

Rule 135.305 – Aircraft load limitations

The operator's exposition is to contain procedures to show how the AFM limitations with respect to weight and centre of gravity position will be complied with throughout the flight. The weight and balance information is recorded as part of the daily flight record required by rule 135.857(b)(11) to (15).

Subpart F – Instruments and Equipment

Rule 135.351 – Purpose

This rule prescribes the instruments and equipment required in addition to those in Part 91, and airworthiness design standards for the equipment. It is suggested that an applicant produce a checklist/matrix of the applicable instruments/equipment rules, to assist with the assessment of the aircraft and its eligibility for air operations. Any procedure or checklist/matrix logically falls into the functional area for the introduction of an aircraft to the operator's fleet.

Rule 135.353 – General

Rule 135.353(1)(ii)

Where communication or navigation equipment is required to conduct an air operation, as specified in the operations specifications, sufficient equipment must be fitted to ensure that the failure of any independent system will not result in the inability to communicate or navigate:

(a) within the routes, or

(b) to aerodromes or heliports intended for use, including alternates.

Two level 1 or 2 VHF transceivers are required to be fitted for air operations in controlled airspace or mandatory broadcast zones.

For the purpose of this rule the duplication of systems originates from the electrical bus (or bus-bar), and in all other respects should be independent.

Rule 135.353(4)

All instruments and equipment installed in the aircraft must be in an operable condition, unless covered by the provisions of a Minimum Equipment List (MEL). However, a MEL cannot contain any instruments or equipment that are:

(a) specifically, or otherwise required by the airworthiness requirements under which the aircraft is type certificated, or

(b) required by this Subpart for specific operations, or

(c) required by an airworthiness directive to be in an operable condition.

Refer to rule 91.539*, Approval of minimum equipment list,* for the approval of an MEL

Rule 135.355 – Seating and restraints

Rule 135.357 – Additional Instruments

Rule 135.359 – Night Flight

Under these rules, the operator is responsible for ensuring that the aircraft is appropriately equipped with the required seating, restraints, instruments or additional equipment for night flying, as appropriate. These responsibilities could all be included in a checklist for any new aircraft in the operator's fleet.

Rule 135.361 – Instrument Flight Rules (IFR)

When operating under IFR, the operator must ensure the aircraft is appropriately equipped with the additional instruments and equipment required.

As with the previous rules, the operator could include this information in a checklist for any new aircraft in their fleet.

Rule 135.363 – Emergency equipment

The intent of this rule is to ensure the aircraft has the emergency equipment required by rule 91.523*, Emergency equipment,* regardless of the exceptions relating to seat breaks.

A procedure or checklist for this equipment and how to operate it could be part of the information supplied for new aircraft in the fleet.

Rule 135.367 – Cockpit voice recorder

Rule 135.369 – Flight data recorder

Because installation of a CVR or a FDR is a significant cost, CAA recommends that the cost of compliance with either rule is factored into the purchase cost of any helicopter that is required to have a CVR or FDR fitted.

Rule 135.371 – Additional attitude indicator

This rule is unlikely to affect aircraft operated under Part 135.

Subpart G – Maintenance

Rule 135.401 – Purpose

This Subpart prescribes maintenance responsibilities and requirements additional or complementary to those in Parts 43*, General Maintenance Rules,* 91 and 119. An operator is not permitted to transfer any maintenance responsibilities to the contracted maintenance provider. However, rules 119.61(b) and 119.109(b), *Maintenance procedures*, allow an operator to transfer maintenance functions to the maintenance provider if details of the functions, scope of maintenance and authority of the maintenance provider are detailed in the exposition. It is also recommended that a comprehensive written contract be established with the maintenance provider. Refer to AC119-1, *Air Operator Certification,* for further guidance.

Rule 135.402 – Option for maintenance

The intention of this rule is to allow the operator to choose whether the company's aircraft will be subject to annual reviews of airworthiness (ARAs) or, under certain circumstances, maintenance reviews (MRs).

For an operator to be eligible to choose the MR option:

(a) the operator must have an organisational management system that complies with rule 119.124(c*), Safety management*, and

(b) the aircraft must be maintained by the holder of a Part 145 maintenance organisation certificate.

An operator of multiple aircraft that meets the eligibility requirements above may also choose to subject some aircraft to ARAs and others to MRs.

The option chosen for each aircraft must be identified in the maintenance programme.

In accordance with rule 43.54(a), *Maintenance required under Part 145,* an operator of a helicopter that has a MCTOW of more than 5700 kgs or a maximum certificated seating capacity, excluding any required crew member seat, of 10 seats or more to must have the maintenance performed by the holder of a Part 145 maintenance organisation certificate. Otherwise, it should be performed by a similar organisation if the maintenance is performed overseas in a country that is party to a technical arrangement.

Operators of smaller helicopters and aeroplanes may choose to have the maintenance performed by a maintenance provider that is not the holder of a Part 145 maintenance organisation certificate, provided the MR option has not been chosen.

Operators should note that if their aircraft are required be maintained by the holder of a Part 145 maintenance organisation certificate (e.g. because the operator has elected to subject their aircraft to MRs, or because of the size of the helicopter), in accordance with rule 43.51(c)(2), *Persons to perform maintenance,* all maintenance on those aircraft must be completed by person(s) that hold a valid Part 145 authorisation. This requirement includes avionics maintenance, component maintenance and pilot maintenance.

Rule 135.403 – Responsibility for airworthiness

The intent of this rule is to give the operator the responsibility for:

(a) the airworthiness of the entire aircraft, including any equipment installed in or attached to the aircraft, and

(b) ensuring that the aircraft is maintained in accordance with the maintenance programme.

This means that the operator is responsible for determining what maintenance is required, when it has to be performed, by whom, and to what standard, to ensure the continued airworthiness of the aircraft being operated. An operator should therefore have adequate knowledge of the design status (type certification basis, customer options, ADs, modifications, operational equipment) and the maintenance requirements peculiar to each aircraft being operated.

An operator should establish adequate co-ordination between flight operations and the maintenance provider, to ensure that both receive all information on the condition of the aircraft to enable both to perform their tasks.

This does not mean the operator must perform the maintenance. However, they are responsible for the airworthy condition of the aircraft, and thus should be satisfied before the intended flight that all required maintenance has been properly carried out and recorded.

When an operator does not carry out the maintenance, a clear work order must be given to the contracted maintenance provider. Even if an operator has contracted its maintenance out they still need procedures in place to check any aspect of the contracted work. Such procedures would ensure that the operator's responsibility for the airworthiness of the aircraft is met.

Rule 135.405 – Condition monitored maintenance programmes

Condition monitored maintenance is explained in AC91-12 and 119-5*, Aircraft Maintenance Programmes*.

Very few aircraft operating under Part 135 use condition-monitored maintenance programmes. However, if they do, this rule places the responsibility on the operator to provide the Director with monthly reliability reports.

Rule 135.415 – Maintenance Review (MR)

The intent of this rule is to allow an air operator that meets the eligibility requirements in rule 135.402 to complete a MR once a year in accordance with rule 135.415(b) or, if the operator is the holder of an airline air operator certificate (AAOC), progressively over each 12-month period in accordance with a maintenance programme that is acceptable to the Director.

The operator must authorise the person employed or contracted to carry out MRs. This person does not need to be the holder of a Part 66 aircraft maintenance engineer licence and rating on the type of aircraft, but must have equivalent experience to that required to grant a Part 66 rating for the type of aircraft. The authorisation may be stated in the operator's exposition, or issued as a separate written document.

Subpart H – Crew Member Requirements

Rule 135.503 – Assignment of flight crew duties

The-operator is responsible for ensuring that flight crew are suitably qualified and designated to crew functions.

Rule 135.505 – Pilot-in-command (PIC) consolidation of operating experience on type

This rule prescribes the minimum experience on the make and basic model of aircraft type before a pilot being designated to act as PIC on an air operation.

Rule 135.505(a)

This rule describes the operating experience required for single engine aircraft, multi-engine aircraft, and for turbo-jet or turbofan aircraft.

There are additional experience requirements for single pilot air operations under either IFR or VFR at night.

Rule 135.505(b)(c)(d)

The consolidation of operating experience can begin after the pilot has completed the initial (including the type rating), and transition training and after the successful completion of the flight crew competency check. This provision enables the consolidation flying to be carried out on a revenue flight.

If the pilot already has a current flight crew competency check for that operator that is less than 180 days old, a competency check does not need to be done in the new type. If it is older than 180 days a competency check is required to be done on the new type. If the consolidation flying cannot be completed within 180 days of the competency check another one must be completed before recommencing the consolidation flying.

The rule is specific as to what constitutes consolidating experience. This should be completed on air operations (ATO or CTO), or for a new type being introduced into an operation, proving flights or ferry flight time can be used. However, any other company flight that is completed under the authority of the AOC could be an air operation provided the full flight is conducted in accordance with the operator’s exposition requirements, including such things as weather planning, passenger briefing, fuel and trip planning, weight and balance, flight following, and decision making.

The pilot undertaking this consolidating experience is required to perform the duties of the PIC under the supervision of a pilot who has been authorised in writing by the operator. The supervising pilot is the designated PIC and logs PIC time. The pilot being supervised also logs PIC time but annotates it in the pilot logbook as ‘under supervision’. This consolidation flight time does not count towards the pilot’s total experience.

Ten hours of the 40 hours of consolidation training for night VFR or IFR may be done in a Flight Training Device that is acceptable to the Director. The Flight Training Device should be essentially similar to the aircraft type.

For multi-pilot aircraft the supervising PIC must occupy a crew seat while supervising the consolidating flying and to allow him to exercise his/her responsibilities should have a set of dual controls fitted. If the supervising pilot is not an instructor it would be prudent to have him/her checked out to fly in the other seat.

***Note**: In Revision 7 of this AC, a sentence that incorrectly stated that the designated PIC did not have to occupy a crew member seat was deleted, as it contradicts rule 135.505(b)(3)(ii).*

There is no need for an operator to create 'two pilot procedures' as long as the operation remains single pilot. The supervising pilot would only exercise their right to over-ride the PIC under supervision in the event that safety was in doubt.

If the aircraft is certificated for two or less passenger seats, consolidation flying on air operations is not required although the minimum hours before commencing air operations still apply.

Rule 135.509 – Experience requirements for IFR pilots

This rule specifies the minimum experience requirements for pilots who are required to perform IFR air operations by day or by night. It refers to specific and total flying experience, whereas rule 135.505 refers to experience on type.

Rule 135.511 – Minimum flight crew

The first part of this rule specifies the crew and equipment requirements for single pilot IFR air operations. The second part specifies the requirements for two pilot operations on IFR or VFR operations. It calls for written procedures covering the duties of both the pilot flying and pilot not flying.

Subpart I – Training

Rule 135.553 – General

Rule 135.553(a)

This rule places the responsibility on the operator to establish a training programme that will ensure crew members are trained and competent to perform their assigned duties.

The programme should include all the elements contained in this subpart. It is also an opportunity to include many other rule requirements where the operator is required to ensure or make flight crew aware of prohibitions and mandatory requirements that may be contained in other subparts.

Each holder of an AOC whose area of operation includes mountainous terrain should establish in its exposition a CAA-accepted mountain training programme to ensure that all of its crew members are trained and competent as a prerequisite requirement before they operate in such areas.

Additional guidance for establishing in-house training courses and assessments can be found in AC141–1*, Aviation Training Organisations,* and for mountain flying programmes*,* Appendix D to this AC for fixed wing aircraft, and Appendix E to this AC for helicopters.

Rule 135.553(b)

The operator must ensure each crew member is trained in accordance with the programme in the operator's exposition. Some method of programming and scheduling flight crew within the programme will be required.

The *Mountain flying Ground Course* and *Flying Course syllabus for aeroplane and helicopter* can be found in Appendix D and E to this AC.

If operating in a mountainous environment, the minimum flight time to meet the requirements of ground course syllabus items is:

(a) **Fixed Wing** – Initial training, a minimum of 10 hours flying; or sufficient further hours as required for the pilot to be fully conversant in the appropriate mountainous environment flown by the operator.

These 10 hours are to include flying in variable weather conditions so that the pilot can experience and be shown the variance between clear skies, and marginal weather conditions on typical operating routes in the region including escape and alternative routes. The completion of the above hours would desirably be over a period of time, to encounter the variable conditions required. The operator is required to make all reasonable attempts to include experience of typical weather conditions, and the pilot demonstrate to the operator a satisfactory standard and knowledge on the route being operated before a pilot is cleared to fly on line. This needs to be then signed off in the pilot's training file.

(b) **Helicopter** - Training beyond the 10-hour CPL issue requirement should be sufficient.

Further hours flown may be needed as required for the pilot to be fully conversant in the appropriate specialist operations of the mountainous environment flown by the operator as outlined in their exposition.

Rule 135.553(c)

The operator has the responsibility for controlling the training programme. This will entail specifying the training and ensuring that it is carried out in accordance with the operators' requirements. It should not be left up to the training provider to decide what is required without any input from the operator.

Rule 135.553(d)

This rule enables the operator to either:

(a) conduct the training within the scope of the Part 119 organisation provided that, with respect to mountain flying training, instructor requirements of rule 135.567 are met. Training procedures that cover the training to be done (initial, transition, recurrent, type rating) will be required as well as some means of recording it, or

(b) contract the training to an organisation certificated under Part 141 provided that, with respect to mountain flying training the organisation has a CAA-approved course and the instructor is authorised per rule 135.567 to conduct that training. As noted above the training organisation should have procedures for the conduct of the training they are contracted to do, or

(c) when the training is conducted outside New Zealand, ~~to~~ contract to a training organisation equivalent to a Part 141 organisation.

