

Revision 5

## Pilot Licences and Ratings—Agricultural Ratings

15 August 2016

### General

Civil Aviation Authority advisory circulars contain guidance and information about standards, practices, and procedures that the Director has found to be an **acceptable means of compliance** with the associated rules and legislation.

However the information in the advisory circular does not replace the requirement for participants to comply with their own obligations under the Civil Aviation rules, the Civil Aviation Act 1990 and other legislation.

An advisory circular reflects the Director's view on the rules and legislation. It expresses CAA policy on the relevant matter. It is not intended to be definitive. 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 advisory circular. Should there be any inconsistency between this information and the rules or legislation, the rules and legislation take precedence.

An advisory circular may also include **guidance material** generally, including guidance on best practice as well as guidance to facilitate compliance with the rule requirements. However, guidance material must not be regarded as an acceptable means of compliance.

An advisory circular may also include technical information that is relevant to the standards or requirements.

### Purpose

The advisory circular provides information on the training syllabus content that is acceptable to the Director for meeting the Civil Aviation Rule requirements for the issue of an agricultural rating.

### Related Rules

This advisory circular relates specifically to Civil Aviation Rule Part 61 Subpart O—Agricultural Ratings.

### Change Notice

Revision 5 provides ground and flight training syllabi for the agricultural rating and the associated specialist fields of topdressing, spraying and vertebrate toxic agent (VTA) distribution.

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It also discusses the agricultural pilot rating flight tests and annual competency demonstration.

## Table of Contents

<b>Rule 61.701 Eligibility Requirements .....</b>	<b>5</b>
Grade 2 Aeroplane or Helicopter.....	5
Grade 1 Aeroplane or Helicopter.....	5
<b>Rule 61.703 Issue .....</b>	<b>6</b>
Logbook Endorsement .....	6
<b>Rule 61.707 Currency Requirements .....</b>	<b>6</b>
<b>Rule 61.709 Transitional Arrangements .....</b>	<b>6</b>
<b>Specialisation Ratings.....</b>	<b>7</b>
Aerial Topdressing Rating .....	7
Aerial Spraying Rating.....	7
Aerial VTA Rating.....	8
<b>Appendix I—Training for Grade 2 Agricultural Rating—Aeroplane.....</b>	<b>9</b>
<i>General</i> .....	9
Type Conversion and Familiarisation .....	9
Intermediate Training.....	10
Agricultural Pilot Role Training .....	11
<b>Appendix II—Training for Aerial Topdressing Rating—Aeroplane.....</b>	<b>12</b>
Ground Course Instruction .....	12
Flight Instruction Course.....	15
Flight Time .....	15
Supervision .....	15
<b>Appendix III—Training for Aerial Spraying Rating—Aeroplane.....</b>	<b>17</b>
Ground Course Instruction .....	17
Flight Instruction Course.....	21
Flight Time .....	22
Supervision .....	22
<b>Appendix IV—Training for Aerial VTA Rating—Aeroplane.....</b>	<b>23</b>
Ground Course Instruction .....	23
Flight Instruction Course.....	26
Flight Time .....	27
Supervision .....	27
<b>Appendix V—Training for Grade 2 Agricultural Rating—Helicopter .....</b>	<b>28</b>
<i>General</i> .....	28
Type Conversion and Familiarisation .....	28
Intermediate Training.....	29
Agricultural Pilot Role Training .....	30
<b>Appendix VI—Training for Aerial Topdressing Rating—Helicopter .....</b>	<b>31</b>
Ground Course Instruction .....	31
Flight Instruction Course.....	33
Flight Time .....	34
Supervision .....	34
<b>Appendix VII—Training for Aerial Spraying Rating—Helicopter .....</b>	<b>35</b>
Ground Course Instruction .....	35
Flight Instruction Course.....	38
Flight Time .....	39
Supervision .....	39
<b>Appendix VIII—Training for Aerial VTA rating—Helicopter .....</b>	<b>40</b>
Ground Course Instruction .....	40
Flight Instruction Course.....	43
Flight Time .....	44
Supervision .....	44
<b>Appendix IX—Flight Test Requirements for Issue and Annual     Competency Demonstrations.....</b>	<b>45</b>

Initial Issue of Ratings .....	45
Transitional Issue of Ratings .....	46
Rule 61.707 Currency Requirements .....	46
Aircraft Selection Criteria.....	47

## Rule 61.701 Eligibility Requirements

### Grade 2 Aeroplane or Helicopter

**Rule 61.701(a)(2)** requires that before commencing training for a Grade 2 agricultural rating a pilot is required to have at least 200 hours of flight time as a pilot which must include at least 100 hours as pilot in command in the appropriate category of aircraft.

**Rule 61.701(a)(3)** requires an applicant for a Grade 2 agricultural rating to have completed a course of ground agricultural training and a course of agricultural flight training conducted by a category E flight instructor.

Details of the syllabus contents of the ground and flight training courses for aeroplanes are set out in Appendix I of this advisory circular.

Details of the syllabus contents of the ground and flight training courses for helicopters are set out in Appendix V of this advisory circular.

CAA recommends as part of the ground course instruction an applicant should undergo a minimum period of at least 6 months loading experience with an operator in the applicable specialisations being sought with the agricultural rating.

**Rule 61.701a)(6)** requires the pilot to hold a Chemical Rating. This rating must be current for agricultural rating issue and prior to any solo flight training.

**Rule 61.701(a)(7)** requires that once the intermediate phase of the training has been satisfactorily completed, a training course conducted by a suitably qualified category E flight instructor, in one or more of the following specialisations is required:

- (a) aerial topdressing; or
- (b) aerial spraying.

An applicant may complete the training required for either a topdressing rating or an aerial spraying rating or both as part of the agricultural (prime) rating training.

Aerial VTA rating training may not be conducted as part of the agricultural (prime) rating training. An applicant for an aerial VTA rating is expected to hold a Grade 2 agricultural rating with an aerial topdressing rating and should have at least 500 hours of recent aerial topdressing experience prior to commencing VTA training.

The syllabus of training required for each specialisation (topdressing, spraying and/or VTA) are detailed in the appropriate Appendix to this advisory circular – refer to the contents index Page 2.

**Rule 61.701(c)** requires that agricultural training and competency demonstrations are carried out under the authority of a Part 137 or 141 organisation that has been authorised to conduct the appropriate training and/or competency assessments.

### Grade 1 Aeroplane or Helicopter

**Rule 61.701(b)(2)** requires at least 1000 hours productive flight time experience dispensing agricultural chemicals or other substances directly affecting agriculture, horticulture or forest preservation, including a minimum of 200 hours as pilot-in-command of the appropriate category of aircraft for the issue of a Grade 1 agricultural rating.

**Rule 61.701(b)(3)** requires a demonstration of competency for Grade 1 issue and rule 61.701(c) requires this demonstration to be conducted under an authorised Part 137 or 141 organisation.

## Rule 61.703 Issue

### Logbook Endorsement

**Rule 61.703(a)** states the requirements for the issue of an agricultural rating. The flight examiner must be satisfied that the eligibility requirements of rule 61.701 have been met before conducting the agricultural rating issue competency demonstration.

Following successful completion of the competency demonstration, the applicant's logbook must be endorsed in accordance with rule 61.703(a)(2).

**Rule 61.703(c)** requires the agricultural rating (Grade 2 or 1) to be issued by the Director by endorsing the holder's licence, before the privileges may be exercised. CAA form 24061/01 is used for this purpose ( <http://www.caa.govt.nz/Forms/24061-01.pdf> ).

## Rule 61.707 Currency Requirements

**Rule 61.707(a)** details the currency requirements of an agricultural rating which may be conducted by an authorised category E flight instructor or agricultural flight examiner.

**Rule 61.707(b)** permits this demonstration to be completed up to 60 days before the expiry date.

**Rule 61.707(ba)** requires a copy of the appropriate competency demonstration to be submitted to the Director. Use CAA form <http://www.caa.govt.nz/Forms/24137-04.pdf> (aeroplane) or <http://www.caa.govt.nz/Forms/24137-05.pdf> (helicopter) as applicable.

**Rule 61.707(d)** requires that the holder's pilot chemical rating is current at all times when exercising the privileges of an agricultural rating.

## Rule 61.709 Transitional Arrangements

**Rule 61.709(a) and (b)** provide for current agricultural ratings issued prior to 15 April 2016 to be reissued and endorsed on the holder's licence on completion of an annual competency demonstration.