Where training is conducted outside New Zealand with an organisation that meets an equivalent standard but does not have designated mountainous terrain, it would still be necessary to meet the 10-hour minimum requirement for local knowledge conversion - mountain flying in New Zealand for aeroplanes, and in the case of helicopters, sufficient hours to be conversant in the appropriate mountainous operations.

Where a pilot has experience in similar mountainous environments acceptable to the Director, in fixed wing the further 2-hour minimum training as per rule 135.559 would apply, and in helicopters a flight check would be needed to establish that competence in mountainous operations meets the intent of this AC.

For an operator to conduct their own training they must employ, contract or otherwise engage appropriately qualified instructors as described in rule 135.567.

Rule 135.555 – Training records

The operator must maintain accurate records of training for crew members. This may be provided in a set of procedures that encompass the maintenance and retention of records that are required to be generated by an operator generally or specifically for this Part. Refer to rule 119.67 or rule 119.115 for more details.

For mountain flying training the operator is to keep accurate records of the training details of each pilot from commencement of such training, demonstrating that each appropriate element of the syllabus in Appendix D and E has been completed. These records should be held along with the pilot's operational competency records, and route assessment/s in the company training files.

The checklist, log and certificate examples included in Appendix D and E provide guidance for documenting this training programme.

Rule 135.557 – Initial training for crew members

Rule 135.557(a))

The operator has the responsibility for providing initial training to any crew member. This should have the effect of preparing a crew member to successfully complete a competency check before starting operations with the operator.

Rule 135.557(a)(1)

The initial training should be structured in a logical manner that progresses the crew member through the programme.

Rule 135.557(a)(2)

The operator has the responsibility for developing a syllabus that includes training in all the listed elements that are applicable to the intended operations. This not only includes training on the aircraft type, the routes and aerodromes, but also the operator's policies, procedures and standards.

The ground course and flying programme contained within Appendix D and E to this AC provide~~s~~ an acceptable option for mountain flying training.

On the basis that the completed exposition represents the operator's method of compliance with the appropriate rules, this section could be the procedure that provides compliance with many other rule parts that require procedures, or the operator to ensure, or to prescribe~~s~~, prohibitions and mandatory requirements.

Rule 135.557(b)

This rule enables the operator to assess the training, qualifications and experience of any potential crew member and vary the initial training syllabus as appropriate, providing a record is made of the variation on the training record and includes the reasons for the variation.

Rule 135.559 – Transition training for crew members

The air operator needs to assess the need for transitional training and then provide appropriate transitional training to flight crew where the crew member is changing from one aircraft type or variant to another, or new procedures or new equipment are introduced. The procedure for this should provide for an assessment of the degree of training required, dependent on the changes being made, then providing for that training.

When considering the requirements of this rule the definition of a variant as defined in Part 1 should be used. Assessing the extent of change may require consultation with CAA. Otherwise, the extent of the training that is required for the introduction of new aircraft, equipment or procedures should be determined by the degree of change being introduced, with particular emphasis being placed on the safety and emergency equipment and procedures.

Where mountain flying operations expand into a region of more challenging terrain, the training programme should reflect this by adapting to accommodate.

It is recommended that for fixed wing this expansion would require a minimum of two hours' flying to ensure the pilot's ability to apply the principles in a more challenging area. For helicopters a minimum of a flight check in such terrain is required.

The air operator should ensure the transition training programme for an additional aircraft type rating include mountain flying training specific to that type and model.

Rule 135.561 – Recurrent training for crew members

The operator has the responsibility for ensuring that all crew members are trained, current, and proficient for each aircraft, and type of operation being performed.

For operations being performed under Part 135 the recurrent training would normally be generated from such things as incidents, accidents, areas of weakness identified during routine competency checks, random quality checks or any other indicator that could identify a training need.

When a pilot is required to fly more than one type on air operations, the operator should schedule recurrent training (in normal and emergency procedures) in the types that have not been checked on the flight crew competency check. This enables the operator to ensure that crew members are proficient in each aircraft.

In respect of mountain flying, where any recurrent training results from occurrences such as in the above paragraph, this training should be documented as per sample checklists in Appendices D and E.

Rule 135.565 – Flight crew training programme

This rule combines all the elements of this subpart into a flight crew training programme that is unique to the particular operation.

This is a mandatory requirement for the operator, and should be used to combine the requirements from throughout the rules as much as practicable.

Rule 135.567 – Flight crew member instructor qualifications

The operator has the responsibility to ensure that any person acting as a flight instructor in the flight crew training programme:

(a) has satisfactorily completed the training required by the operator's training programme to be able to act as PIC in the operation

(b) is appropriately qualified as an instructor, and

(c) has completed the initial and recurrent training requirements applicable to the instruction to be carried out.

This may require a procedure or a checklist of elements of the rule to ensure compliance with this rule. As there are three main elements to this rule, they could be included on the training checklist and completed by the instructor at the time to confirm compliance with the rule.

The minimum qualification and experience requirements for Part 135 Mountain Flying Training Instructor, except helicopter advanced mountain flying training instruction, are:

(a) A, B, or C category instructor rating, and

(b) at least one year's experience including 50 hours' flying in a recognised mountainous environment, or overseas equivalent, and

(c) a minimum 700 hours' total time in appropriate category including 100 hours instructional experience, and

(d) having completed a CAA-accepted Mountain Flying Course, and

(e) demonstrated competence to an appropriately qualified flight examiner and on successful completion having had their logbook endorsed.

The minimum qualifications and experience to conduct helicopter advanced mountain flying training instruction are:

(a) A, B, or C category instructor rating, and

(b) at least one year's experience including 150 hours as PIC of a helicopter flying in a mountainous environment, and

(c) minimum 700 hours' experience in helicopters including 300 hours' instructional experience in helicopters, and

(d) having completed a CAA-accepted Mountain Flying Course, and

(e) having completed an assessment flight in the presentation of mountain flying by an instructor approved under this AC for the purpose.

Subpart J – Crew Member Competency Requirements

Rule 135.601 – Purpose

This subpart prescribes the rules governing the operational competency assessment of flight crew members. It should be read in conjunction with rule 119.53 or rule 119.103*, Personnel competency requirements,* as applicable.

Rule 135.603 - General

Rule 135.603(a)

The operator must establish and control an operational competency assessment programme that encompasses all the elements of Subpart J. The programme could be structured to provide for the competency checks to be carried out over the required period.

Rule 135.603(b)

This rule enables the operator to:

- conduct the competency assessment programme itself
- contract an organisation certificated under Part 141, or
- where the assessments are conducted outside New Zealand, contract an organisation outside New Zealand that is equivalent to a Part 141 organisation.

For an operator to conduct their own competency testing they must employ, contract or otherwise engage appropriately qualified flight examiners as described in rule 135.605.

Rule 135.605(a) – Flight examiner qualifications

A method of ensuring compliance with this rule may require a procedure, or could be included in a checklist of the elements of the rule and retained in the personnel records required by rule 119.115.

Whoever is to be used as a flight examiner to carry out an operator's competency checking programme needs to:

- be type-rated
- have a current flight examiner rating
- be familiar with the types of operations that are conducted, and
- have completed the initial and recurrent training requirements applicable to the testing to be carried out.

Rule 135.605(b) – Flight examiner qualifications – simulator training

This rule would not normally apply to a Part 135 operator, but if a simulator is to be used then it is the responsibility of the operator to ensure the flight examiner is appropriately qualified and current.

This rule may require a procedure or a checklist of elements of the rule to ensure compliance with the rule. As there are three main elements to this rule they could be included on the competency checklist and completed by the flight examiner at the time to confirm compliance with the rule.

Rule 135.607 – Flight crew competency assessments

Rule 135.607(1) – Flight crew competency checks

The operator has the responsibility for ensuring that the elements of a route and aerodrome proficiency check are carried out for each pilot acting as PIC. It specifies the period that the check must be carried out, then requires a ground-based procedure check over one route segment and a flight check with one or more landings at an aerodrome representative of the operations to be flown.

During this annual check of competency and route, components of mountain flying principles and techniques should be evaluated for continued competency.

The above, as applicable, should be included as a part of the competency assessment programme that is mandated by rule 135.603, and could be addressed as checklist items with notes or comments as required, confirming the completion of the checks. Any assessment forms associated with this check should be accurate and be retained as specified in rule 135.859.

Where a crew member is conducting both VFR and IFR operations, the elements of both requirements will have to be met. It is suggested that a VFR competency check be combined with each second IFR check.

Rule 135.607(2) – Flight crew competency checks VFR

This rule specifies the period for competency checks of a pilot conducting VFR operations and covers operating procedures, including emergency procedures, in an aircraft type normally used by the pilot in the operation. This should form a part of the operational competency assessment programme required by rule 135.603.

Where a pilot is employed by two operators , the flight check for one may be used for both operators, provided the aircraft is of the same type, the operations are substantially the same, and the flight examiner is common to both organisations. In this case both operator’s flight check forms would be completed and signed by the flight examiner.

Rule 135.607(3) – Flight crew competency checks IFR

This rule specifies the period and condition for the conduct of IFR competency checks that are additional to those required for VFR operations.

The check must be conducted in each aircraft type that is used for IFR operations, with the exception that for aircraft configured for less than nine passenger seats, the check may be taken in rotation in each aircraft type with one in each six-month period.

Where IFR operations are planned this should form a part of the operational competency assessment programme mandated by rule 135.603.

Rule 135.607(4) – Flight crew competency checks - tests

This rule specifies the period and mandates a written or oral test of the pilot’s knowledge of the items listed in the rule. Regardless of whether a written or oral test is to be conducted, the operator would have to develop a set list of items to be tested. This would not only cover those elements covered by this rule, but where it is intended to use the training and competency testing programmes to cover areas of rules that require an operator to ensure, mandate or apply a prohibition, these items should be included.

As this could be a very large list, a random sample of the checks could be suitable where it is not practicable to cover off everything at once.

Note: *The written or oral test on aircraft systems, performance, operating procedures, and the contents of the flight manual are required for each type flown, not just the type being flown on the check.*

This part of the flight crew competency check is not portable between operators as it covers several operator-specific items.

If any significant weaknesses are found by the flight examiner recurrent training can be scheduled.

This should form a part of the operational competency assessment programme required by rule 135.603.

Rule 135.607(5) – Flight Crew Competency Checks - certification

The flight examiner must make and certify an entry in the pilot training record indicating the result of the test. This could simply be included on the record of the test.

Rule 135.607(6) – Flight Crew Competency Checks – aircraft or simulator

The competency check must be carried out in an aircraft or simulator approved for the purpose. This means that the Director must approve both the aircraft type and the simulator.

135.613 – Competency and testing records

The operator must maintain accurate records of competency assessment. Procedures for-the maintenance and retention of records can either be developed specifically for this purpose, or included in general record-keeping as outlined in Subpart L, *Manuals Log and Records*.

Subpart K – Fatigue of Flight Crew

Rule 135.801 - Purpose

This Subpart prescribes flight time limitations and other rules to minimise fatigue in flight crew members of aircraft engaged in air operations.

Note: *Refer also to AC119-2*, Fatigue of Flight Crew*, and the CAA website's section on human factors, including fatigue management at https://www.aviation.govt.nz/safety/safety-education-and-advice/human-factors/*

There is currently an acceptable flight-and-duty scheme for Part 135 in AC 119-2. However, this is very broad and does not allow an operator conducting a combination of air transport, commercial transport and other hire or reward operations, e.g. agricultural or external load operations, to fully use the fatigue rules. The purpose of this information is to provide advice on how the full potential of Subpart K may be used commercially.

Definitions

When developing a flight and duty scheme, the definitions in Part 1 should be used, in addition to the ones below, where Part 1 does not have a definition.

Adequate rest facilities means a single-occupancy bedroom that is subject to a minimal level of noise, is well ventilated and has facilities to control the levels of temperature and light, or where such a bedroom is not available, an accommodation that is suitable for the site and season, is subject to a minimal level of noise, and provides adequate protection from the elements.

Disrupted schedule means a schedule that, by reason of circumstance outside the control of the operator, is prevented from being completed within its scheduled time:

Duty & duty period

Duty means any task (including positioning) that a crew member is required to carry out associated with the business of the air operator.

Duty period means any continuous period during which a crew member is required to carry out any task associated with the business of an air operator. It includes any flight duty period, positioning, ground training, ground duties and standby.

Where a flight crew member is required by an operator to be on duty or available for duty for two or more periods separated by an interval of less than 10 hours, the periods are to be deemed continuous, starting when the first of the periods begins and finishing when the last period ends.

External operation means an operation, excluding an operation to the Chatham Islands, the greater part of which is carried out outside the territorial waters of New Zealand:

Flight duty time means the period of time that starts when a flight crew member reports for a flight, or reports as a flight crew member on standby, and includes the time required to complete any duties assigned by the air operator. For a flight engineer it includes the time required to complete aircraft maintenance duties prior to or after a flight.

Internal operation means an operation that is carried out between places within New Zealand, and includes an operation between the islands of New Zealand:

Positioning means the practice of transferring flight crews from place to place as passengers in surface or air transport at the behest of an air operator.

Recovery period means a period free of duty following a duty cycle of length greater than 48 hours during which the crew member may recover from the cumulative effects of fatigue.