CAA form <http://www.caa.govt.nz/Forms/24061-01.pdf> should be used for this purpose.

**Note:** a fit and proper declaration is not required—

- a copy of the annual competency demonstration flight test report (including the appropriate specialisations, topdressing, spraying and/or VTA as applicable) must be attached
- evidence of the current chemical rating must be attached
- there is no additional charge for the chemical rating or any specialisation (topdressing, spraying, VTA) endorsed on the licence at the time of agricultural rating issue.

## Specialisation Ratings

### Aerial Topdressing Rating

#### Minimum qualification

To be eligible for an aerial topdressing rating a pilot must hold at least a current Grade 2 agricultural rating for the appropriate category of aircraft, a current pilot chemical rating and have satisfactorily completed an approved training course that includes both ground training and flight instruction in aerial topdressing operations conducted by a category E flight instructor in the appropriate category of aircraft. This rating may be issued as part of the agricultural (prime) rating.

The syllabus for the aerial topdressing rating aeroplane is in Appendix II.

The syllabus for the aerial topdressing rating helicopter is in Appendix VI.

#### Demonstration of competence

The pilot must demonstrate competence in aerial topdressing operations to the holder of an Category E flight instructor rating or the holder of an agricultural flight examiner rating.

#### Issue

If the flight instructor or flight examiner who conducted the competency demonstration is satisfied that the eligibility requirements have been met, the flight instructor or flight examiner may issue the aerial topdressing rating by endorsing the pilot's logbook in accordance with rule 61.713.

A pilot logbook endorsement only is required for the issue of an aerial topdressing rating; however the holder of the rating may apply to the Director using form CAA 24061/04 to have the rating endorsed on the holder's pilot licence ( <http://www.caa.govt.nz/Forms/24061-04.pdf> ).

### Aerial Spraying Rating

#### Minimum qualification

To be eligible for an aerial spraying rating a pilot must hold at least a current Grade 2 agricultural rating for the appropriate category of aircraft, hold a current pilot chemical rating and have satisfactorily completed an approved training course in both ground training and flight instruction in aerial spraying operations conducted by a Category E flight instructor in the appropriate category of aircraft. The rating may be issued as part of the agricultural (prime) rating.

The syllabus for the aerial spraying rating aeroplane is in Appendix III to this advisory circular.

The syllabus for the aerial spraying rating helicopter is in Appendix VII to this advisory circular.

#### Demonstration of competence

The pilot must demonstrate competence in aerial spraying operations to the holder of a Category E flight instructor rating or the holder of an agricultural flight examiner rating.

#### Issue

If the flight instructor or flight examiner who conducted the competency demonstration is satisfied that the eligibility requirements have been met, the flight instructor or flight examiner may issue the aerial spraying rating by endorsing pilot's logbook in accordance with rule 61.723.

A pilot logbook endorsement only is required for the issue of an aerial spraying rating; however the holder of the rating may apply to the Director using form CAA 24061/04 to have the rating endorsed on the holder's pilot licence ( <http://www.caa.govt.nz/Forms/24061-04.pdf> ).

## **Aerial VTA Rating**

### **Minimum qualification**

To be eligible for an aerial VTA rating a pilot must hold at least a current Grade 2 agricultural rating for the appropriate category of aircraft, hold a current pilot chemical rating and have satisfactorily completed an approved training course in both ground training and flight instruction in aerial VTA operations conducted by a Category E flight instructor in the appropriate category of aircraft.

A pilot wishing to train for an aerial VTA rating is expected to hold an aerial topdressing rating and have at least 500 hours of recent aerial topdressing experience in the same category of aircraft before commencing VTA training.

### **Demonstration of competence**

The pilot must demonstrate competence in aerial VTA operations to a holder of a Category E flight instructor rating or an agricultural flight examiner rating.

### **Issue**

If the flight instructor or flight examiner who conducted the competency demonstration is satisfied that the eligibility requirements have been met, the flight instructor or flight examiner may issue the aerial VTA rating by endorsing pilot's logbook in accordance with rule 61.733.

A pilot logbook endorsement only is required for the issue of an aerial VTA rating; however the holder of the rating may apply to the Director using form CAA 24061/04 to have the rating endorsed on the holder's pilot licence (<http://www.caa.govt.nz/Forms/24061-04.pdf>).



## Appendix I—Training for Grade 2 Agricultural Rating—Aeroplane

### **General**

The holder of an appropriate current Category E flight instructor rating who also holds an appropriate current agricultural pilot rating, is to conduct all dual training and authorise flights where the student acts as pilot-in-command.

The training will be divided into three stages—

- (i) type conversion and familiarisation
- (ii) intermediate training
- (iii) agricultural pilot (role) training.

### **Type Conversion and Familiarisation**

Type conversion onto the type or types of aircraft to be used in the approved course of training (if the type rating(s) are not already held) should be completed and the type rating(s) issued in accordance with advisory circular AC61-10. The purpose of this training is to ensure that the pilot under instruction is type rated on and familiar with the appropriate aircraft type before beginning the agricultural flying training.

### **Ground Course Instruction**

#### ***Study of aircraft handbook and flight manual***

- Relevant aircraft documentation
- Normal procedures
- Emergency procedures
- Flight limitations & placards
- Aircraft performance
- Weight & balance considerations
- Safety equipment
- Aircraft pre-flight inspection and pilot maintenance with emphasis and considerations given to the agricultural operational role
- Fuel, oil and electrical systems
- Hopper and jettison (dump) systems

#### ***Aircraft systems***

- Review of applicable flight manual sections
- Introduction to GPS guidance systems
- Operation of electronic tracking system

***Flight Instruction Course***

- Pre-flight inspection
- Engine start and warm up
- Before take-off checks
- Take-off and climb
- Climbing and steep turns
- Approach to stall (various configurations)
- Normal approach and landings
- Forced landings
- Approach, rejected landing and overshoot
- Stopping engine, parking and picketing

**Flight Time**

**Dual controlled agricultural aeroplane** – not less than: 1 hour dual, 1 hour solo; or

**Single seat agricultural aeroplane** – not less than: 1 hour dual in an equivalent training aeroplane and 2 hours solo in the agricultural aeroplane.

**Intermediate Training**

This period of pure flying instruction and solo practice is intended to bridge the gap between the commercial pilot licence standard and the standard required of the pilot prior to beginning role training.

**Ground Course Instruction**

Low level operations over various types of terrain and techniques associated with low level flying and contour flying.

- Effect of wind
- Mechanical turbulence and minimising the effects of mechanical turbulence
- Contour flying
- Obstructions to navigation e.g. spars
- Wires – avoidance and identification techniques
- Glare and sun angle
- People, stock, third parties, machinery and buildings
- Effect of flap in turns
- Problems associated with low level operations over various types of terrain
- Techniques associated with low level circuits and landings

**Flight Instruction Course**

- Steep turns, stalling in steep turns, maximum rate turns
- Basic low flying
- Take-off into wind, 500 – 300 foot circuit landings and touch-and-go
- Low flying, including steep turns, effect of wind and effect of flap
- Constant and minimum radius turns
- Mountain flying techniques
- Circuits, 300 foot & 100 foot, cross-wind and downwind touch-and-go
- Low level dumbbell circuits – crosswind, into wind and downwind take-offs and landings
- Low flying, over differing terrain at maximum take-off weight MCTOW (normal category)

**Flight Time**

This must not be less than 20 hours of which 7 hours must be dual.

The intermediate training phase must be completed before commencing agricultural pilot role training.

**Agricultural Pilot Role Training**

The agricultural pilot role training criteria is described in the applicable aerial topdressing or aerial spraying rating syllabus contained in Appendix II or Appendix III to this advisory circular.

The intent of the role training is to give overall quality training by ensuring the trainee is exposed to as many variables and hazards as possible in the agricultural environment.

## **Appendix II—Training for Aerial Topdressing Rating—Aeroplane**

### **Ground Course Instruction**

#### **References**

- The Study of Civil Aviation Rules and Advisory Circulars
- HSNO Act & Regulations
- New Zealand Standard NZS 8409:2004 Management of Agrichemical Users Code of Practice
- Safety Guideline for Farm Airstrips and Associated Fertiliser Cartage, Storage and Application Booklet
- Approved Code of Practice for prevention of sulphur fires and explosions
- Health and Safety and Employment Act
- Resource Management Act
- Local Authority District and Regional Plans
- Any other requirements applicable to agricultural aviation.