Rest period means any period of time on the ground during which a flight crew member is relieved of all duties by the operator, where the rest is not interrupted by the operator. It should not include travel time to or from the rest facility, meals or time for personal hygiene.

Standby period means the period of time during which a flight crew member is required to hold themselves available for active duty:

Split duty means a flight duty period, which consists of two duties separated by a break on the ground during which the crew member is relieved of all duty.

Split-duty time means a split-duty period during a day where the flight crew member has:

(a) advanced notice of the split-duty time; and

(b) the crew member receives adequate rest in suitable accommodation.

Stay in an area means a stopover in an area for a period that includes a facility for two normal night's rest; that is, two consecutive periods between midnight and 6 am local time:

Tour of duty means the period of time commencing at the start of duties at home base prior to a series of flights and ending at home base on completion of the duties associated with the series of flights:

Note*: When a flight crew member is based temporarily at a place other than his home base, that place, for the period of the detachment, will be regarded as his home base:*

Total hours of duty means the sum of the duty periods within any particular period that a flight crew member is at the disposal of an operator.

Unforeseen operational circumstances means an event that is beyond the control of the air operator, such as unforecast weather, equipment malfunctions, or air traffic control delays.

Rule 135.803 – Operator responsibilities

The operator is responsible for developing flight and duty time limitations applicable to the particular operation in a method acceptable to the Director. Rule 135.803(a)(1) lists the factors the operator should consider.

The operator is responsible for developing and maintaining a flight and duty limitation scheme that

- manages fatigue of all flight crew members effectively
- takes into account all flying done by flight crew, including hire or reward operations
- does not exceed flight crew members’ maximum hours set out in rule 135.803(3)
- allows flight crew members to have sufficient days off, as set out in rule 135.803(3)
- keeps accurate records of the flight and duty times of all flight crew members, and
- is acceptable to the Director.

When assessing a scheme for the management of fatigue, the Director may accept one that runs for a lesser period than the AOC. This restriction is to trial a scheme and enable the operator to show that it is workable and acceptable. During that trial period CAA may monitor the scheme to assess its effectiveness. This may include attendance of the management review meetings, review of corrections and interviews with flight crew.

Rule 135.805 – Flight crew responsibilities

While the operator is responsible for setting up and managing a fatigue management scheme, the management of fatigue is a partnership between the operator and the employee, as both have a shared responsibility to ensure that fatigue is managed responsibly.

Flight crew members should not take part in air operations, including hire or reward operations if:

- they know or suspect they are suffering fatigue or the effects of fatigue, or
- have exceeded the flight and duty limitations applicable to them, e.g. the limitations set out in the operator's fatigue management scheme, or in rule 135.803(3).

As well as the responsibilities of all flight crew members, the PIC is responsible for ensuring, in the cases where the flight and duty limitations are exceeded in the interests of health and safety, that this can be done without endangering any flight crew members or passengers.

Fatigue Management Schemes

Fatigue Management Schemes should aim to take a broader approach to the consideration of fatigue as an operational factor, addressing all possible causes of fatigue. Implicit in this approach is the recognition that factors outside the workplace that can make an important contribution to fatigue, and that fatigue management is a shared responsibility of air operators and individual flight crew.

The considerations and determinations made for each element contained in rule 135.803 should be documented, and records kept, allowing a review for the entire duration of the scheme. The information should be submitted for acceptance by the Director as part of the flight and duty scheme. Operators conducting both ATO and CTO will need to show in the scheme how the limitations and rest requirements of both of these operations are to be managed.

A scheme should be based on policies and systems including, but not limited to:

(a) identification and assignment of responsibilities

(b) ongoing education of management and staff

(c) a fatigue and incident/accident reporting and investigation system

(d) workload monitoring

(e) identification and management of fatigued personnel, and

(f) system review.

Items for consideration in the development of a scheme for the management of fatigue

An air operator submitting their own flight and duty scheme for acceptance must address the elements in rule 135.803(a)(2). and should ensure that:

(a) The scheme identifies all the factors influencing fatigue and apply appropriate weightings to these.

(b) The organisation's management, in conjunction with the flight crew, have developed the scheme.

(c) The flight crew or the flight crew representatives have been consulted on all aspects of the scheme.

(d) The scheme includes a formal method of feedback from flight crew.

As a part of an organisation's internal quality management processes, the scheme should contain a monitoring system with a provision for regular reviews of the scheme by management and flight crew to assess whether the scheme is effective and is achieving the desired outcomes.

Monitoring flight crew workload on duty

The method by which an operator chooses to monitor the workload of flight crew should be defined in a policy. The policy should indicate trigger levels in the monitoring system where management and staff at the regular review meetings need to reassess the current situation and to make any necessary adjustments. The following indicators should be considered:

(a) Geography – Terrain.

(b) Meteorological conditions – Wind, visibility and low cloud, significant hazardous phenomena, special phenomena.

(c) Type and density of traffic – Type of air traffic, density of air traffic, aircraft activity forecasts, peak IFR movements.

(d) ATS – Provision of ATC services, provision of flight information services (FIS), provision of alerting services, proximity of controlled airspace.

(e) Instrument approaches – Instrument approach procedures, approach sequencing, IFR training.

(f) Circuit patterns – Aerodrome circuit selection, non-standard circuit patterns, noise abatement procedures.

(g) Aerodrome and approach facilities – Runways, railways, navigation approach and landing aids, radio and radar coverage.

(h) Other aerodromes – Aerodromes in the vicinity of the aerodrome.

(i) Special aircraft operations – Non-scheduled larger aircraft, special events, non-radio equipped aircraft, sport/recreation aircraft, military aircraft.

(j) Air safety incidents and other occurrences **–** Air safety incidents, emergencies and accidents, bird hazard, air safety incident reporting, non-compliance with CAA rules, security.

Shift rotation in use

Many aspects of rosters can potentially be modified (duration and timing of operations, number of consecutive operations, direction of rotation, duration of rest periods, etc). The type of rostering system that an operator may have in place is less important than the reflection of accepted fatigue management principles in a fatigue management scheme, i.e. ensuring that:

(a) An individual in the management structure who has the responsibility for rostering has received education about the effects of shift work, and shift work management strategies.

(b) Personnel responsible for designing rosters have received education about the effects of shift work, and shift work management strategies.

(c) Personnel working shifts have received education about the effects of shift work and personal coping strategies.

(d) Personnel working shifts have had the opportunity to participate actively in roster design.

(e) Consideration has been given to the rate of accumulation of sleep debt across the roster, and the provision of regular recovery opportunities (two full nights off).

(f) There is a real-time system for monitoring actual (as opposed to rostered) hours worked, and for prioritising eligibility for call back.

(g) There is a system for monitoring concerns about rosters, and regular review of the issues raised.

(h) The review team includes representatives of management and the workforce, and can call upon independent expertise, where appropriate.

Methods of grading contributing factors to fatigue

Fatigue Weighting – It is recommended that an operator develop a method of grading the levels of fatigue that could be expected to be experienced during any particular type of operation, taking into account those elements contained in rule 135.803(a)(2).

Example A – a military system may specify an 8-hour flight and an 18-hour duty period. It will then go on to apply a multiplier for each hour of a particular operational mode.

This is shown in Appendix A of this AC.

Example B – could list each element of fatigue that has been identified and must be considered for the proposed operation. When satisfied that all the elements have been identified, apply a weighting to fatigue on a scale of minus 10 to plus 10 against each element. As every element that adds to fatigue has a plus factor, the operator will then need to apply elements of rest, meal breaks, time free of duty etc that would apply negative fatigue factors to balance the scheme at an acceptable level.

An example of this may be found in Appendix B of this AC.

As previously stated, any scheme must contain a monitoring system with regular management and flight crew reviews to ensure the scheme is not only being complied with, but is effective and is achieving the desired outcome of managing fatigue within acceptable levels.

Rule 135.803 – Fatigue of flight crew

Rule 135.803(a) The intent of this rule is to require an operator to establish a flight and duty scheme for the management of fatigue in flight crew. It provides general considerations for air transport operators and specific limitations for commercial transport operators. It also places a prohibition on the operator not to permit or cause to permit a person to act as a flight crew member if the operator knows or has reason to believe the person is suffering from fatigue, or is likely to suffer from fatigue.

To meet the flight and duty scheme requirements for ATO an operator can:

(a) develop a flight and duty scheme under rule 135.803(a)(2), or

(b) use the flight and duty scheme in AC119-2.

Any scheme presented for acceptance must contain fixed limits in regard to flight, duty and rest periods. These limits are to be defined and monitored by the operator. In developing these limitations, an operator should show that they have addressed the following items.

(a) ATO

(b) CTO

(c) Other hire or reward operations

(d) Casual or freelance flight crew

(e) Single pilot crews

(f) Two-pilot crews

(g) Instrument flight rules operations

(h) Visual flight rules operations

(i) Duty time

(j) Flight time

(k) Standby periods

(l) Rest periods

(m) Meal breaks

(n) Rest facilities

(o) Disrupted schedules due to unforeseen operational circumstances

(p) External operations

(q) Internal operations

(r) Tour of duty

The working documents used in the development of a scheme could be presented as a matrix showing the elements that have been addressed and the weightings that have been applied to each element. Consideration must take into account all the elements that may affect fatigue in relation to the scope of the intended operations.

Rule 135.803(a)(2)(i) Rest periods prior to flight. It is recommended that the rest period prior to commencing a duty is a minimum of 12 hours. This break should provide adequate opportunity for sleep to minimise the effects of fatigue prior to commencing a duty cycle.

The greatest risk of fatigue is experienced on night operations. This is where the 12-hour minimum break will be most beneficial to staff and valuable in the management of fatigue. The period may vary but it should provide for adequate sleep, meals, travel and recreation.

The recovery value of rest periods depends on how much sleep a person is able to obtain. This, in turn, depends on how much of the rest period coincides with the time of day when the brain and the body are primed for sleep, by the circadian biological clock.

Rule 135.803(a)(2)(ii) Acclimatisation. The intention of this rule is to consider the effects of physiological adaptation to environmental stress. It is recommended that where flight crew are being transferred between temperate, artic or tropical climates a suitable rest period be provided prior to the commencement of duty for acclimatisation. This period may vary dependant on the period of transition between climatic zones. It is unlikely that acclimation will be a consideration for operations within New Zealand territories. This should also consider the effects of night operations and split duties.

Rule 135.803(a)(2)(iii) Time zones. It is recommended that where flight crew are being transferred between time zones, a suitable period of rest be provided prior to the commencement of duty for realignment of the normal circadian rhythms. This period may vary dependant on the period of transition between time zones, the direction of travel and the time differences being experienced. It is unlikely that time zones will be a consideration for operations within New Zealand territories.

Rule 135.803(a)(2)(iv) Night operations. The intention of this rule is to ensure an operator takes consideration of the effects of night operations and its effect on performance. Night operations will have the greatest effect on an individual’s alertness and ability to perform complex tasks due to disruption sleep patterns. Alertness reaches a low point in the early hour of the morning (about 3-5 am, or slightly later on scheduled night operations) when the physiological drive for sleep is the greatest. The urge to fall asleep at this time is stronger when prior sleep has not been adequate. Consideration should be given to rest and meal breaks to overcome the low point in the circadian rhythm during this period of operation. Operations under Part 135 that would be likely to consider this element of fatigue would be night freight, emergency operations or IFR helicopter operations.

Rule 135.803(a)(2)(v) Maximum number of sectors. The intention of this rule is to ensure that an operator takes consideration of the number of sectors with respect to workload. Emphasis, in this assessment, may be given to operations that involve high-frequency charter operations; this is due to generally greater workloads that may be experienced.

Rule 135.803(a)(2)(vi) Single pilot operations. It is recommended that an operator consider this rule with respect to workload that may be expected in the operation. It is generally accepted that there is high workload associated with single-pilot operations, this will apply to the majority of Part 135 operations. Additional consideration should be given to single pilot IFR operations that may increase workload; this may include night operations.

Rule 135.803(a)(2)(vii) Two pilot operations. It is recommended that an operator consider this rule with respect to workload, and the impact of the second pilot. It is generally accepted that the presence of a second pilot has an effect of sharing the workload and possibly reducing fatigue levels. This will have limited impact on Part 135 operators, and will normally only apply to helicopter IFR operations.

Rule 135.803(a)(2)(viii) Two pilots plus additional flight crew members. The intention of this rule is to have an operator consider the further fatigue-reducing effects of further shared responsibility. This will have limited impact on Part 135 operators, and will normally only apply to helicopter IFR operations.

Rule 135.803(a)(2)(ix) Flight crew member’s qualifications. The intention of this rule is to give consideration to qualifications over and above the minimum qualification required for the duties being performed by flight crew that could have the effect of reducing the level of fatigue associated with the duties being performed. In the consideration of this rule, experience of the pilot in the situation and environment should not be overlooked. Taking into consideration these two factors an assessment should be made as to a person's ability, with regard to effects of fatigue, to handle the situation in which they are operating.

Rule 135.803(a)(2)(x) Mixed duties. The intention of this rule is to give consideration to the mixture of duties likely to be undertaken during any duty period and apply a weighting to the likely stress levels. For example, a combination of high-concentration lifting operations and relatively lower-level sightseeing operations being conducted during the same duty period may require a reduction in the duty period or an increase in rest to maintain an adequate level of alertness throughout the period.

Rule 135.803(a)(2)(xi) Dead head transportation. The intention of this rule is to ensure that an operator considers how this time is to be addressed. It is not treated as rest time but should be included as duty time. This is not likely to apply to a Part 135 operation, but in the unlikely event flight crew are to be transferred as passengers after the completion of a flight, or to the commencement of a flight, consideration should be given to this time.

Rule 135.803(a)(2)(xii) Reserve or standby periods. The intent of this rule is to require any period of reserve or standby away from the place of work or duty to be considered as a form of duty, and some weighting in relation to fatigue should be made. Consideration should also be made for the time of day of commencement and cessation of standby in relation to duty.

Rule 135.803(a)(2)(xiii) Flight duty period. The intent of this rule is to take into account the overall effects of fatigue over one duty period. This is from the time that a person is required by an operator to present themselves for duty to the time that an operator no longer requires that person for duty. For example, this would normally affect ~~effect~~ operations where flight crew work to a roster of a month on and a month off, or any similar arrangement. This may have the effect of extending rest periods.

Rule 135.803(a)(2)(xiv) In Flight relief. The intent of this rule is to allow for relief where multiple flight crews are available to provide in-flight relief of the duty crew. Overall, all flight crew will be on duty, but the overall flight and duty period could be extended due to the relief provided by a second flight crew. This consideration is unlikely for operations conducted under Part 135, and would normally only apply to large airlines flying over very long routes.

Rule 135.803(a)(2)(xv) Type of operation. The intent of this rule is to take into account the stress and associated fatigue that will affect flight crew when undertaking various types of operation. A consideration should also be given where flight crew are required to perform more than one type of operation within the same flight-and-duty period. The workload of the various types of operation should be analysed and a fatigue weighting applied. Some examples are:

(a) VFR air transport operation between airports with paved runways, low traffic density and good weather patterns, that is the primary operation of an operator would have a medium to low fatigue weighting.

(b) IFR air transport operation into areas of high traffic density with poor weather patterns would have a high workload and a higher fatigue weighting.

(c) Commercial transport operation operating a low level or a lifting operation in a confined area would require a high level of concentration and therefore high stress levels and a higher weighting in regard to fatigue.

(d) Charter operation to an unfamiliar aerodrome or landing site would require more pre-flight planning and a higher level of concentration during the flight and consequently a higher fatigue weighting.

Rule 135.803(a)(2)(xvi) Cumulative duty time. The intent of this rule is to consider the effects of duty over periods of time. This includes the normal working day and the overall period encompassed by the scheme. For example, this could include the duty day including any rest and meal breaks, and the annual duty cycle including public holidays, weekends and annual leave allotments. The weightings against fatigue could be negative in relation to a daily period and positive over the annual period where public holidays, weekends and leave are taken into account. Overall, there should be a balance.

Rule 135.803(a)(2)(xvii) Cumulative flight time. The intent of this rule is to consider the effects of flight periods over time. This includes the normal working day and the overall period encompassed by the scheme. For example, this could include many factors. The weightings against fatigue could vary in relation to a large number of flights over daily period, morning and afternoon operations with a large rest period during the middle of the day, a combination of mixed air transport, commercial transport operations, lifting or agricultural duties. The scheme should also consider the effects of fatigue over the annual cycle of the scheme. A workload assessment should be carried in relation to the support provided to flight crew in carrying out their duties and the complexity of the flights within the scope of the operation.

Rule 135.803(a)(2)(xviii) Discretionary increases in flight time limitations or flight duty times or both. The intention of this rule is to provide for discretionary increases in flight and duty times within the scheme to provide for contingencies that arise from time to time due to unforeseen operational circumstances. Increases in flight and duty times should be assessed as having a negative effect on fatigue and provisions should be made to increase rest periods, provide meal breaks or any other strategy that will provide for fatigue recovery. The operator should have a procedure for approving discretionary increases in either flight or duty time limits. The procedure would cover the nature of the task, the weather, the pilot's experience, any limits to the increase, workload over the last 24 hours, acceptance by the pilot, authorisation by the Operations Manager after consideration of all the factors.

Rule 135.803(a)(2)(xix) Circadian rhythm. This rule is considered in the assessment of many of the elements of fatigue that are required to be considered in this Subpart. It must be recognised that people do not function, physically or psychologically, at a steady, unchanging level across the 24-hour day. All of the organs of the body cycle through daily peaks and troughs of efficiency known as circadian rhythms, which are coordinated by a biological clock in the brain. The biological clock keeps the body 'in step' with the day/night cycle by being sensitive to light and darkness, to work/rest patterns, and to the patterns of activity of other people. The clock is genetically based, and effectively programmes the body for sleep at night and for wakefulness during the day. It does not usually adapt much to night operations because it is constantly being drawn back to its preferred orientation by the unchanged day/night cycle and the activities of the rest of day active society.

Two aspects of circadian rhythms are directly relevant to fatigue management and safety in air operations:

(a) There are circadian rhythms in alertness and performance capacity, which can affect how a person responds to job demands.

Alertness reaches its daily low-point in the early hours of the morning (about 3 –5am, or slightly later on night operations) when the physiological drive for sleep is greatest. There is a second drop in alertness, and increase in sleepiness, in mid-afternoon, corresponding to the naptime in siesta cultures. The urge to fall asleep at these times is stronger when prior sleep has not been adequate.

Both physical and mental performance capacity reach a daily low-point at a similar time in the early morning (about 3 – 5am, or slightly later on night operations). People working under time pressure, or with high workload, are most likely to make errors at this time. Particularly for tasks that require vigilance, there is also a secondary slump in performance capacity in the mid-afternoon. The time of day of best performance depends on the nature of the task. For example, people usually perform best around noon on tasks that require complex mental processing. On the other hand, they generally perform best in the early evening on tasks requiring physical coordination and vigilance.

In practical terms, the circadian rhythms in performance capacity mean that people cannot be expected to function equally well at all times of the day, and that they are likely to have most difficulty on night operations.

(b) There are also circadian rhythms in the ability to sleep. In other words, people simply cannot sleep 'at will'. As already mentioned, the physiological drive for sleep is strongest in the early hours of the morning (about 3 – 5am, or slightly later on night operations). The physiological drive for waking up is strongest about 6 hours later. As a result, after night operations, people frequently wake up spontaneously after only a few hours of sleep. The daytime sleep of night workers is consistently found to be about one third shorter than their night time sleep.

Note: *In practical terms, the circadian rhythms in sleep propensity mean that it is possible to obtain more sleep in a night-time rest period than in a daytime rest period* ***of the same length.*** *Thus, night work is associated with maximum sleep loss and with working around the daily low-point in performance capacity.*

Rule 135.803(a)(2)(xx) Days off. The intent of this rule requires the operator to consider the number of days off within the overall scheme. The number of days off including leave entitlements have a bearing on the cumulative effects of fatigue as has already been stated and should be assessed as an integral part of the scheme.

Short term and accumulated sleep deficit To be alert and able to function well, each person requires a specific amount of nightly sleep. The average for an adult is about 7 – 8 hours, but there are people who require more or less than this average. When this individual 'sleep need' is not met, waking function is degraded. For most people, getting two hours less sleep than they need on one night (an acute sleep loss of two hours) is sufficient to degrade their performance and alertness the next day. The reduction in performance capacity is particularly marked if less than about 5 hours sleep is obtained. The effects of consecutive nights of reduced sleep accumulate into a sleep debt, with alertness and performance becoming progressively worse.

Recovering from the effects of sleep loss generally requires two nights of undisturbed sleep. Recovery sleep is usually deeper and more efficient, and the lost hours of sleep do not need to be recovered hour for hour.

Note*: In practical terms, any work pattern that requires a person to change the timing of their sleep, particularly night work, is likely to cause sleep loss. Because of the cumulative effects of sleep loss, it is important in roster design to consider the rate at which sleep loss is likely to be accruing across the roster. This should determine the number of consecutive night operations before a scheduled opportunity for recovery (two full nights).*

Rule 135.803(a)(2)(xxi) Record keeping. The intention of this rule is to take into account and clearly establish any record keeping activities the operator requires of the flight crew that are to be considered as a duty under the overall scheme. This will also extend to the records, forms and results of the review meetings generated during monitoring of the scheme.

Rule 135.803(3) Where an air operator conducts commercial transport operations the flight and duty scheme must include the limitations that apply to rule 135.803(3) and encompass any other hire-or-reward flight duties that that the pilot may be required to perform. The impact of these limits must be considered when air transport operations are to be carried out in conjunction with commercial transport or other operations. Once a flight-and-duty scheme has been accepted, any amendments to the scheme will require the Director’s prior notification and acceptance as stated in rule 119.165.

Rule 135.803(b) This rule is a prohibition and places a responsibility onto the operator performing an air operation to not cause or permit any person to fly in an aircraft as a flight crew member if the operator knows or has reason to believe that person is suffering from or is likely to suffer from fatigue. A scheme in itself is not sufficient to satisfy this rule as the effects of fatigue are variable between individuals, and the operator will have to monitor the individual fatigue performance and provide within the scheme a method of feedback from staff and make adjustments to the scheme as appropriate.

Rule 135.803(c) This rule requires the operator to keep accurate records in relation to flight and duty and could be covered within the administrative procedures for all types of record.

Rule 135.805 – Flight crew responsibilities

Rule 135.805(a) The intent of this rule is to place a responsibility on the flight crew member not to act as crew when fatigued or likely to become fatigued to a point, which may endanger the aircraft or its occupants. This is a prohibition that could be included in the scheme or initial training programme.

Rule 135.805(b) This rule is a prohibition and places a responsibility on the flight crew member from conducting other hire-or-reward duties where these would exceed the flight-and-duty scheme. It should be noted that other hire-or-reward operations could include Part 133 and 137 operations, training, parachuting, balloon and adventure aviation operations etc.

Crew members working on a freelance basis will need to maintain an individual record of their flying and duty hours so that it can be presented to an operator before undertaking a flying duty.

Rule 135.805(c) This is a prohibition and places the responsibility on the flight crew member to ensure that the limitation prescribed in the flight-and-duty scheme of the air operator are not exceeded.

This in effect requires the crew member to have access to the progressive totals and limitations of the scheme. The crew member must have the ability to project the flight-and-duty time for the intended flight or series of flights during planning for flights. The limitations may be exceeded under the conditions specified in the CA Act 2023, sections 15-16, which relate to the duties of PICs in emergencies, and appropriate reporting made.

Subpart L – Manuals, Logs, and Records

Rule 135.853 – Operating information

Under this rule, the operator is responsible for ensuring that the parts of the exposition relevant to the duties of each crew member are current and available. The currency of any part of the exposition should be covered in the general amendment process. The operator would normally make all or only the relevant parts available to crew through the distribution list.

Rule 135.855 – Documents to be carried

Operators must ensure that the documents that are listed are carried where appropriate on each individual flight as well as those documents required by rule 91.111*, Documents to be carried*. These requirements could be addressed in the operational functional area of flight preparation. For example, in some areas where operations are conducted there may be no NOTAMs or AIS information.

Rule 135.857 – Daily flight record

Operators must keep accurate daily flight records for each day an operation is conducted. These should and contain~~s~~ the information stated in the rule, as well as the technical log required by rule 91.619. However, provided suitable explanatory procedures are included in the exposition, the detail required by these two rules could be combined if desired.

Items 11 to 15 in the rule should be gathered in such a way that the daily flight record details for every flight may be constructed. Putting this information in the daily flight record rather than a passenger manifest gives the operator more flexibility to complete it. However, the operator must have systems in place to ensure that the weight and balance information is available to the pilot <u>before</u> the flight.

Rule 135.859 – Retention period

The operator must ensure records are retained for specified periods. This is one of many rules that require records to be compiled and retained for various periods and it is an opportunity to bring together all the records for retention within one central record system. Refer also to rules 119.67*, Records – personnel,* and 135.555.

A summary of record keeping requirements for a Part 119/135 operation over all rule parts is:

- **Rule 119.115 –** Personnel records for anyone who is required to hold a Licence or Rating. Kept until **1 year** after the person ceases to be employed.

- **Rule 119.117 –** Resource records of the testing, checking and safety calibration of safety-critical resources (scales, lifting equipment, fuel pumps, filters). Kept for **2 years** from the date the details are recorded.

- **Rule 119.157 –** Copy of charter, cross-hire or lease agreement. Kept for **1 year** after the date of the last flight under the agreement.

- **Rule 133.69 –** A plan covering operations over congested areas. Kept for **6 months** from the date of the operation.

- **Rule 133.75 –** Crew member competency checks and flight reviews. Kept for **4 years** from the date of that check flight.

- **Rule 135.93 –** Operations over congested areas. Plan kept for **12 months** from the date of the operation.
- **Rule 135.555/ 135.859 –** Training records (initial, transition, recurrent). Kept for **12 months** after the employment of the crewmember ceases.
- **Rule 135.613/ 135.859 –** Checking records. Kept for **12 months** after the employment of the crewmember ceases.
- **Rule 135.803 –** Flight & Duty Records. Kept for **12 months** after the entry was made.
- **Rule 135.857 –** Daily flight record. Kept for **12 months** after the date of the flight.
- **Rule 135.859 –** Retention period – summary:
  - Flight plan information (met, weather, notification of Dangerous Goods (DGs)). **12 months** from date of flight.
  - Flight crew records of flight & duty time. **12 months** from date of records entry.
  - Records of training, checking, and qualifications of each crew member. **12 months** after the crew member has left the AOC holders employment.
  - Daily flight record retained for not less than **12 months** after the date of the flight.