#### **Theoretical aspects of agricultural aviation involving**

- Fatigue Risk Management
- Human Factors
  - Culture
  - Attitude
  - Awareness
  - Health
  - Information processing
  - Spatial disorientation and illusions
  - Threat & Error Management.

**Flight to and landing at operational airstrips**

- Low level map reading
- Airstrip identification
- Inspection of airstrip from the air – obstructions, wires, livestock, fences, assessing wind strength and direction etc.
- Approach to airstrip (assessing decision/overshoot point) and landing
- Airstrip and loading area assessment post landing
- Effect of surface conditions (soft ground, grass, dew, frost, thaw etc.) slope and wind direction.

**Operational planning**

- Briefing of and aerial inspection of work area, hazards, wires, aerials etc.
- Boundary recognition
- Sowing plan – sowing run direction, race track etc.
- Use of GPS, mapping and job planning
- Effect of sun glare and turbulence
- Fuel management
- Operation of loading area
- Positioning of aircraft for loading
- Briefing loader driver – selection of loads, signals to driver, emergency procedures

**Flight between airstrip and sowing area**

- Selection of appropriate altitude
- Take off and cruise – engine failure
- Flying parallel to high ground – turbulence
- Flying up and down slopes – up and down draughts
- Flight into valleys and across ridges – false/no horizon and turbulence

**Application techniques**

- Operational planning – shape, terrain, obstacles, sun, wind, maintaining situational awareness
- Application – types of products/material to be sown, flow ability characteristics (lime etc.), product flammability (sulphur mixes etc.)
- Application - rates and techniques - formulae for calculating swath widths and application rates, airspeed versus swath widths, height and meteorological aspects affecting drift
- Application of Appendix B (Overload Weight Determination) to Part 137

- Use of GPS - operational tracking
- Manual selection (without GPS) of and keeping straight on markers - estimating swath width and drift
- Procedure turns – use of flap and power
- Operation of hopper controls
- Operation and effect of jettison (dump) – correct time to jettison (dump)
- Aircraft performance - effect on C of G with changing load- trim usage, aircraft control and performance, maximum manoeuvring speed limitations with role equipment attached (spreaders etc.)
- Complete treatment of area – clean up runs with reassessment of obstacles/hazards
- Emergency procedures/engine failure

**Environmental responsibilities**

- Establishing correct application area, buffer/exclusion zones and correct application rates
- Physical environment e.g. water bodies and other sensitive areas.
- Confining product within boundary's and maintaining buffer zone clearances
- Third Party Risk – application of Appendix A to Part 137
- Livestock & wildlife
- Accepting & declining tasks

**Aircraft & role equipment handling & care**

- Cleaning windscreen
- Care of aircraft – cleaning of airframe including underside, flaps, tail plane and elevator
- Early morning icing & fogging
- Serviceability of engine & instruments
- Fuel policy - refuelling, hot refuelling
- Inspecting, installing & removing role equipment
- Maintenance of role equipment
- Pilot maintenance
- Daily pre-flight before first flight of day including role equipment and regularly throughout the day
- Overdue/accident procedures
- Review of company procedures

## Record keeping

- Daily flight/work records and pilot logbook
- Aircraft tech logs
- Pilot maintenance records
- Defect recording & rectification
- Occurrence, incident and hazard identification

## Flight Instruction Course

- Inspection of airstrip from the air, planning approach and landing/take-off
- Appreciation of decision/overshoot point
- Operations on loading area and airstrip, selection of loads, communication (VHF and signals) with driver, actions in the event of an emergency/response plan
- Take-off decision point – jettison (dump)
- Briefing of work area, boundary inspections, planning of work – terrain, wind speed and direction, obstacle and hazard considerations, GPS mapping etc.
- Fuel management, timing discussed with driver
- Simulated topdressing/spraying runs, including drill procedures for each stage of the flight/sortie, block planning and application methods (race tracking etc.)
- Procedure turns
- GPS operation & techniques
- Demonstration of no horizon/false horizon flying

## Flight Time

**No rating held** - the flight time must not be less than 20 hours dual in an agricultural aeroplane and 40 hours of directly supervised solo training in an agricultural aeroplane with the work load being transferred gradually from the instructor to the pilot under instruction.

**Aerial spraying rating held** – the flight time must not be less than 20 hours dual in an agricultural aeroplane and 10 hours of directly supervised solo training in an agricultural aeroplane with the work load being transferred gradually from the instructor to the pilot under instruction.

## Supervision

An initial period of direct supervision is recommended after the issue of the Grade 2 agricultural rating to be conducted by an appropriate Category E instructor, or an appropriate current Grade 1 agricultural pilot to assist with training consolidation and overall operational safety in the early stages.

- The minimum period of direct supervision recommended is 100 hours of productive agricultural flight time.
- The actual amount of direct supervision required is at the discretion of the Part 137 operator or in the case of a PPL holder, the supervising instructor or Grade 1 holder.

- If the applicant already holds a Grade 2 agricultural rating with an aerial spraying rating, any direct supervision required post aerial topdressing rating issue is at the discretion of the Part 137 operator or in the case of a PPL holder, the supervising instructor or Grade 1 holder.



## **Appendix III—Training for Aerial Spraying Rating—Aeroplane**

### **Ground Course Instruction**

#### **References**

- The Study of Civil Aviation Rules and Advisory Circulars
- HSNO Act & Regulations
- New Zealand Standard NZS 8409:2004 Management of Agrichemical Users Code of Practice
- Safety Guideline for Farm Airstrips and Associated Fertiliser Cartage, Storage and Application Booklet
- Approved Code of Practice for prevention of sulphur fires and explosions
- Health and Safety and Employment Act
- Resource Management Act
- Local Authority District and Regional Plans
- Any other requirements applicable to agricultural aviation.

#### **Theoretical aspects of agricultural aviation involving**

- Fatigue Risk Management
- Human Factors
  - Culture
  - Attitude
  - Awareness
  - Health
  - Information processing
  - Spatial disorientation and illusions
  - Threat & Error Management

**Flight to and landing at operational airstrips**

- Low level map reading;
- Airstrip identification;
- Inspection of airstrip from the air – obstructions, wires, livestock, fences, assessing wind strength and direction etc.;
- Approach to airstrip (assessing decision/overshoot point) and landing;
- Airstrip and loading area assessment post landing;
- Effect of surface conditions (soft ground, grass, dew, frost, thaw etc.) slope and wind direction.

**Operational planning**

- Briefing of and aerial inspection of work area, terrain, shape, hazards, wires, sun, wind and maintaining situational awareness etc.
- Boundary recognition/buffer and exclusion zones
- Spray plan – spray run direction, race track etc.
- Use of GPS, mapping and job planning
- Effect of sun glare and turbulence
- Fuel management
- Operation of loading area
- Positioning of aircraft for loading
- Briefing loader driver – selection of loads, signals to driver, emergency procedures.

**Flight between airstrip and spray area**

- Selection of appropriate altitude
- Take-off and cruise – engine failure
- Flying parallel to high ground – turbulence
- Flying up and down slopes – up/down draughts
- Flight into valleys and across ridges – false/no horizon and turbulence

**Application techniques**

- Factors affecting application and calibration – Product types to be sprayed
- Formulae for calculating application rates, airspeed versus swath width, height and meteorological aspects affecting drift, inversion layers, humidity and temperature
- Effect of slope on swath width
- Effect of wind on ground speed and pattern, spraying into wind, downwind or crosswind
- Effect of airspeed and spray height on droplet recovery & swath pattern

- Single pass half overlap
- Racetrack
- Squeeze
- Application of Appendix B (Overload Weight Determination) to Part 137
- Use of GPS - operational tracking
- Manual selection (without GPS) of and keeping straight on markers - estimating swath width and drift
- Procedure turns – use of flap and power
- Operation of spray controls
- Operation and effect of jettison (dump) – correct time to jettison (dump)
- Aircraft performance - effect on C of G with changing load- trim usage, aircraft control and performance, maximum manoeuvring speed limitations with the spray gear attached
- Complete treatment of area – clean up runs with reassessment of obstacles/hazards
- Emergency procedures/engine failure
- Wire strike avoidance