Appendix A

Example A

Crew Endurance Guide

Type of flight	**Multiplier**
Day	**1.0**
Day contour flight	**1.3**
Instrument flight	**1.4**
Night terrain flight	**2.1**
Night flight with NVGs	**2.3**

Appendix B

Example B

In this example an assessment of fatigue has been made and applied to each element relating to fatigue. This weighting is from minus 10 to plus 10. Overall, when all the elements of fatigue are totalled up, an acceptable level of fatigue has been established.

For example, a fatigue level of 2 or less may be acceptable, and 3 and above may not. In the event of the level being high, adding factors that apply a negative weighting and bring the overall weighting down to an acceptable level may offset this.

The figures contained in the following table are provided as an example to illustrate the concept of fatigue weighting.

Rest periods prior to flight	-10
Acclimatisation Increase of 15degrees C	+5
Time zones difference 12 hours	+7
Night operations	+9
In flight relief	-3
Type of operation	+6
Meal breaks	-4
CTO operation with sling	+8
IFR	+2
Single pilot	+2
Two pilot	-2
Cumulative duty time	+2
Cumulative flight time	
Discretionary increases in flight and duty time	+4
Rest periods	-5
Standby periods	+2
Total acceptable	+5

Monitoring the scheme and applying adjustments as necessary in a formal manner would be required to make the scheme acceptable.

Monitoring of the scheme would require the following:

(a) Formal completion of questionnaire by flight crew on a regular basis.

(b) Formal completion of questionnaire by flight crew on a random basis.

(c) Feedback from flight crew.

(d) Results from analysis of incident and accident investigation required by rule 12.59.

(e) Results from analysis of any incident or accident investigation conducted by the company that is not required by Part 12.

The following questionnaire is an example that could be used to monitor fatigue of flight crew, but this could be modified where it is more complex than needed for a small operator.

Fatigue Questionnaire

1. Daily report or after an occurrence

.. am or pm?

2. Duty History Prior to Monitoring or Prior to an Event

	Duty Period		Operational Duty		Rest Period	
	Start	Finish	Start	Finish	Start	Finish
Day of monitoring/event						
Day before monitoring/event						
2 days before monitoring/event						
3 days before monitoring/event						

3. Sleep History Prior to Monitoring or the Event

	Sleep Periods		Naps		Sleep Quality		
	Start	Finish	Start	Finish	Good	OK	Poor
Day of monitoring/event							
Day before monitoring/event							
2 days before monitoring/event							
3 days before monitoring/event							

4. Sleep Need

How long would you normally need to sleep at night to feel fully rested the next day?

(If you take naps regularly on days off, include them as well)

.... hours .... minutes

5. Has a doctor ever told you that you have a particular sleep problem (for example, sleep apnoea, insomnia)?

1☐Yes 2☐No 3☐Don't Know

If yes, please describe ....

....

6. How likely are you to doze off or fall asleep in the following situations, in contrast to feeling just tired? This refers to your usual way of life in recent times.

PLEASE TICK ONE BOX ON EACH LINE

	would never doze	slight chance	moderate chance	high chance
Sitting and reading	☐0	☐1	☐2	☐3
Watching TV	☐0	☐1	☐2	☐3
Sitting inactive in a public place (e.g. theatre, meeting)	☐0	☐1	☐2	☐3
As a passenger in a car for an hour without a break	☐0	☐1	☐2	☐3
Lying down in the afternoon when circumstances permit	☐0	☐1	☐2	☐3
Sitting and talking to someone	☐0	☐1	☐2	☐3
Sitting quietly after a lunch <u>without</u> alcohol	☐0	☐1	☐2	☐3
In a car, while stopped for a few minutes in traffic	☐0	☐1	☐2	☐3

PLEASE MAKE SURE YOU HAVE TICKED ONE BOX ON EACH LINE

7. Do you believe that fatigue played a part in this working day or this event?

1☐Yes 2☐No 3☐Don't Know

Please explain (use extra pages if necessary)

Appendix C

How to plot a P-Chart

Producing a P-chart is a relatively simple exercise that involves using the manufacturer's data out of the AFM. It is virtually the reverse of using the P-chart. The purpose of the P-chart is to enable simple calculation of required take-off and landing distances which already incorporate the required CAR Part 135 Air Transport safety factors for various runway surface types. The charts also provide convenient corrections for wind and runway slope, which may not be provided in the original manufacturer's manual.

All that is necessary is to locate reference lines for basic distances for one or more operational weights.

STEPS:

(a) Identify the basic charts for take-off and landing in the manufacturer's approved AFM. (Make sure these are the total distance to 50'. Some manuals provide both the ground and total distances.)

(b) Find the take-off or landing distance for a specified combination of pressure altitude and ambient temperature, and record these in the table. (Some suitable combinations are listed on the left of the table.) The distance should be found for the zero wind flat paved surface case.

Note: *The distance should also be found for the Maximum take-off Weight case. It should be used for the P-chart, because this is the worst case so it is conservative. However, the same procedure can be used for several other weights if desired, and more than one line produced on the chart. They should be carefully labelled.*

(c) Plot the take-off or landing distances backwards on the P-chart to find the common point in the variable box. I.e. run a horizontal line from the known temperature and altitude on the LHS across to the right-hand bottom box. Run a second line from the calculated distance on the RHS scale across to the bottom line (Private Operations – no safety factor) in the left-hand top box, and then continue the line vertically downwards from that point. The intersection of those two lines in the unmarked bottom box is then one data point. Find similar data points for at least three other temperature/altitude combinations.

(d) Draw a line of best-fit between the data points marked. The P-chart is then completed.

POINTS TO NOTE:

The aircraft configuration to which the original manufacturer's data is applicable should be noted on the P-chart, and also any special techniques or procedures used, such as lift-off speeds if they are not standard. This is because some AFMs give data for several configurations, particularly take-off, such as different flap settings. Also, the Piper manuals in particular use data based on a low (1.2 V_{SI}) lift-off speed.

TAKE-OFF DISTANCES

ISA	AIRCRAFT WEIGHT					
	lb./ kg.		lb./ kg.		lb./ kg.	
	FEET	METRES	FEET	METRES	FEET	METRES
SL						
1000						
2000						
3000						
4000						

AIRCRAFT CONFIGURATION: ……………………………………………………….

REMARKS: ………………………………………………………………………………

LANDING DISTANCES

ISA	AIRCRAFT WEIGHT					
	lb./ kg.		lb./ kg.		lb./ kg.	
	FEET	METRES	FEET	METRES	FEET	METRES
SL						
1000						
2000						
3000						
4000						

REMARKS: ………………………………………………………………………………

If you have any queries about production of P-charts or performance in general please contact CAA at certification@caa.govt.nz or info@caa.govt.nz

The P-Chart section is currently under revision.

Appendix D – Mountain Flying Training Programme – Fixed Wing

Contents

1. Mountain Flying Ground Course – Fixed Wing

To include as applicable:

1.1 Horizon

- define horizon
- identification of real or imaginary horizon
- superimposing a useable horizon on any variable background i.e.. visualising where real horizon sits as if terrain or obstacles were transparent
- illusions associated with inaccurate horizon definition
- hazard potential associated with these illusions and poor horizon definition.

1.2 Wind Awareness

- forecast conditions including synoptic
- 'fluid flow' concept of air between, over, and around terrain
- significance of direction relative to terrain
- wind patterns less than 15kts
- wind patterns greater than 15kts
- local patterns and effects
- upper winds compared to lower winds i.e.. comparison of wind in valley with wind at altitude
- indication of wind velocity at altitude i.e. snow, drift, lift/sink patterns, VSI indications, wave, cloud movement
- lift, sink, rotor, wave, turbulence, gusts
- cloud types as indicators of potential flying conditions
- indicators of lower-level wind, for example:
  - tussocks
  - water ripples / lanes on stationary water and wind shadows on water
  - poplars

  - willows
  - crop
  - smoke / dust
  - drift, and drift indicators
  - G/S versus A/S
  - cloud shadows as indicator of upper wind and its influence on lower-level wind
- applicability of Va and Vnokatabatic / anabatic winds in a valley
- choice of flying low versus flying high

1.3 Situational Awareness

- threats
- space
- inertia
- drift
- altitude, including pressure and density altitude
- gaining or losing height
- turning radius and effects of speed, configurations, wind, turbulence, weight, visibility
- weather patterns
- sun/shadow
- scale – GA aircraft is but a dot on the landscape
- merging terrain
- clear air effect
- legal requirements
- recognition of height above terrain
- appreciation of the need for anticipation versus reaction
- moral responsibilities – consideration of people & stock
- appropriate clothing & footwear
- passenger safety & comfort
- potential landing options
- distances for position reports

- traffic
- illusions, especially terrain gradient
- fuel remaining
- daylight remaining
- potential for stalling in the turn
- effect of poor visibility configuration on fuel management
- potential dehydration effects
- white water content in rivers as indicator of valley gradient

1.4 Contour/constant altitude flying

- horizon identification / appropriate nose attitude
- awareness of space and position
- appreciation of inertia
- appreciation of available escape options
- right of way
- lookout - high wing versus low wing, left versus right, blind corners, colour schemes
- recognising lift / sink
- Groundspeed versus Airspeed relationship
- flying constant altitude to recognise any changing gradient of valley floor

1.5 Valley Turns

- use of full width anticipating need for 360° turn
- minimise angle of bank to minimise Vs increase
- lower airspeed to reduce turn radius
- use of poor visibility configuration
- reduced flap to maintain performance i.e. 10° flap as opposed to 20°
- need for power to combat drag
- check turns before valley narrows
- large valley – position anywhere right of centre
- confined valley – any need to move over to make turn means one is not correctly positioned (Human Factors 5 – 7.5 seconds reaction time)

- effect of sudden shadow / sun effects
- clear screen
- steep gliding turns and effects of changing horizon, narrowing valley
- roll out position – never in middle of valley
- always positioned to anticipate not react
- if on wrong side…easy decision to change sides, if in middle potential for indecision and lack of space
- if airspeed decays with full power lower nose to convert height to airspeed
- emphasise 'caution flying up a valley haven't previously flown down' philosophy.

1.6 Saddle Crossings

- concept of saddle, pass, spur, ridge
- compromise of many variables
- anticipation/assessment of lift and sink
- VSI indications
- appreciation of wind direction relative to terrain
- approach 45° with escape route downhill, downstream
- desirable approach left to right
- escape option 'obstacle free' to use minimum bank angle
- knife edge saddle versus prolonged commitment area saddle
- level attitude - maintain airspeed with regard to Va
- not in climb attitude - airspeed and lookout are compromised
- not in descent – airspeed and control limited by Va
- anticipate turbulence
- use of parallax to assess sink and safe height to cross i.e. more terrain visible behind as approaching saddle therefore higher than saddle; less terrain visible therefore lower and turn away early; including technique for assessment of 500' clearance
- decision making including:
    - planning of initial flight path to a mountain range or ridge
    - options
    - approaches to the saddle/pass/ridge/spur

- commitment point
- escape routes
- position and options after crossing
- position reports for traffic information
- proximity to cloud including potential for lift

1.7 Route Finding

- water only flows downhill
- identify flow and follow to larger river, lake, sea, roads, town etc.
- awareness of valley alignment relative to compass
- awareness of sun position
- map folding; hold in one hand thumb on moving position whilst holding control–column/stick to facilitate peripheral vision
- effective pre-flight planning

1.8 Difficult Conditions

- cloud, snow, showers, white out, bright out - effects on visibility, disorientation, illusion, workload
- merging terrain – foreground with distant
- dirty windscreen versus clean
- precipitation on screen affecting judgement
- gradient of snow-covered areas, depth perception
- sun/shadow effects
- effects of difficult conditions on aircraft management including:
    - distractions
    - fuel
    - icing
    - visual reference
    - attitude control
    - altitude / hypoxia
    - aviate, navigate, communicate
    - below VHF radio coverage levels

- SARTIME management
- orientation
- decision making, including pilot attitudes
- temperature extremes, temperature factors
- turbulence
- air movements including significant up or down flow
- wires and obstacles e.g. wind farms

1.9 Cautions and Emergencies

- Performance comparisons including:
  - utility category versus MAUW
  - effects on turn radius
  - rates of climb
  - handling of sink
  - altitude/power considerations
- New aircraft rating differences including:
  - often faster/heavier
  - greater turn radius required
  - more anticipation needed
  - higher workload (e.g. extra controls and instruments)
- CFIT accidents – most occur by:
  - loss of visual reference (horizon)
  - stall in turn
  - attempting to out-climb terrain
  - poor decision making, resulting in reaction instead of anticipation
  - lack of decision making resulting in inaction
- Forced Landing and Precautionary Landing considerations including:
  - limited options
  - priority ~ make a plan; confined spaces may affect the ideal
  - tendency to crowd landing area

- consider climatic/seasonal wind effects for calculated gamble on wind i.e.. Anabatic versus Katabatic
- consider valley gradient
- awareness of mind sets and illusions
- consider early Mayday or Pan call
- habitation in remote area; look for airstrip/fertiliser bins
- consider elevation
- use of lift conditions to glide down valley closer to potentially more suitable option and habitation
- river beds - consider landing downstream; surface may be smoother
- beaches
  - stoney patches usually indicate firm sand
  - steep indicates soft sand
  - flat, damp sand usually means firm sand
  - debris, especially following period of poor weather
  - no lagoon area above high tide line
  - x/w potential
  - sand type : quartz, iron, coal etc
  - always a gamble

1.10 Consider survival kits, their use and contents relative to basic principles of survival and to the area of operations including:

- Location
- Water
- Food
- Shelter
- Will to survive
- Survival principles after unplanned landing, including basic first aid principles and skills

1.11 Use of survival equipment:

Location

- Have items that will facilitate being found, that enhance your visibility compared to the surroundings i.e.:

- bright ground sheet / tent fly / clothing
- condys crystals, food colouring
- flares
- mirrors / reflection items
- torch
- ability to ignite fuel / oil as smoke producer
- candle
- fire axe to break pattern of vegetation for searchers
- lightweight camp shovel (snow ops)
- whistle

Water

- Survival kit container as receptacle
- Ability to heat and provide warm drink

Food

- Basic dry freeze type food and means of providing warm food more from principle of preventing hypothermia than satiating hunger.

Shelter

- Items that will facilitate use of resources available to shelter from the elements including parts of aircraft:
    - Ground sheet / tent fly
    - survival blankets
    - duct tape
    - light rope / string

Will to survive

- Awareness that if each survivor retains the will to survive their chances are greater regardless of the availability of the other principles. This alone will make the most difference.
- Have available Mountain Survival guidance material

1.12 Flight following/ELT

- Options for flight following in a mountainous environment
- Limitations and uses of ELT in a mountainous environment

2. Mountain Flying – Fixed Wing Flying Programme.

2.1 Preamble/Philosophy

- The practical exercises listed reflect the application of the ground course principles.
- The flight course requirement and content are to be applied to the operator's local mountainous area of operations.
- The intention of maximising opportunity for experiencing varied meteorological and flight conditions should be demonstrated.
- The operator may consider contracting out parts or all of the flying programme where they either:
  - Lack the appropriately qualified or experienced staff.
  - Feel their staff to be better serviced by experiencing part or all of the training in a more challenging region.
- Every opportunity should be taken within the limitations of the training instructors experience and skill to test the trainees decision making. This should take the form of flying the chosen option e.g. saddle crossing, and then assessing and flying the alternative(s) to encourage experiencing the effectiveness or lack of effectiveness in their decisions. Until the variables are experienced the pilot lacks the resources to make the best decision in the circumstances that prevail.

  It should be noted that while in the course of this training the trainee may be taken outside their comfort zone. **Under no circumstances should the instructor exceed their own limitations.**
- Emphasis should be placed on recognising threats pertaining to the terrain and associated weather, including the appropriate mitigation strategies. Likewise developing strategies to trap errors and minimise potential for entry into an 'undesired aircraft state' should be emphasised.
- The flying programme will in most cases place trainees in circumstances they have not previously experienced. It will also be a workload that tests their concentration and ability to operate at an optimum level. Instructors should therefore be aware of the workload they are placing the pilots under, and therefore timetable initial training with this in mind.
- The most dangerous position a pilot can experience in mountain flying is when they are forced to react and therefore rely on their skill to retrieve an otherwise hazardous circumstance.

- The appropriate approach is that through training and experience the pilot learns to understand and appreciate the significant factors in order to anticipate and as a result always have a pre-planned, calculated set of options or if necessary escape.
- Initial training will involve the pilot responding *reactively* when experiencing the results of either their own decisions, good or bad, or the simulated experiences provided by the instructor. A measure of the trainees' progress will be the degree to which they begin *anticipating* and have pre-planned options available should their decision not be the best.

2.2 Reference Reading: GAP Booklets Mountain Flying; In, Out and Around Milford; In, Out and Around Mt Cook; In, Out and Around Queenstown; Winter Flying; Survival.

Additional references: Mountain Flying DVD; Mountain Flying Training Standards Guide

2.3 Horizon

Exercise: Maintaining a constant height and/or contour flying in areas of varying terrain (e.g. slope, surface covered by vegetation /snow) where defined horizon is lacking.

Aim: To consistently identify a usable imaginary horizon and superimpose on any background.

Technique:

- Fly a constant altitude (terrain contour line) maintaining a constant wing tip distance from the terrain.
- Develop co-ordination of elevator, aileron, rudder and power using outside reference confirming with instruments.
- Fly constant height above a descending valley floor to appreciate gradient and shifting horizon perspective.
- Fly a constant altitude above a rising valley (or terrain) to appreciate gradient and horizon effects.

Principles to experience:

- consistent nose attitude
- awareness of space and position
- appreciation of inertia
- maintenance of escape options
- legal position / right of way
- lookout technique with blind corners
- minor lift / sink where attitude is difficult to maintain
- maintenance of attitude versus altitude

- G/S versus A/S relationship
- anticipation versus reaction
- illusions created by varying slope and or gradient of terrain
- effect of ballooning out in turns and restricting options in confined space
- use of throttle in lift / sink
- wind conditions < 15 knots compared to > 15 knots
- comparison of upper winds with valley winds
- assessing wind using lift, sink, drift, tussocks, water, trees etc.
- applicability of Va (maximum manoeuvring speed)
- katabatic and anabatic conditions
- cloud patterns and resultant cues to turbulence, lift, sink, rotor, wave
- terrain texture differences i.e. bush, forest, tussock, rock, sand, snow etc.
- precipitation on screen affecting judgement
- awareness that by the time an instrument shows a change of attitude or altitude such change has been long evident by outside visual cues. VSI indications to confirm.

  Note: *Reasonable accuracy of superimposing an imaginary horizon on variable terrain may require approximately 5 hours disciplined flight experience.*

Standards:

After 5 hours:

- in calm conditions with ill-defined horizon:
  - ¼ ball
  - +/- 50'
  - smooth, co-ordinated control inputs
  - clean windscreen
- in turbulent conditions i.e.. where attitude not altitude is priority:
  - chooses most comfortable flight path
  - maintains most consistent attitude
  - consistently verbalises options available
  - maximises comfort by co-ord elevator, aileron, rudder and throttle while respecting Va

- anticipates such conditions by securing loose items before flight
- clean windscreen

2.4 Valley Turns

Exercise: Using valleys with as many variables that are available practise mainly level, but also climbing and descending turns.

Aims:

- To appreciate the safe level turn radius using different configurations in valleys with an ill-defined horizon.
- To make check turns to ensure operating space is available before valley narrows to the extent escape is compromised
- To learn appropriate positioning in both large and confined valleys
- To appreciate effects of a changing horizon perspective and reducing radius in descending turns in confined space
- To appreciate lack of performance in climbing turns with changing horizon in confined space and the need to identify best flight path to maximise space and lift to improve performance

Technique:

- Practise level 360° turns using full width of valley in cruise configuration
- Practise level 360° turns using poor visibility configuration
- In narrowing valley make check turns to evaluate turn radius and exit options with appropriate escape space available
- Compare position for flying a large valley with that of a confined valley i.e.. anywhere right of centre in large valley
- Make steep descending turns into a valley ensuring correct anticipated position for roll out
- Make efficient climbing turns from the valley to climb out of valley system or to position for saddle crossing
- From beside a vertical face (if available) experience the aircraft turning radius through 180° in both cruise and poor visibility configurations

Principles to experience:

- Establishing and maintaining level turns with ill-defined horizon in as many combinations of the following variables available:
  - steep valley walls - up to vertical
  - varying slopes in valley walls

  - varying terrain effects as background for ill-defined horizon e.g. Bush, forest, tussock, rock, snow etc.
  - varying valley floor gradient
  - deep valleys, shallow valleys
  - wind with rugged terrain compared to smoothly contoured terrain
  - calm conditions, windy conditions, turbulence
  - clear, cloudy, and precipitation conditions
  - bright sun glare behind ridges and suddenly exposed
  - deep shadow effects
  - white-out horizons
- If need to move over in a valley in order to make turn then weren't correctly positioned. Ref. Human Factors 5-7.5 seconds to respond.
- Planned entry, sufficient power to control speed, minimum AOB to minimise stall speed, use the space available
- High wing - lean forward to anticipate horizon
- Anticipation of roll out position to not compromise options available
- Steep gliding turns:
  - changing horizon perspective
  - narrowing valley
  - roll out position - never in the middle
- If airspeed decays with full power lower nose to convert height to A/S
- Awareness of higher performance aircraft effects:
  - less time
  - inertia
  - greater turn radius
  - workload
- Difference of conditions in valley lower regions compared to above valley i.e. at altitude greater wind can often be experienced with more severe turbulence. Recognising the ‘shear level’.
- Awareness of greater power requirement at MAUW especially in poor visibility configuration

<u>Standards after 5 hours</u>:

- Calm conditions:
  - +/- 50'
  - ¼ ball
  - smooth, co-ord control inputs
  - roll into appropriate AOB for valley size to use space available with no pressure
  - correct start position - max space available
  - correct finish position - options available
  - power use appropriate to maintain safe speed but not excess speed
- Turbulent conditions:
  - maximises comfort
  - maintains speed not above Va but with margin above Vs
  - ensures margins for safe turning radius and escape options
  - controls attitude without disrespecting altitude
  - anticipates circumstances of unsafe turning radius
  - keeps escape options available

2.5 Saddle Crossing

<u>Exercise</u>: To consider variables associated with any particular saddle/pass/ridge/spur and assess best compromise options for safe crossing.

<u>Aim</u>: To recognise and assess options for best approach, crossing and positioning after crossing.

<u>Technique</u>:

- Assess lift/sink sides of saddle
- Approach 45° or less to provide escape downhill, downstream with minimum AOB required
- Desirably fly left to right for best visibility
- If obstacle obstructed or in serious sink then right to left
- Choose ‘knife edge’ saddle versus an area of prolonged commitment
- Approach level Va under control
  - not in a climb – no A/S back up and poor visibility

  - not in a descent – limited Va control; anticipate turbulence.
- Use PARALLAX to assess sink and height in relation to pass
  - should see more terrain behind as approaching – therefore higher
  - less terrain - therefore lower

Principles to experience:

- benefits of early planning of approach
- left to right versus right to left:
- best option often a compromise of several variables
- best approach combined with best escape, both before and after crossing
- choice of saddle offering minimum commitment time crossing i.e.. 'knife edge' preferred with face of the saddle as flat as possible compared to concave face which requires greater angle of bank during turn away
- identify a commitment point up to which escape away is available
- use of parallax to recognise 500' clearance to cross, including height recognition/calculation technique
- retaining height after crossing in case return is necessary
- both calm conditions and conditions of lift and sink where good decision making is required and reliance on aircraft performance is not available
- wind direction relative to terrain
- anticipating terrain with potential for viable saddle option when saddle not initially visible
- where decision making is lacking, providing instructors experience, judgement and skill is not compromised, ensure pilot under training is put into reactive scenarios to improve anticipation and decisions e.g. simulating 'In significant sink, turn away now!' i.e.. Take pilot to their commitment point and then test their escape option
- making appropriate position calls for other traffic

Standards : After 5 hours:

- Chooses best approach and escape. Accurately assesses parallax and height relative to saddle. Maintains speed and attitude control throughout manoeuvre with smooth co-ordinated control inputs. Chooses best positioning after crossing to maintain options of escape or return

2.6 Route Finding

Exercise: Using real or simulated circumstances of disorientation to develop strategies for re-orienting in place and time awareness.

<u>Aims</u>:

- To recognise and experience disorientation
- To identify cues and steps for re-orienting
- To keep evaluating with an open mind and not continue to convince oneself of a false scenario

<u>Technique</u>:

- At some point during training exercises, where orientation in place and time awareness may be a challenge for the pilot under training, simulate the scenario to develop strategies for re-orientation.

<u>Principles to experience:</u>

- water only flows downhill - identify the flow direction
- small streams lead to larger flows, lakes or ocean which ultimately means roads, power lines, towns etc.
- much white water means steep gradient to valley floor
- valley alignment (compass rose)
- sun position going in, versus going out, assuming time covered is not significant
- map folding and holding to maximise peripheral vision and therefore LOOKOUT while referring to map
- high level – use peaks
- low level – use valleys

<u>Standard:</u>

- Maintains situational awareness to a degree that provides training instructor with confidence. Any disorientation is momentary and has little or no effect on flight path and flight safety.

2.7 Emergencies

<u>Exercise</u>: To experience simulated forced landings and precautionary landings in mountainous areas.

<u>Aim</u>: To practice emergencies where options may be limited, where terrain and or weather are intrusive to the ideal.

<u>Technique</u>:

- In real or simulated circumstances provide as much variety from the ideal simulated forced landing or precautionary landing as local resources permit, where the selected landing site means descent below the ridge line is required i.e. real horizon reference is unavailable.

Principles to experience:

- Lack of real horizon
- Variables:
  - height available
  - distance from options/gliding distance
  - option types e.g. strips, paddocks, clearings, beaches, sand bars, roads, etc.
  - conditions of wind, turbulence, and precipitation
  - conditions of load and performance
  - conditions of visibility including light/sun/shadow effects
- priority - make plan - confined spaces may affect
- climatic / seasonal wind effects e.g. for a calculated gamble use anabatic / katabatic?
- use of lift conditions/avoidance of sink for glide range considerations
- valley gradient
- illusions and mind sets
- need for early mayday - what frequency, consider 121.5, ELT/tracking system activation
- habitation in remote areas - look for airstrip/fertiliser bins
- consider elevation
- consider wires
- contents of survival kit and uses relative to principles of survival

Standards:

- Can safely ‘select, assess, plan and execute’ for a real or simulated precautionary landing and forced landing onto a variety of the options within the area of company operations.
- Demonstrates threat and error management, sound decision making and situational awareness minimising the risk of any emergency or of mismanagement of any emergency.
- Knows the contents and potential uses of the aircraft survival kit.