#### **Application rates**

- Effect of slope on application area
- Product label or tech rep recommendation

#### **Nozzle types & selection**

- Various nozzle types and VMD
- Product or tech rep recommendation
- Water rate requirements
- Target species canopy make & penetration requirements

#### **Factors affecting drift & droplet recovery**

- Primary drift
- Evaporation
- Secondary drift
- Wind strength and direction
- Airspeed
- Droplet size – consider orientation of nozzles to airflow
- Humidity including fog and drizzle
- Temperature

- Atmospheric stability – inversion layers
- Slope
- Nozzle selection & boom pressure (hydraulic shattering)
- Vortices - Boom width versus wingspan
- Aerodynamic shattering
- Penetrating adjuvants

**Minimising drift**

- Meteorological aspects affecting drift
- Nozzle selection & boom pressure
- Anti-drift agents
- Spraying oils
- Boom shut off

**Environmental responsibilities**

- Notifications – appropriate information provided
- Physical environment e.g. water bodies and other sensitive areas.
- Establishing correct application area, buffer/exclusion zones and correct application rates & techniques
- Confining product within boundary's and maintaining buffer/exclusion
- Other people - Third Party Risk – application of Appendix A to Part 137
- Livestock and wildlife
- Accepting & declining tasks
- Insecticide toxicity to bees

**Decontamination**

- Aircraft and spray gear
- Between jobs
- Sensitive crops
- End of each operational period

**Aircraft & role equipment handling & care**

- Cleaning windscreen
- Care of aircraft – cleaning of airframe including underside, flaps, tail plane and elevator
- Early morning icing & fogging

- Serviceability of engine & instruments
- Fuel policy - refuelling, hot refuelling
- Inspecting, installing & removing role equipment
- Maintenance of role equipment
- Pilot maintenance
- Daily pre-flight before first flight of day including role equipment and regularly throughout the day e.g. refuels etc

### **Overdue/accident procedures**

- Review of company procedures

### **Record keeping**

- Daily flight/work records and pilot logbook
- Aircraft tech logs
- Pilot maintenance records
- Defect recording & rectification
- Occurrence, incident and hazard identification

### **Flight Instruction Course**

- Inspection of airstrip from the air, planning approach and landing, take-off
- Appreciation of decision/overshoot point
- Operations on loading area and airstrip, selection of loads, communication (VHF and signals) with driver, actions in the event of an emergency
- Take-off decision point – jettison (dump)
- Briefing of work area, boundary inspections, planning of work – terrain, wind speed and direction, wire/obstacle/ hazard considerations, GPS mapping etc.
- Fuel management/timing discussed with driver
- Simulated spraying runs at spray height, including drill procedures for each stage of the flight/sortie, block planning and application methods (race tracking etc.)
- Procedure turns – wings level over wires & obstacles
- Pull up and let down over obstacles
- Flying between and adjacent to obstacles – effect of wind, wires
- Flying adjacent to and parallel with wires/tree rows – maintaining clearances
- Flying under wires
- GPS operation & techniques
- Forced landing from low altitude

- Demonstration of no horizon flying/false horizon.

## Flight Time

**No rating held** - the flight time must not be less than 20 hours dual in an agricultural aeroplane and 40 hours of directly supervised solo training in an agricultural aeroplane, with the work load being transferred gradually from the instructor to the pilot under instruction.

**Aerial topdressing rating held** – the flight time must not be less than 15 hours dual in an agricultural aeroplane and 10 hours of directly supervised solo training in an agricultural aeroplane with the work load being transferred gradually from the instructor to the pilot under instruction.

- CAA recommend that agrichemicals should be used when conducting all agricultural operational role spray training, however CAA accept that this is not always achievable and will accept substitute products being used e.g. water for a portion of the training providing the training is conducted while simulating actual agricultural operations. CAA expects at least 50% of the role training should involve dispensing agrichemicals. The ratio of agrichemical used versus substitute products used is at the discretion of the instructor.
- The combined total flight time minimums described in each section above must be flown. The ratio of dual flight time flown versus solo flight time flown is at the discretion of the instructor.

## Supervision

- An initial period of direct supervision is recommended after the issue of the Grade 2 agricultural rating to be conducted by an appropriate Category E instructor, or an appropriate current Grade 1 agricultural pilot to assist with training consolidation and overall operational safety in the early stages.
- The minimum period of direct supervision recommended is 100 hours of productive pilot-in-command agricultural flight time.
- The actual amount of direct supervision required is at the discretion of the Part 137 operator or in the case of a PPL holder the supervising instructor or Grade 1 holder.
- If the applicant already holds a Grade 2 agricultural rating with an aerial topdressing rating, any direct supervision required post aerial spraying rating issue is at the discretion of the Part 137 operator or in the case of a PPL holder, the supervising instructor or Grade 1 holder.

## **Appendix IV—Training for Aerial VTA Rating—Aeroplane**

### **Ground Course Instruction**

#### **References**

- The Study of Civil Aviation Rules and Advisory Circulars
- HSNO Act & Regulations
- New Zealand Standard NZS 8409:2004 Management of Agrichemical Users Code of Practice: Safety Guideline for Farm Airstrips and Associated Fertiliser Cartage, Storage and Application Booklet
- Health and Safety and Employment Act
- Resource Management Act
- Local Authority District and Regional Plans
- Any other requirements applicable to the aerial application of VTA.

#### **Theoretical aspects of agricultural aviation involving**

- Fatigue Risk Management
- Human Factors
  - Culture
  - Attitude
  - Awareness
  - Health
  - Information processing
  - Spatial disorientation and illusions
  - Threat & Error Management

#### **Flight to and landing at operational airstrip**

- Low level map reading
- Airstrip identification
- Inspection of airstrip from the air – obstructions, wires, livestock, fences, assessing wind strength and direction etc
- Approach to airstrip (assessing decision/overshoot point) and landing
- Airstrip and loading area assessment post landing
- Effect of surface conditions (soft ground, grass, dew, frost, thaw etc.) slope and wind direction

**Operational planning**

- Briefing of and aerial inspection of work area, hazards, wires etc
- Boundary recognition
- Sowing plan – sowing run direction, race track etc.
- Use of GPS - mapping and job planning
- Effect of sun glare and turbulence
- Fuel management
- Operation of loading area
- Positioning of aircraft for loading
- Briefing loader driver – selection of loads, signals to driver, emergency procedures
- Positioning of aircraft for loading
- Work site briefing with all personnel on site

**Flight between airstrip and sowing area**

- Selection of appropriate altitude
- Take off and cruise – engine failure
- Flying parallel to high ground – turbulence
- Flying up and down slopes – up and down draughts
- Flight into valleys and across ridges – false/no horizon and turbulence
- Consideration of airstrip in relation to treatment area

**Application techniques**

- Operational planning – shape, terrain, obstacles, sun, wind speed and direction, maintaining situational awareness
- Product – types of material to be sown, physical properties – particle size, flow ability characteristics – effect on swath
- Product hazard -HSNO hazard classifications and controls, HSNO class – bio-accumulation, water solubility and attributes relevant to potential adverse effects
- Application - rates and techniques - formulae for calculating swath widths, application rates, airspeed versus swath widths, height and meteorological aspects affecting drift
- Application of Appendix B (Overload Weight Determination) to Part 137
- Use of GPS - operational tracking
- Manual application selection without GPS is not permitted
- Procedure turns – use of flap and power
- Operation of hopper controls



- Operation and effect of jettison (dump) – correct time to jettison (dump)
- Aircraft performance - effect on C of G with changing load - trim usage, aircraft control and performance, maximum manoeuvring speed limitations with the various role equipment attached (spreaders)
- Complete treatment of area – clean up runs with reassessment of obstacles/hazards
- Emergency procedures/engine failure

### **Environmental awareness and responsibilities**

- Notifications and appropriate information provided.
- Public and other affected parties notified appropriately
- Signage placed in the correct and required areas
- Establishing correct application area, buffer/exclusion zones and correct application rates
- Physical environment e.g. water bodies and other sensitive areas.
- Confining product within boundary's and maintaining exclusion/buffer zone clearances
- Third Party Risks including application of Appendix A to Part 137
- Livestock & wildlife implications – reporting of any livestock within the boundary
- Accepting & declining tasks. Prior to commencing VTA operations a pilot must establish a chain of command by clearly identifying the person or persons responsible for the overall management of and directing the contract. The pilot must sight the contract and discuss with the person responsible to ensure all of the above listed responsibilities have been appropriately managed and complied with.