3. Specialist Applications in Mountainous Regions

Particular flight operations by their nature have a specialist application to the mountain flying principles and techniques. Such operations would be reflected in the training programme and would include, but be not limited to the following for:

3.1 Amphibian/Float Aircraft

Taxiing, sailing, docking, beaching, mooring, step taxi and turns, glassy / rough water take-offs and landings, fresh / salt water, normal take-off and landings, cross wind take-off and landings, assessment of unfamiliar landing areas, operation in confined space, pressure/density altitude effects.

3.2 Ski/Snow Operations

Snow operations rating syllabus shall include but not limited to the following:

- snow assessment, snow marking, snow types
- pressure/density altitude effects
- taxiing, parking, retrieving ski from breaking through surface, vapour locking (piston aircraft)
- take-off/landings, flat lighting, varying slopes (cross, up and down slopes)
- wind assessment, (snow drift, tail wind/head wind, ground speed)

3.3 Remote Strips

Ground briefing:

- Strip owners name, contact details, permission
- Obstructions:
    - wires
    - trees
    - buildings
    - fences
    - stock and their behaviour
    - terrain
- wind and local effects
- surface conditions including:
    - seasonal variables
    - following adverse weather conditions
    - stock effects i.e. frozen turds, rabbit holes, hollows from stock use
    - ruts
- preferred landing and take-off directions
- length, width, best path

- approx. MAUW for safe take-off
- EFATO options
- availability of ATS communications and nearest ground contact
- elevation / density altitude
- awareness of performance i.e. 2 POB verses MAUW
- slope versus wind
- one-way options

In Flight Procedures – positioning aircraft for assessing:

- wind
- surface conditions
- vector in use
- approach and overshoot variables
- obstacle clearance
- safe circuit height and direction
- use of flap on approach / take-off / turbulence
- approach speeds / profiles
- touchdown precision
- decision points:
    - missed approach
    - overshoot
    - abort / commit for take-off and landing
- use of braking
- ground handling / taxiing / turning
- illusions
- slope verses wind

4. Records

The following checklist or similar provides a guideline to the means of documenting the training programme.

4.1 Checklist

4.2 Training Log

4.3 Certification

4.4 Specialist Application Checklist

4.5 Remote Strips Check Form

4.1 Mountain Flying Training Checklist

Name: ______________________ Licence No: __________

Training carried out by: ______________________

as per operators Part 119 Exposition: ______________________

or contracted to: ______________________ under Part 141

Ground Course

Horizon definition	☐	Contour flying	☐
Wind awareness	☐	Valley position/Turns	☐
Situational awareness	☐	Saddle crossing	☐
Difficult conditions	☐	Route finding	☐
Emergencies	☐	Survival	☐

Flying Programme

Horizon definition	☐	Contour flying	☐
Dev. wind awareness	☐	Valley position/Turns	☐
Dev. situational awareness	☐	Saddle crossing	☐
Difficult conditions	☐	Routine finding	☐
Emergencies	☐	Dev. anticipation	☐

Training area: ______________________

Total time: __________ Mountain region time: __________

Mountain flying training experience time under this programme: __________

Approved aircraft types: ______________________

Instructor: __________ Signature: __________

Category: __________ Licence No: __________ Date: __________

Comments: ______________________

Recurrent or transition training

Exercise completed: ______________________

____

Aircraft type: __________ Date: __________

Instructor: __________ Licence No: __________

Signature: ______________________ Comments: ______________________

4.2 Training Log

Log of Initial Training Programme:

DATE	A/C TYPE	REG	PILOT	INSTRUCTOR	EXERCISE/AREA	TIME

Recurrent or Transition Training:

DATE	A/C TYPE	REG	PILOT	INSTRUCTOR	EXERCISE/AREA	TIME

4.3 Logbook Certification

XYZ Flying Company

MOUNTAIN FLYING

I certify that

____

has ____________________ hours Mountain Flying Training IAW AC 119-3

Instructor: ____________________ Signature: ____________________

Cat: ________ Licence No: ____________ Date: ____________

4.4 Specialist Applications Checklist

Name: ______________________ Licence No: ______________

Aircraft Type: ______________________ Registration: ______________

Checked by: ______________________ Date: ______________

Amphibian/Float:

Taxiing	☐	Glassy/Rough Landing	☐
Sailing	☐	Fresh/Salt Water	☐
Docking	☐	Normal T/O	☐
Beaching	☐	Normal Landing	☐
Mooring	☐	Crosswind T/O	☐
Step Taxi and Turns	☐	Crosswind Landing	☐
Glassy/Rough T/O	☐	Unfamiliar landing areas	☐
Confined Areas	☐		☐

Ski/Snow:

Snow Assessment	☐	Taxiing	☐
Snow Marking	☐	Parking	☐
Landings	☐	Retrieving	☐
take-off	☐		☐

NOTE: COMPETENCY IS DEFINED AS THE PILOT'S ABILITY FOLLOWING THE BRIEFING AND INFLIGHT PROCEDURES TO DEMONSTRATE CORRECT ASSESSMENT OF THE CHECK FROM ITEMS FOR A CONTINUED SAFE OPERATION.

Signature: ______________________ Licence No: ______________________

4.5 Remote Strips Check Form

Name: ____________________ Airstrip: ____________________

Licence No: ____________________ Aircraft type: __________ Registration: __________

Checked By: ____________________ Date: ____________________

NOTE: COMPETENCY IS DEFINED AS THE PILOTS ABILITY FOLLOWING THE BRIEFING AND IN-FLIGHT PROCEDURES TO DEMONSTRATE CORRECT ASSESSMENT OF THE CHECK-FORM ITEMS FOR A CONTINUED SAFE OPERATION.

GROUND BRIEFING			**IN-FLIGHT PROCEDURES**	
LAND OWNERS NAME:			AIRCRAFT POSITIONING FOR:	
OBSTRUCTIONS:	~ WIRES		~ ASSESSING WIND	
	~ TREES		~ SURFACE CONDITIONS	
	~ BUILDINGS		~ VECTOR IN USE	
	~ FENCES		~ OBSTACLES / ILLUSIONS	
	~ STOCK		SAFE CIRCUIT HEIGHT, DIRECTION	
	~ TERRAIN		USE OF FLAP ON APPROACH	
	~ OTHERS		MAINTENANCE OF APPROACH A/SPEEDS	
WIND AND LOCAL WIND EFFECTS			TOUCH DOWN	
SURFACE CONDITIONS : SEASONALLY AND AFTER ADVERSE WX CONDITIONS, STOCK EFFECTS ETC.			RECOGNITION OF MISSED APPROACH POINT	
PREFERRED LAND AND T/O DIRECTIONS			OVERSHOOT / ABORT	
LENGTH OF AIRSTRIP			BRAKING, GROUND HANDLING	
APPROX. MAUW FOR SAFE TAKE-OFF			SLOPE V WIND TAKE-OFF	
EFATO OPTIONS			USE OF FLAP ON CLIMB OUT	
AVAILABILITY OF ATS COMMS. AND NEAREST GROUND CONTACT			CLIMB OUT : OBSTACLE CLEARANCE	
ELEVATION / DENSITY ALTITUDE			**REMARKS:**	
AWARENESS OF DIFFERENCE IN AIRCRAFT PERFORMANCE BETWEEN 2 POB AND MAUW				

SIGNATURE (APPROVED PERSON): ______________________ ID: ______________________

Appendix E – Helicopter Mountain Flying Training Course

1. Helicopter Mountain Flying: General

Helicopter basic mountain flying training completed as part of CPL(H) training is only intended to introduce the pilot to the basic techniques and principles of operating a helicopter through or within mountainous terrain and is normally only conducted in benign weather conditions. Therefore, it is not necessarily sufficient to prepare a helicopter pilot to conduct all commercial operations in a mountainous environment.

Mountains are not necessarily defined as high or rugged terrain. However, it is incumbent on the operator to conduct appropriate structured theory and practical training and to provide additional experience as necessary to ensure the pilot has the level of knowledge, skill and experience required to safely conduct the type of mountain operations covered in the operator’s exposition.

The minimum knowledge and skills expected of a recently-qualified commercial pilot are contained in AC61-3 and AC61-5. The pilot should have received 10 hours of theory training and completed 10 hours flight experience in mountainous terrain, including at least 6 hours dual instruction and 2 hours solo.

Mountain operations cover a wide scope of tasks and environments so training may be conducted in stages and divided into ‘core’ advanced skills, which all commercial helicopter pilots flying in a mountainous environment should possess; and ‘specialist’ skills only required for specific situations, operations or environments.

2. Helicopter Mountain Flying Theory Course

An operator’s approved theory course should cover the following core topics:

1.0	**AIRCRAFT HANDLING**
1.1.0	**Horizon awareness**
1.2.0	**Height and altitude considerations**
2.0	**WEATHER PATTERNS AND WIND AWARENESS**
2.1.0	**Mountain weather**
2.2.0	**Wind awareness**
3.0	**TRANSIT FLYING**
3.1.0	**Pre-flight planning**
3.2.0	**Flying techniques**
4.0	**APPROACH AND LANDING TO UNPREPARED SITE**
4.1.0	**Reconnaissance**
4.2.0	**Power checks**
4.3.0	**Wind direction & demarcation line**
4.4.0	**Approach direction and angle**

4.5.0	**Committal point and escape route**
4.6.0	**Aiming point/hover or touchdown point**
4.7.0	**Typical terrain features**
4.8.0	**Main/tail rotor awareness**
5.0	**TAKE-OFF FROM UNPREPARED SITE**
5.1.0	**Power checks**
5.2.0	**Take-off and climb-out**
6.0	**EMERGENCIES**
6.1.0	**Controlled flight into terrain**
6.2.0	**Forced/Precautionary Landings**
7.0	**HUMAN FACTORS**
7.1.0	**Situational awareness**
7.2.0	**Aircraft management**
7.3.0	**Airmanship**
7.4.0	**Aviation medicine**
7.5.0	**SAR aspects**

An example syllabus for a course covering the above topics is included at Annex 1.

3. Helicopter Mountain Flying Practical Training Course

An operator's approved practical training course should cover the following topics:

1.0	**AIRCRAFT HANDLING**
2.0	**WEATHER PATTERNS AND WIND AWARENESS**
3.0	**TRANSIT FLYING**
4.0	**APPROACH AND LANDING TO UNPREPARED SITE**
5.0	**TAKE-OFF FROM UNPREPARED SITE**
6.0	**EMERGENCIES**
7.0	**HUMAN FACTORS**

An example syllabus for a practical training course covering the above topics is included at Annex 2. Sufficient dual and pilot-command hours should be flown for the pilot to achieve competence in all areas.

4. Training for Specialist Applications in Mountainous Regions

An operator's approved specialist training should cover the following topics as applicable for the operations outlined in the operator's exposition.

7.0	**ADVANCED OPERATIONS**
7.1.0	**High altitude considerations (above ~ 5,000ft)**
7.2.0	**Snow/ice conditions**
7.3.0	**Applied (non-agricultural) operations**

Example theory and practical syllabi for a course covering the above topics is included at Annex 3.

5. Records

The following checklist or similar provides a guideline to the means of documenting the training programme:

5.1 Core Competency Checklist
5.2 Training Log
5.3 Logbook Certification
5.4 Specialist Applications Checklist

5.1 Mountain Flying Core Competency Checklist

Name: ______________________ Licence No: ______________

Training carried out by: ______________________

as per operators Part 119 Exposition: ______________________

or contracted to: ______________________ under Part 141

Ground Course

Aircraft handling	☐	Take-off from unprepared site	☐
Weather patterns and wind awareness	☐	Emergencies	☐
Transit flying	☐	Human factors	☐
Approach and landing to unprepared site	☐		

Flying Programme

Aircraft handling	☐	Take-off from unprepared site	☐
Weather patterns and wind awareness	☐	Emergencies	☐
Transit flying	☐	Human factors	☐
Approach and landing to unprepared site	☐		

Training area: ______________________

Total time: ______________ Mountain region time: ______________

Mountain flying training experience time under this programme: ______________

Approved helicopter types: ______________________

Instructor: ______________ Signature: ______________

Category: ____________ Licence No: ____________ Date: ____________

Comments: ______________________

Recurrent or transition training

Exercise completed: ______________________

Aircraft type: ______________ Date: ______________

Instructor: ______________ Licence No: ______________

Signature: ______________ Comments: ______________

5.2 Training Log

Log of Initial Training Programme:

DATE	A/C TYPE	REG	PILOT	INSTRUCTOR	EXERCISE/AREA	TIME

Recurrent or Transition Training:

DATE	A/C TYPE	REG	PILOT	INSTRUCTOR	EXERCISE/AREA	TIME

5.3 Logbook Certification

XYZ Flying Company

MOUNTAIN FLYING

I certify that

____

has __________________ hours Mountain Flying Training IAW AC 119-3

Instructor: __________________ Signature: __________________

Cat: _______ Licence No: ____________ Date: ____________

5.4 Specialist Applications Checklist

Name: ____________________ Licence No: ____________________

Aircraft Type: ____________________ Registration: ____________________

Checked by: ____________________ Date: ____________________

THEORY

High Altitude Considerations:

Wind conditions	☐	Density altitude	☐
		Specific aircraft performance HIGE/HOGE	☐

Snow/Ice Conditions:

Hazardous lighting	☐	Landing hazards	☐
Falling snow in flight	☐	Take-off hazards	☐
Cues to judge slope and surface	☐	Visual illusions	☐
Surface definition	☐		

Applied Operations

External loads	☐	Night flight	☐
Low speed/low height	☐	Other	☐

PRACTICAL

Advanced Operations:

Approaches	☐	Snow	☐
Take-offs	☐	Bone fide <500’	☐
High altitude	☐	Applied ops	☐

NOTE: COMPETENCY IS DEFINED AS THE PILOT’S ABILITY FOLLOWING THE BRIEFING AND INFLIGHT PROCEDURES TO DEMONSTRATE CORRECT ASSESSMENT OF THE CHECK FROM ITEMS FOR A CONTINUED SAFE OPERATION.