### **Aircraft & role equipment handling & care**

- Cleaning windscreen
- Care of aircraft – cleaning of airframe and underside and maintenance of role equipment
- Early morning icing & fogging
- Serviceability of engine & instruments
- Fuel policy - refuelling, hot refuelling
- Installing & removing role equipment
- Pilot maintenance
- Agricultural pre-flight including role equipment

### **Overdue/accident procedures**

- Review of company procedures

### **Record keeping**

- Daily flight/work records and pilot logbook
- Aircraft tech logs

- Defect recording & rectification
- Occurrence, incident and hazard identification

### **Flight Instruction Course**

- Appropriate documentation
- All licences, permits and consents obtained
- Ministry of Health permit sighted, pilots and ground crew licences controlled substance licence current and ratings current
- Inspection of airstrip from the air
- Planning approach, landing and take-off
- Identify decision/overshoot point
- Operations on loading area and airstrip
- Selection of loads
- Communication - (VHF and signals) with driver
- Actions in the event of an emergency
- Take-off decision point – jettison (dump)

### **Briefing of work area**

- Route to and from treatment site
- Boundary inspections – operational boundary's/treatment areas defined
- Planning of work – terrain, wind speed and direction
- Obstacle and hazard considerations
- GPS mapping – target/treatment areas, exclusion zones, water supply catchments and intakes plotted
- Other sensitive areas/buffer zones plotted and specified
- Route plan to and from treatment area

### **Notifications**

- Public and other affected parties notified within the required time
- Appropriate information provided
- Signage
- Placed in the correct and required areas
- Signs have the correct and required information
- Sign removal after the operation

**Loading equipment and practice**

- Holder of control substance licence (CSL) available at the loading site
- Appropriate equipment available, including PPE and worn

**Application equipment calibrated**

- Bait quality check
- Provision for monitoring bait output at the specified application rate
- GPS equipment fitted and operable
- Pilot current and competent in GPS
- Capability to achieve + or – 2 metres of required track

**Fuel management**

- Timing discussed with driver

**Simulated topdressing runs**

- Drill procedures for each stage of the flight/sortie
- Treatment area planning and application methods (race tracking etc.)
- Procedure turns
- GPS operation & techniques
- Acceptable emergency procedures

**Flight Time**

**Aerial topdressing rating held** – CAA recommends the flight time should not be less than 2 hours dual in an agricultural aeroplane and 3 hours of directly supervised solo training in an agricultural aeroplane with the work load being transferred gradually from the instructor to the pilot under instruction. The actual amount of inflight instruction required is at the discretion of the Category E flight instructor conducting the training.

**Supervision**

- An initial period of direct supervision is recommended after the issue of the VTA rating to be conducted by an appropriate Category E instructor, or an appropriate current Grade 1 agricultural pilot to assist with training consolidation and overall operational safety in the early stages.
- The actual amount of direct supervision required is at the discretion of the Part 137 operator or in the case of a PPL holder, the supervising instructor or Grade 1 holder.

## Appendix V—Training for Grade 2 Agricultural Rating—Helicopter

### **General**

The holder of an appropriate current Category E flight instructor rating who also holds an appropriate current agricultural pilot rating is to conduct all dual training and authorise flights where the student acts as pilot-in-command.

The training will be divided into three stages—

- (i) type conversion and familiarisation
- (ii) intermediate training
- (iii) agricultural pilot role training

### **Type Conversion and Familiarisation**

Type conversion onto the type or types of aircraft to be used in the approved course of training (if the type rating(s) are not already held) should be completed and the type rating(s) issued in accordance with advisory circular AC61-10. The purpose of this training is to ensure that the pilot under instruction is type rated on and familiar with the appropriate aircraft type before beginning the agricultural flying training.

### **Ground Course Instruction**

#### ***Study of aircraft handbook & flight manual***

- Relevant aircraft documentation
- Normal procedures
- Emergencies
- Flight limitations & placards
- Aircraft performance
- Weight & balance considerations
- Safety equipment
- Spray tanks and, where appropriate, jettison systems
- Aircraft pre-flight inspection and pilot maintenance with emphasis and considerations given to the agricultural operational role
- Fuel, oil and electrical systems

#### ***Aircraft systems***

- Review of applicable flight manual sections
- Introduction to GPS guidance
- Operation of electronic tracking system.

### **Flight Instruction Course**

- Pre-flight inspection
- Correct engine start & warm up procedures, start emergencies
- Loading & performance
- Pre take-off checks
- Lift into hover, pattern flying and hover
- Take off and climb climbing and descending (straight and whilst turning)
- Circuits
- Limited power take-offs & landings
- Quick stops
- S-turns & steep turns
- Autorotation's and power recovery
- Tail rotor failures
- Confined area operations
- Normal landings
- Slope landings
- Simulated high altitude take-offs and landings
- Rundown, stopping engines, and tying down rotors

### **Flight Time**

**Dual controlled agricultural helicopter** – not less than: 1 hour dual, 1 hour solo.

**Single seat agricultural helicopter** – not less than: 1 hour dual in an equivalent training helicopter and 2 hours solo in the agricultural helicopter.

### **Intermediate Training**

This period of pure flying instruction and solo practice is intended to bridge the gap between the commercial pilot licence standard and the standard required of the pilot prior to beginning role training.

### **Ground Course Instruction**

- Low level operations over various types of terrain & techniques associated with low level flying & contour flying
- Mechanical turbulence & minimising effects of mechanical turbulence
- Mast bumping
- Obstructions to navigation e.g. spars
- Wires - avoidance & identification techniques

- Glare & sun angle
- Stock, third parties, machinery & buildings
- Controlling ground speed and operational height above the ground
- Establishing a pattern & factors to consider if modifying pattern
- Low flying at MCTOW

#### ***Requirements for hovering in & out of ground effect***

- MCTOW weight considerations
- Effects of water, long grass etc.

#### ***Effect of loss of translation***

- Factors that cause loss of translation
- Loss of translation during take-off
- Loss of translation during low level flight

#### ***Importance of RPM control***

- RPM versus boost or torque
- Engine handling

#### **Flight Instruction Course**

- Procedure turns
- Low contour flying with emphasis on constant speed & height above the surface
- Prolonged hovering in & out of ground effect – emphasis on accuracy & position holding
- MCTOW all up weight operations
- Mountain flying techniques including take-offs and landings at altitude

#### **Flight Time**

Intermediate training flight time must not be less than 8 hours dual and 6 hours solo, the combined total flight time of 14 hours must be flown, however the ratio of dual flight time flown versus solo flight time flown is at the discretion of the instructor. The intermediate training phase must be completed before commencing agricultural pilot role training.

#### **Agricultural Pilot Role Training**

The agricultural pilot role training criteria is described in the applicable aerial topdressing or aerial spraying rating syllabus contained in Appendix VI or Appendix VII to this advisory circular.

The intent of the role training is to give overall quality training by ensuring the trainee is exposed to as many variables and hazards as possible in the agricultural environment.

## **Appendix VI—Training for Aerial Topdressing Rating—Helicopter**

### **Ground Course Instruction**

#### **References**

- The Study of Civil Aviation Rules, Advisory Circulars
- HSNO Act & Regulations and New Zealand Standard
- NZS 8409:2004 Management of Agrichemical Users Code of Practice
- Approved Code of Practice for prevention of sulphur fires and explosions
- Health and Safety and Employment act
- Resource Management Act
- Local Authority, District and Regional Plans
- Any other requirements applicable to agricultural aviation.

#### **Theoretical aspects of agricultural aviation involving**

- Fatigue Risk Management
- Human Factors
  - Culture
  - Attitude
  - Awareness
  - Health
  - Information processing
  - Disorientation and illusions
  - Threat & Error Management

#### **Calibrating solids**

- Factors affecting calibration, discuss the types of material sown
- Use of formulae

#### **Application techniques**

- The effect of slope on swath width
- Effect of wind on ground speed and application pattern
- Effect of topdressing height on swath pattern
- Single pass
- Half overlap

- Racetrack
- Squeeze

**Application rates**

- Effect of slope on application area
- Product characteristics – granulated versus fines
- Product recommendation

**Factors affecting drift**

- Wind strength and direction
- Product characteristics – granulated versus fines
- Product recommendation
- Minimizing drift
- Application techniques

**Environmental responsibilities**

- Establishing targets, correct application rates & techniques
- Physical environment e.g. water bodies and other sensitive areas
- Sensitive off target areas
- Buffer zones
- Third Party Risk
- Livestock & wildlife
- Accepting & declining tasks

**Aircraft & role equipment handling & care**

- Cleaning windscreen
- Cleaning blades & effect on performance
- Early morning icing & fog
- Serviceability of engine & instruments
- Refuelling, hot refuelling, fuel management, monitoring and storage
- Airborne safety equipment
- Installing & removing role equipment
- Pilot maintenance
- Agricultural pre-flight including role equipment
- Role equipment inspection & maintenance programmes



- Spreading equipment components & operation
- Pre ops cargo hook serviceability checks

**Selection of load sites**

- Obstacles & access for support equipment
- Wind direction
- Adverse meteorological conditions
- Environmental considerations on load site
- Environmental considerations for flight paths to & from operational area
- Load site safety equipment
- Security
- Livestock considerations

**Briefing & communications with ground crew**

- Briefings
- Ground crew record keeping
- Communications

**Overdue/accident procedures**

- Review of company procedures

**Record keeping**

- Daily flight/work records – pilot logbooks
- Aircraft tech logs
- Defect recording & rectification
- Occurrence, incident and hazard identification

**Flight Instruction Course**

- Discuss types of material to be sown, flammability properties (e.g. sulphur products/mixes)
- Selection & Inspection of load sites, take off & landing approaches
- Briefing of work area, boundary inspections, buffer zones, planning of work, fuel management
- Operations on loading site, selection of loads, communication VHF and/or signals with driver
- Simulated topdressing runs, including drills for each stage of flight
- Effects of bucket on aircraft manageability e.g. turning with loaded bucket

## Flight Time

- **No rating held** - not less than 25 hours dual in an agricultural helicopter and 35 hours of directly supervised productive flying in an agricultural helicopter with the work load being transferred gradually from the instructor to the pilot under instruction.
- **Aerial spraying rating held** – not less than 15 hours dual in an agricultural helicopter and 10 hours of directly supervised solo training in an agricultural helicopter with the work load being transferred gradually from the instructor to the pilot under instruction.
- If aerial topdressing rating role training and aerial spraying rating role training are being conducted simultaneously, the combined minimum role training flight time for both ratings will not be less than 25 hours dual in an agricultural helicopter and 35 hours of directly supervised productive flying in an agricultural helicopter with the work load being transferred gradually from the instructor to the pilot under instruction.
- CAA recommends solid fertilisers should be used when conducting all helicopter operational topdressing role training, however CAA accept that this is not always achievable and will accept substitute products being used for a portion of the training providing the training is conducted while simulating actual agricultural operations. CAA expects at least 50% of the role training should involve dispensing solid fertilisers. The ratio of solid fertiliser versus substitute products used is at the discretion of the instructor.
- The combined total flight time minimums described in each section above must be flown. The ratio of dual flight time flown versus solo flight time flown is at the discretion of the instructor.

## Supervision

- An initial period of direct supervision is recommended after the issue of the Grade 2 agricultural rating to be conducted by an appropriate Category E instructor, or an appropriate current Grade 1 agricultural pilot to assist with training consolidation and overall operational safety in the early stages. The minimum period of direct supervision recommended is 100 hours of productive pilot-in-command agricultural flight time.
- The actual amount of direct supervision required is at the discretion of the Part 137 operator, or in the case of a PPL, the supervising instructor or Grade 1 holder.
- If the applicant already holds a Grade 2 agricultural rating with an aerial spraying rating, any direct supervision required post aerial topdressing rating issue is at the discretion of the Part 137 operator, or in the case of a PPL, the supervising instructor or Grade 1 holder.

## Appendix VII—Training for Aerial Spraying Rating—Helicopter

### Ground Course Instruction

#### References

- The Study of Civil Aviation Rules and Advisory Circulars
- HSNO Act & Regulations
- New Zealand Standard NZS 8409:2004 Management of Agrichemical Users Code of Practice
- Approved Code of Practice for prevention of sulphur fires and explosions
- Health and Safety and Employment Act
- Resource Management Act
- Local Authority District and Regional Plans
- Any other requirements applicable to agricultural aviation.

#### Theoretical aspects of and agricultural aviation involving

- Fatigue Risk Management
- Human Factors
  - Culture
  - Attitude
  - Awareness
  - Health
  - Information processing
  - Disorientation and illusions
  - Threat & Error Management

#### Calibrating liquids

- Factors affecting calibration, discuss the types of material to be sprayed
- Use of formulae

#### Application techniques

- The effect of slope on swath width
- Effect of wind on ground speed and application pattern
- Effect of spraying into wind / downwind versus crosswind on swath pattern
- Effect of airspeed and spray height on droplet recovery & swath pattern
- Single pass

- Half overlap
- Racetrack
- Squeeze

**Application rates**

- Effect of slope on application area
- Label recommendations
- Product or tech rep recommendation

**Nozzle types & selection**

- Various types of nozzle and VMD
- Product or tech rep recommendation
- Water rate requirements
- Target species canopy make & penetration requirements

**Factors affecting drift & droplet recovery**

- Primary drift
- Evaporation
- Secondary drift
- Wind strength and direction
- Humidity including fog & drizzle
- Temperature
- Atmospheric stability –inversion layers
- Slope
- Nozzle selection & boom pressure (hydraulic shattering)
- Airspeed
- Droplet size
- Boom width and rotor vortices
- Aerodynamic shattering e.g. orientation of nozzles to airflow
- Penetrating adjuvants

**Minimizing drift**

- Meteorological aspects affecting drift
- Nozzle selection & boom pressure
- Anti-drift agents

- Spraying oils
- Shut off boom

**Environmental responsibilities**

- Establishing targets, correct application rates & techniques
- Physical environment e.g. water bodies and other sensitive areas.
- Sensitive off target species
- Other people – Third Party's
- Livestock & wildlife
- Accepting & declining tasks
- Insecticide toxicity to bees

**Decontamination**

- Aircraft and spray gear
- Between jobs
- Sensitive crops
- End of each operational period

**Aircraft & role equipment handling & care**

- Cleaning bubble
- Cleaning blades & effect on performance
- Early morning icing & fogging
- Serviceability of engine & instruments
- Refuelling, hot refuelling, fuel management & monitoring
- Airborne safety equipment
- Installing & removing role equipment
- Pilot maintenance
- Agricultural pre-flight including role equipment
- Role equipment inspection & maintenance programmes
- Spray tank or tanks & where appropriate jettison systems
- Spray equipment components & operation

**Selection of load sites**

- Obstacles & access for support equipment
- Wind direction

- Suitability of water supply
- Adverse meteorological conditions
- Environmental considerations on load site
- Environmental considerations for flight paths to & from operational area
- Load site safety equipment
- Security- access points/third parties
- Livestock

**Briefing & communications with ground crew**

- Briefings
- Ground crew record keeping
- Communications

**Overdue/accident procedures**

- Review of company procedures

**Record keeping**

- Daily flight/work records – pilot logbooks
- Aircraft tech logs
- Defect recording & rectification
- Occurrence, incident and hazard identification

**Flight Instruction Course**

- Spraying operations
- Selection of loading site and operational preparation of loading site, selection of loads, communication (VHF and signals) with driver, actions in the event of an emergency/response plan
- Aerial inspection, planning of and briefing of treatment area, boundary inspections, planning of work – terrain, wind speed and direction, temperature & humidity, wire, obstacle and other hazard considerations, GPS mapping
- Fuel management/timing discussed with driver
- Simulated spraying runs at spray height, including drill procedures for each stage of the flight/sortie, application methods (race tracking etc.)
- Procedure and advanced spray turns
- Pull up and let down over obstacles
- Flying between and adjacent to obstacles – effect of wind
- Flying adjacent to and parallel with wires/tree rows – maintaining clearances

- Confined area operations
- Flying under wires
- GPS operation & techniques

### Flight Time

- **No rating held** - not less than 25 hours dual in an agricultural helicopter and 35 hours of directly supervised training of productive flying in an agricultural helicopter with the work load being transferred gradually from the instructor to the pilot under instruction.
- **Aerial topdressing rating held** – the flight time will be not less than 15 hours dual in an agricultural helicopter and 10 hours of directly supervised solo training in an agricultural helicopter with the work load being transferred gradually from the instructor to the pilot under instruction.
- If aerial spraying rating role training and aerial topdressing rating role training are being conducted simultaneously the combined minimum role training flight time for both ratings will not be less than 25 hours dual in an agricultural helicopter and 35 hours of directly supervised productive flying in an agricultural helicopter with the work load being transferred gradually from the instructor to the pilot under instruction.
- CAA recommend that agrichemicals should be used when conducting all operational spraying role training, however CAA accept that this is not always achievable and will accept substitute products being used e.g. water for a portion of the training providing the training is conducted while simulating actual agricultural operations. CAA expects at least 50% of the role training should involve dispensing agrichemicals. The ratio of agrichemical used versus substitute products used is at the discretion of the instructor.
- The combined total flight time minimums described in each section above must be flown. The ratio of dual flight time flown versus solo flight time flown is at the discretion of the instructor.