Signature: ____________________ Licence No: ____________________

Annex 1 - Helicopter Mountain Flying Theory Course Syllabus

1.0	**AIRCRAFT HANDLING**
1.1.0	**Horizon awareness**
1.1.2	Outline the illusions associated with inaccurate horizon definition
1.2.0	**Height and altitude considerations**
1.2.1	State the visual cues used for lateral and vertical clearances
1.2.2	Outline how a barometric altimeter is used to gauge height above terrain
1.2.3	Describe the effect of density altitude on the following aspects of performance:
2.0	**WEATHER PATTERNS AND WIND AWARENESS**
2.1.0	**Mountain weather**
2.1.1	Evaluate the general weather situation and pressure systems in terms of likely mountain weather
2.1.2	Outline typical seasonal differences in mountain weather
2.1.3	Describe how to recognise mountain waves and rotor zones and the hazards they pose
2.1.4	Describe the likely flying conditions associated with various cloud types
2.1.5	Outline the rapidity of weather changes, including the importance of those behind the aircraft
2.1.6	State how free air & surface temperature vary with altitude
2.1.7	State the environmental factors that influence visibility plus the effect of precipitation on windscreen
2.2.0	**Wind awareness**
2.2.1	Describe, in fluid terms, the flow of air that is obstructed by terrain
2.2.2	Describe the difference between wind over flat land and in the mountains
2.2.3	Outline the formation and characteristics of local winds, including katabatic and anabatic winds
2.2.4	Describe updraughts, down draughts, funnelling, mechanical/thermal turbulence, gusts and turbulence, rotors and lee waves
2.2.5	Describe the behaviour of wind at less than ~15kts and above 15kts
2.2.6	Define the demarcation line
2.2.7	Outline the following methods of wind-finding:
a	cloud shadows as indicators of upper winds
b	indicators of lower-level wind, e.g.:
	(1) smoke/dust/precipitation

	(2) drift and groundspeed/airspeed correlation
	(3) updraughts and downdraughts
	(4) cloud/mist formation
	(5) movement of vegetation
	(6) water ripples/lanes/shadows on bodies of water
	(7) rotor wash/blowing snow
3.0	**TRANSIT FLYING**
3.1.0	**Pre-flight planning**
3.1.2	Select an appropriate route and height, taking into account:
a	VFR minima
b	terrain & map interpretation
c	wind, turbulence etc
d	cloud base
e	sun/shadow
f	power available
g	forced landing areas
h	wires
i	radio coverage
j	alternate/escape routes
k	legal requirements (incl. the minimum height/lateral separation specified in CAR 91.311)
3.2.0	**Flying techniques**
3.2.1	Describe valley flying techniques for:
a	entering & manoeuvring in a wide valley
b	selecting where in valley, and how far up the side, to fly
c	anticipating the effect of sudden shadow / sun effects
d	flying up a valley compared to flying down a valley
e	entering a narrow valley/re-entrant/gully
f	flying at reduced airspeed, with particular attention to translational lift and turning downwind
g	making reversal turns, including the use of valley width and the effect of airspeed and wind on radius of a balanced turn; the benefits and dangers of using yaw/pitch

3.2.2	Describe techniques for maintaining orientation:
a	how to maintain situational awareness: map reading, sun, valley alignment, compass. Note the limitations of GNSS
b	using a kneeboard and map. Map folding
c	lost procedure: escape route downstream
3.2.3	Describe saddle/ridge crossing techniques:
a	the variables determining how to cross, and the relative importance of each.
b	assessing up and down draughts
c	safest approach direction and escape route
d	difference between a knife edge saddle and a prolonged commitment area saddle
e	aircraft attitude and altitude at saddle/ridge
f	anticipation of turbulence
g	estimating a safe height to cross by appropriate use of parallax and horizon
h	effect of different backgrounds
3.2.4	State the importance of prompt and effective decision making for crossing saddles/ridges, including the consideration of the following factors:
a	identify and consider all options
b	select the best approach direction
c	select and review a fixed committal point
d	identify a safe escape route
e	consider the helicopter position and options after crossing
4.0	**APPROACH AND LANDING TO UNPREPARED SITE**
4.1.0	**Reconnaissance**
4.1.1	State how permission to land/approach is obtained
4.2.0	**Power checks**
4.2.1	Use flight manual/supplements/performance graphs & tables to accurately determine power requirements
4.3.0	**Wind direction & demarcation line**
4.3.1	Illustrate the general wind flow and local disturbances over a mountain feature and identify the demarcation line
4.3.2	Illustrate the wind flow in very light (≤ 3kt) conditions
4.4.0	**Approach direction and angle**

4.4.1	State the benefits of remaining above the demarcation line
4.4.2	Describe how a constant angle/straight-in approach should be flown
4.4.3	Describe when a curved/offset/climbing approach may be required and how the approach may be flown
4.5.0	**Committal point and escape route**
4.5.1	Describe the points to consider before commencing an approach
4.5.2	State how translational lift can be differentiated from turbulence
4.6.0	**Aiming point/hover or touchdown point**
4.6.1	State the need to positively identify the point
4.6.2	State the factors to be considered in assessing suitability of the point
4.7.0	**Typical terrain features**
4.7.1	Describe the following typical terrain features and associated considerations:
a	river flat, open ground above the tree line
b	rounded knoll/crown
c	sharp peak/pinnacle
d	plateau
e	rounded ridge, razorback, saddle
f	spur/ledge
g	col/bowl/basin
h	valley/creek bed (with consideration of rocks, boulders, sand etc)
4.8.0	**Main/tail rotor awareness**
4.8.1	Describe the techniques for landing on uneven ground and considerations for clearances
4.8.2	State when hover-loading or an out-of wind landing may be required
4.8.3	State the dangers involved in backing up
4.8.4	Describe how tail rotor effectiveness can be lost at high density altitude
5.0	**TAKE-OFF FROM UNPREPARED SITE**
5.1.0	**Power checks**
5.1.1	Use flight manual/supplements/performance graphs & tables to accurately determine power requirements
5.1.2	State why sufficient power should normally be available to conduct at least a shallow towering take-off from any unprepared site in the mountains.
5.1.3	State the requirement to maintain RRPM within the normal operating range.

5.1.4	State the requirement to check hover power available
5.2.0	**Take-off and climb-out**
5.2.1	Describe how to safely lift from rough terrain into the hover
5.2.2	Describe the standard take-off technique; including take-off direction with respect to wind, when to transition forward, the height to climb to or when a descent may be initiated, and the climb-out path to follow
5.2.3	Outline the limited circumstances when a cushion-creep or running take-off are safe and necessary options
5.2.4	Outline tail rotor considerations
5.2.5	Describe when an offset/circling take-off may be required and how it may be flown
6.0	**EMERGENCIES**
6.1.0	**Controlled flight into terrain**
6.1.1	Outline the consequences of poor decision making, resulting in reaction instead of anticipation
6.1.2	Describe how to recover from sink/overpitching/settling with power
6.1.3	Describe how to recover from the loss of visual reference or entry into inadvertent IMC
6.2.0	**Forced/Precautionary Landings**
6.2.1	Describe the actions to be taken in the event of a complete engine failure or catastrophic failure requiring immediate landing:
a	immediate actions
	(1) lower collective, or as required by flight manual
	(2) effect of altitude on: collective position; RRPM; ROD
b	know the (often limited) options, including:
	(1) wind direction/strength/turbulence
	(2) possibility that no open flat ground is available
	(3) landing on valley floor versus ridgeline
	(4) landing upslope/downslope
	(5) type of engine-off landing
	(6) autorotation distance
c	have a plan
6.2.2	Describe the actions to be taken in the event of a partial engine failure or other helicopter or weather emergencies requiring landing as soon as possible including: Loss of Tail Rotor Effectiveness, low or high RRPM, low G, exceeding Vne
a	immediate actions

b	know the options
c	have a plan
7.0	**HUMAN FACTORS**
7.1.0	**Situational awareness**
7.1.1	Describe the importance of correct orientation and how to maintain it
7.1.2	Outline the impact of the scale of the landscape and clear visibility on estimating heights and distances
7.1.3	Describe the psychological stresses of operating in the mountains, particularly for inexperienced pilots
7.2.0	**Aircraft management**
7.2.1	Outline the additional factors required in fuel planning
7.2.2.	Detail the factors that lead to airframe/engine icing and how to avoid or minimise them
7.3.0	**Airmanship**
7.3.1	Explain the need for positive action rather than reaction to events
7.3.2	Explain the need for, and techniques of, effective decision-making
7.3.3	Outline the need to apply fundamental principles: aviate- navigate –communicate
7.3.4	Outline radio communications/flight follow considerations
7.3.5	Outline multi-crew considerations
7.3.6	Outline the requirements to ensure the care, comfort and safety of passengers
7.4.0	**Aviation medicine**
7.4.1	Outline the physiological effects relating to pressure & temperature
7.4.2	Outline the causes and effects of hypoxia/anxiety/load-shedding
7.4.3	Outline the effect of glare on effective vision
7.4.4	Describe the type of clothing/footwear that should be worn
7.5.0	**SAR aspects**
7.5.1	Outline typical aircraft and personal survival kits, their use and contents with respect to basic principles of survival, the area of operations and the likely time before pickup
7.5.2	Outline the principles of survival: First Aid, Protection, Location, Water, Food, Will to Survive

Annex 2- Helicopter Mountain Flying Practical Training Course Syllabus

1.0	**AIRCRAFT HANDLING**
1.1	Fly at constant height above a contour line for:
	horizon identification & to maintain appropriate disc/nose attitude
	maintaining constant altitude
	awareness of lateral and vertical distance from terrain
	appreciation of inertia
	appreciation of available escape routes
1.2	Estimate height by visual means, use of barometric or radio altimeters
2.0	**WEATHER PATTERNS AND WIND AWARENESS**
2.1	Recognise up and down draughts and areas of likely turbulence
2.2	Estimate wind strength and direction using visual indicators
2.3	Estimate wind strength and direction using groundspeed/airspeed correlation
3.0	**TRANSIT FLYING**
3.1	Fly at an appropriate height for the conditions
3.2	Select and fly an appropriate route/position for wind or weather conditions etc
3.3	Fly in a confined valley
3.4	Cross a ridge/saddle
4.0	**APPROACH AND LANDING TO UNPREPARED SITE**
4.1	Carry out a reconnaissance and power check
4.2	Accurately determine the surface wind
4.3	Experience flight ahead of and behind demarcation line
4.5	Conduct a straight-in constant angle (‘gun barrel’) approach
4.6	Execute an overshoot to the pre-planned escape route
5.0	**TAKE-OFF FROM UNPREPARED SITE**
5.1	Calculate power required and check power available in hover
5.2	Conduct a towering take-off directly into wind
6.0	**EMERGENCIES**
6.1	Enter and sustain an autorotation from high altitude, recovering as required
6.2	Experience LTE and low RRPM and recovery from both

7.0	**HUMAN FACTORS**
7.1	Maintain situational awareness
7.2	Demonstrate good aircraft management
7.3	Demonstrate good airmanship
7.4	Carry a personal first aid and survival kit

Annex 3- Helicopter Mountain Flying (Specialist Applications) Training Course Syllabus

Theory Element

8.0	ADVANCED OPERATIONS
8.1.0	**High altitude considerations (above ~ 5,000ft)**
8.1.1	Explain how wind conditions and terrain change with increasing altitude
8.1.2	Describe the effects of increased density altitude on engine and airframe performance
8.2.0	**Snow/ice conditions**
8.2.1	Describe hazardous lighting conditions, including: flat light, overcast, bright sunlight, sun and shadow, white out, ‘bright out’
8.2.2	Describe the effects of falling snow on flight
8.2.3	Describe cues used to judge slope and surface
8.2.4	Define surface definition and describe the associated hazards
8.2.5	Describe landing hazards, including: breaking through crust, hidden obstacles, landing on powder, close to cornice, skid spreading, freezing to surface
8.2.6	Describe take-off hazards, including blown snow
8.2.7	Describe the weather, terrain and snow conditions that pose a danger of avalanches
8.2.8	Describe common visual illusions associated with snow conditions
8.3.0	**Applied (non-agricultural) operations**
8.3.1	Explain the additional factors to be considered when carrying external loads
8.3.2	Explain the challenges and techniques required for safe flight at low speed and low height AGL
8.3.3	Explain the challenges and techniques required for safe flight at night: unaided and using ANV
8.3.4	Explain other specialised tasks as required

Practical Element

8.0	ADVANCED OPERATIONS
8.1	Conduct advanced approaches and take-offs (different types & to/from demanding terrain features)
8.2	Conduct high altitude operations
8.3	Conduct snow operations
8.4	Fly at heights below 500' for bona fide purposes
8.5	Conduct applied operations