### Supervision

- An initial period of direct supervision is recommended after the issue of the Grade 2 agricultural rating to be conducted by an appropriate Category E instructor, or an appropriate current Grade 1 agricultural pilot to assist with training consolidation and overall operational safety in the early stages.
- The minimum period of direct supervision recommended is 100 hours of productive pilot-in-command agricultural flight time.
- The actual amount of direct supervision required is at the discretion of the Part 137 operator, or in the case of a PPL, the supervising instructor or Grade 1 holder.
- If the applicant already holds a Grade 2 agricultural rating with an aerial topdressing rating, any direct supervision required post aerial spraying rating issue is at the discretion of the Part 137 operator or in the case of a PPL, the supervising instructor or Grade 1 holder.

## **Appendix VIII—Training for Aerial VTA rating—Helicopter**

### **Ground Course Instruction**

#### **References**

- The Study of Civil Aviation Rules and Advisory Circulars
- HSNO Act & Regulations
- New Zealand Standard NZS 8409:2004 Management of Agrichemical Users Code of Practice
- Health and Safety and Employment Act
- Resource Management Act
- Local Authority District and Regional Plans
- Any other requirements applicable to the aerial application of VTA.

#### **Theoretical aspects of agricultural aviation involving**

- Fatigue Risk Management
- Human Factors
  - Culture
  - Attitude
  - Awareness
  - Health
  - Information processing
  - Spatial disorientation and illusions
  - Threat & Error Management

#### **Flight to and landing at operational site**

- Low level map reading
- Loading site identification
- Inspection of site from the air – obstructions, wires, livestock, fences, assessing wind strength and direction, etc
- Approach to site and landing
- Loading site area assessment post landing

#### **Operational planning**

- Briefing of and aerial inspection of work area, hazards, wires, etc
- Boundary recognition



- Sowing plan – sowing run direction, race track, etc
- Use of GPS - mapping and job planning
- Effect of sun glare and turbulence
- Fuel management
- Operation of loading area
- Positioning of aircraft for loading
- Briefing loader driver – selection of loads, signals to driver, emergency procedures
- Work site briefing with all personnel on site

#### **Flight between airstrip and sowing area**

- Take off and cruise – engine failure
- Flying parallel to high ground – turbulence
- Flying up and down slopes – up and down draughts
- Flight into valleys and across ridges – false/no horizon and turbulence
- Consideration of loading site in relation to treatment area

#### **Application techniques**

- Operational planning – shape, terrain, obstacles, sun, wind speed and direction, maintaining situational awareness
- Product – types of material to be sown, physical properties – particle size, flow ability characteristics – effect on swath
- Product hazard -HASNO hazard classifications and controls, HSNO class – bio-accumulation, water solubility and attributes relevant to potential adverse effects
- Application - rates and techniques - formulae for calculating swath widths and application rates, airspeed versus swath widths, height and meteorological aspects affecting drift
- Use of GPS - operational tracking
- Manual application selection without GPS is not permitted
- Procedure turns
- Operation of bucket controls
- Operation and effect of jettison (dump) – correct time to jettison (dump)
- Aircraft performance
- Complete treatment of area – clean up runs with reassessment of obstacles/hazards
- Emergency procedures/engine failure
- Procedures for an equipment malfunction resulting in an out landing

**Environmental awareness and responsibilities**

- Notifications and appropriate information provided
- Public and other affected parties notified appropriately
- Signage placed in the correct and required areas
- Placed in the correct and required areas
- Signs have the correct and required information
- Sign removal after the operation
- Establishing correct application area, buffer/exclusion zones and correct application rates
- Physical environment e.g. water bodies and other sensitive areas
- Confining product within boundary's and maintaining exclusion/buffer zone clearances
- Third Party Risk
- Livestock & wildlife implications including reporting livestock within the boundary
- Accepting & declining tasks
- Prior to commencing VTA operations a pilot must establish a chain of command by clearly identifying the person or persons responsible for the overall management of and directing the contract. The pilot must sign the contract and discuss with the person responsible to ensure all of the above listed responsibilities have been appropriately managed and complied with.

**Aircraft & role equipment handling & care**

- Cleaning bubble
- Care of aircraft – cleaning and maintenance of external loading equipment
- Early morning icing & fogging
- Serviceability of engine & instruments
- Fuel policy - refuelling, hot refuelling
- Pilot maintenance
- Agricultural pre-flight including external loading equipment

**Overdue/accident procedures**

- Review of company procedures

**Record keeping**

- Daily flight/work records and pilot logbook
- Aircraft tech logs
- Defect recording & rectification
- Occurrence, incident and hazard identification

## **Flight Instruction Course**

### **Appropriate documentation**

- All licences, permits and consents obtained.
- Ministry of Health permit sighted, pilots and ground crew licences (CSL) and ratings current.

### **Inspection of loading site from the air**

- Planning approach, landing and take-off

### **Operations on loading site**

- Selection of loads
- Communication - (VHF and signals) with driver
- Actions in the event of an emergency

### **Briefing of work area**

- Boundary inspections – operational boundary's/treatment areas defined
- Planning of work – terrain, wind speed and direction
- Obstacle and hazard considerations
- GPS mapping – target/treatment areas, exclusion zones, water supply catchments and intakes plotted
- Other sensitive areas/buffer zones plotted and specified
- Plan route to and from the treatment area

### **Notifications**

- Public and other affected parties notified within the required time
- Appropriate information provided

### **Signage**

- Placed in the correct and required areas
- Signs have the correct and required information
- Sign removal after the operation
- Loading equipment and practice
- Holder of control substance licence (CSL) available at the loading site
- Appropriate equipment available, including PPE and worn

**Application equipment calibrated**

- Bait quality check
- Provision for monitoring bait output at the specified application rate
- GPS equipment fitted and operable
- Pilot current and competent in GPS
- Capability to achieve + or – 2 metres of required track

**Fuel management**

- Timing discussed with driver
- Simulated topdressing runs
- Drill procedures for each stage of the flight/sortie
- Treatment area planning and application methods (race tracking, etc.)
- Procedure turns
- GPS operation & techniques
- Acceptable emergency procedures

**Flight Time**

**Aerial topdressing rating held** – CAA recommends the flight time should not be less than 2 hours dual in an agricultural helicopter and 3 hours of directly supervised solo training in an agricultural helicopter with the work load being transferred gradually from the instructor to the pilot under instruction. The actual amount of inflight instruction required is at the discretion of the Category E flight instructor conducting the training.

**Supervision**

- An initial period of direct supervision is recommended after the issue of the VTA rating to be conducted by an appropriate Category E instructor, or an appropriate current Grade 1 agricultural pilot to assist with training consolidation and overall operational safety in the early stages.
- The actual amount of direct supervision required is at the discretion of the Part 137 operator or in the case of a PPL, the supervising instructor or Grade 1 holder.

## Appendix IX—Flight Test Requirements for Issue and Annual Competency Demonstrations

CAA expects that agricultural pilot flight tests and competency demonstrations will be conducted inflight with the agricultural flight examiner or instructor on-board and in the aircraft cockpit with the person being assessed. The purpose of the following information is to provide an acceptable means of meeting this expectation and enable appropriate management of the risks associated with operating the varying aircraft types in the agricultural aviation sector.

### Initial Issue of Ratings

#### Grade 2 agricultural pilot rating

For the initial issue of a Grade 2 agricultural pilot rating, a flight test must be conducted in agricultural operations in a dual controlled agricultural aircraft with the flight examiner in the cockpit on-board the aircraft.

#### Grade 1 agricultural pilot rating

For the initial issue of a Grade 1 agricultural pilot rating, a flight test must be conducted in agricultural operations.

At the discretion of the flight examiner, the flight test may be conducted either in a dual controlled agricultural aircraft, a single seat agricultural aircraft, or a single controlled two seat agricultural aircraft. The passenger seat must be an approved seat equipped with an approved shoulder harness.

#### *Dual controlled agricultural aircraft.*

- A dual controlled agricultural aircraft flight test must be conducted inflight with the flight examiner in the cockpit on-board the aircraft.

#### *Single seat agricultural aircraft and single controlled approved two seat agricultural aircraft.*

- The flight examiner must apply the mitigations listed in the aircraft selection criteria section of this advisory circular.

If the flight examiner determines that the agricultural aircraft provided by the applicant is not acceptable to demonstrate competency in, the onus is on the applicant to find an acceptable agricultural aircraft as required by rule 61.25(a).

### Aerial topdressing and aerial spraying ratings

A flight test must be conducted in agricultural operations in a dual controlled agricultural aircraft with the flight examiner/instructor in the cockpit on-board the aircraft.

#### Aerial VTA rating

A flight test must be conducted in agricultural operations in a dual controlled agricultural aircraft with the flight examiner/instructor in the cockpit on-board the aircraft.

Notwithstanding the above, as the applicant will already hold an aerial topdressing rating and have previous experience in aerial topdressing operations in the appropriate category of aircraft, the VTA rating may be issued in conjunction with an aerial topdressing annual competency demonstration. The extent of inflight demonstration will be at the discretion of the flight examiner/instructor. The ground course must cover the relevant controls and requirements associated with VTA operations.

## **Transitional Issue of Ratings**

### **Aerial topdressing and aerial spraying ratings**

Where the applicant already holds a Grade 1 or 2 agricultural rating, has experience in aerial topdressing and aerial spraying, and is being issued with the rating under the new Part 61 transitional rule effective 15 April 2016, a flight test should be conducted in aerial topdressing and aerial spraying operations with the flight examiner/instructor in the cockpit on-board the aircraft. The ratings will be issued in conjunction with a rule 61.707 competency demonstration.

### **Aerial VTA rating**

Where the applicant already holds a Grade 1 or Grade 2 agricultural rating, has experience in aerial VTA operations, and is being issued with the rating under the new Part 61 transitional rule effective 15 April 2016, a flight test should be conducted in aerial VTA operations with the flight examiner/instructor in the cockpit on-board the aircraft.

At the discretion of the flight examiner/instructor, the demonstration may be conducted in a single controlled two seat agricultural aircraft or a dual controlled agricultural aircraft. The passenger seat must be an approved seat equipped with an approved shoulder harness.

Notwithstanding the above, as the applicant will already hold an aerial topdressing rating and have previous experience in aerial topdressing operations in the appropriate category of aircraft, the VTA rating may be issued in conjunction with an aerial topdressing annual competency demonstration. The extent of inflight demonstration will be at the discretion of the flight examiner/instructor. The ground course must cover the relevant controls and requirements associated with VTA operations.

## **Rule 61.707 Currency Requirements**

### **General considerations**

A pilot must successfully demonstrate competency in agricultural operations in the appropriate category of aircraft within the immediately preceding 12 months in each rating specialisation to be exercised, to a current and appropriate agricultural flight examiner or a current and appropriate Category E flight instructor that is working under the privileges and limitations of a Part 137 or Part 141 certificate.

The intent of the Part 61 agricultural rating is that all pilot competency assessment/demonstrations are to be conducted inflight with the flight examiner/instructor on-board and in the cockpit with the pilot. However, CAA acknowledges there are practical and safety complexities that need to be considered when assessing pilots of single controlled two seat aircraft and single seat aircraft. The following sections contain mitigations that meet the intent of the rules.

If an applicant holds an aerial VTA rating, the VTA competency demonstration may be conducted in conjunction with and at the same time as the aerial topdressing competency demonstration, provided the extra requirements and controls for VTA are appropriately assessed at the time of the demonstration.

At the discretion of the flight examiner/instructor, if product is not readily available, agricultural aircraft operations may be simulated using a suitable product alternative e.g. sand or water. Although not recommended by the CAA, where deemed appropriate by the flight examiner/instructor, agricultural aircraft operations may also be simulated with no product or role equipment fitted to the aircraft.

Notwithstanding any of the above, the flight examiner/instructor, when exercising his or her discretion, is responsible and accountable for ensuring that the method selected for assessing

competency is suitable and appropriate under the circumstances to determine whether the pilot is competent, and for ensuring that the required safety outcomes are achieved.

### **Dual controlled agricultural aircraft**

A dual controlled agricultural aircraft competency demonstration must be conducted inflight with the flight examiner/instructor in the cockpit on-board the aircraft.

### **Single controlled approved two seat agricultural aircraft**

A single controlled approved two seat agricultural aircraft competency demonstration should be conducted inflight with the flight examiner/instructor in the cockpit on-board the aircraft. The passenger seat must be an approved seat equipped with an approved shoulder harness.

If the flight examiner/instructor determines that it is unsafe to be in the cockpit inflight while assessing competency, he or she must decide the most appropriate alternative method of assessing the pilot's competency. The flight examiner/instructor will be expected to apply the mitigations listed in the aircraft selection criteria section of this advisory circular when determining whether it is appropriate to assess a pilot's competency in the agricultural aircraft provided, and when assessing competency.

If the flight examiner/instructor determines that the agricultural aircraft provided by the applicant is not acceptable to demonstrate competency in, the onus is on the applicant to find an acceptable agricultural aircraft as required by rule 61.25(a).

On completion of the competency demonstration, the flight examiner/instructor must assess the pilot's overall competency and if satisfied certify the pilot's logbook.

### **Single seat agricultural aircraft**

The flight examiner/instructor will be expected to apply the mitigations listed in the aircraft selection criteria section of this advisory circular when determining whether it is appropriate to assess a pilot's competency using a single seat agricultural aircraft, and when assessing competency.

If the flight examiner/instructor determines that the agricultural aircraft provided by the applicant is not acceptable to demonstrate competency in, the onus is on the applicant to find an acceptable agricultural aircraft as required by rule 61.25(a).

On completion of the competency demonstration, the flight examiner/instructor must assess the pilot's overall competency and if satisfied certify the pilot's logbook.

### **Aircraft Selection Criteria**

Agricultural pilot competency assessment can only be conducted by a flight examiner/instructor under the privileges of a Part 137 or Part 141 certificate. In circumstances where the certificate holder intends to allow the flight examiner/instructor to assess pilot competency while not in the cockpit of the agricultural aircraft inflight, the CAA will expect the following list of mitigations to apply and be addressed in the certificate holder's procedures prior to being granted competency assessment privileges.

- (a) The flight examiner/instructor must decide the most appropriate method of assessing the pilot's competency under the circumstances. The flight examiner/instructor is expected as a minimum to give consideration to the pilot's overall and specific agricultural aircraft operational experience, recency, experience on type, nature of operations, operating environment, whether the pilot carries bona fide passengers, availability of a suitable two seat agricultural aircraft, and the elapsed time since the pilot's last inflight competency assessment.

- (b) The flights are to be video recorded from inside the cockpit in a manner that clearly shows relevant instruments, the pilot manipulating the controls, and the outside forward visibility available to the pilot demonstrating competence.
- (c) Video recordings are to be of high resolution, date and time stamped, and be acceptable to the flight examiner/instructor.
- (d) Video recording device installations must meet any relevant airworthiness requirements.
- (e) While a competency demonstration flight is being video recorded from inside the cockpit, the entire flight is also to be ground observed by the flight examiner/instructor.
- (f) The flight examiner/instructor observing the competency demonstration from the ground is to remain in VHF contact with the pilot for the duration of the flight.
- (g) Immediately after the flight, the flight examiner/instructor is to assess the video and debrief the pilot.
- (h) The pilot must further demonstrate competency to the flight examiner/instructor in a dual controlled aircraft in the same category or, if the pilot has not completed a BFR within the preceding two years, complete a BFR with a Category A or Category B instructor in the same category of aircraft.
- (i) Records of the competency demonstration, including video recordings, are to be retained by the flight examiner/instructor for a minimum period of 2 years.