Australian Government

Civil Aviation Safety Authority

Civil Aviation Order 40.6 (as amended)

made under subregulation 5.14 (1) and regulations 5.16 and 5.18 of the *Civil Aviation Regulations 1988.*

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Section 40.6 (Agricultural pilot (aeroplane) rating and agricultural pilot (helicopter) rating)

Section 40.6

Agricultural pilot (aeroplane) rating and agricultural pilot (helicopter) rating

1 Interpretation

Terms used in this section have the following meanings:

approved agricultural (aeroplane) pilot means a person who:

(a) is approved under subregulation 5.20 (1) to give training for the issue of an agricultural pilot (aeroplane) rating; or

(b) is approved under paragraph 5.21 (1) (a) of the *Civil Aviation Regulations 1988* (***CAR 1988***) to give aeroplane conversion training in a type of aeroplane used for agricultural operations; or

(c) is approved under subsection 13 to conduct direct or indirect supervision of aeroplane pilots.

approved agricultural (helicopter) pilot means a person who:

(a) is approved under subregulation 5.20 (1) to give training for the issue of an agricultural pilot (helicopter) rating; or

(b) is approved under paragraph 5.21 (1) (b) of CAR 1988 to give helicopter conversion training; or

(c) is approved under subsection 13 to conduct direct or indirect supervision of helicopter pilots.

direct supervision means that the approved pilot shall be present and available to a pilot engaged in agricultural operations either on the ground or in the aircraft being flown by that pilot.

indirect supervision means the periodic surveillance, assessment and correction of persons engaged in operations when those operations are not being conducted under direct supervision.

1.2 A reference in this section to a regulation or subregulation identified by a numerical code (for example, 5.18 or 5.20 (1)) is a reference to the regulation or subregulation identified by that code in CAR 1988.

2 Application

2.1 For the purposes of subregulation 5.14 (1):

(a) the flight tests that must be passed; and

(b) other requirements that must be satisfied;

for the issue of each grade of agricultural pilot (aeroplane) rating are set out in paragraphs 4.1, 5.1, 6.1, 8.1 and 8.2.

2.2 For the purposes of subregulation 5.14 (1):

(a) the flight tests that must be passed; and

(b) other requirements that must be satisfied;

for the issue of each grade of agricultural pilot (helicopter) rating are set out in paragraphs 4.2, 5.2, 6.2 and 8.3.

2.3 For the purposes of regulation 5.18:

(a) the authority given by each grade of agricultural pilot (aeroplane) rating; and

(b) the limitations of that authority; and

(c) the flight tests that must be passed and other requirements that must be satisfied, before that authority may be exercised;

are set out in paragraphs 7.1, 7.1.1, 7.2, 11.1 and 12.1.

2.4 For the purposes of regulation 5.18:

(a) the authority given by each grade of agricultural pilot (helicopter) rating; and

(b) the limitations of that authority; and

(c) the flight tests that must be passed and other requirements that must be satisfied, before that authority may be exercised;

are set out in paragraphs 7.1, 7.2.1, 7.3, 11.2 and 12.2.

4 Aeronautical knowledge

4.1 An applicant for an agricultural pilot (aeroplane) rating must pass a written examination on the matters specified in the syllabus set out in Appendix I that are relevant to the agricultural pilot (aeroplane) rating.

4.2 An applicant for an agricultural pilot (helicopter) rating must pass a written examination on the matters specified in the syllabus set out in Appendix I that are relevant to the agricultural pilot (helicopter) rating.

5 Aeronautical experience

5.1

(1) An applicant for an agricultural pilot (aeroplane) rating grade 2 must hold a commercial pilot (aeroplane) licence or an air transport pilot (aeroplane) licence and must satisfactorily complete a course of flying training consisting of:

(a) initial agricultural flying training as set out in Appendix II Syllabus 1. This training shall be conducted by a pilot approved under subregulation 5.20 (1) to give initial agricultural training in aeroplanes and shall comprise a minimum of 10 hours dual instruction. The aircraft used for the initial training may be of the same type as that which will be used for the dual operational training, and its equipment shall be as specified in subparagraph 10.3 (1); and

(b) operational agricultural flying training as set out in Appendix II Syllabus 2. This training shall be conducted by a pilot approved under subregulation 5.20 (1) to give operational agricultural training in aeroplanes and shall comprise a minimum of 30 hours flying of which 20 hours shall be dual instruction and 10 hours solo flying in a single place agricultural aeroplane; and

(c) conversion or endorsement training as applicable, prior to the commencement of training specified in (a) and (b), on the aircraft type in which this training is to be conducted.

(2) An applicant for an agricultural pilot (aeroplane) rating grade 1 must satisfy the requirements of subparagraph 5.1 (2A) and must have a minimum of 1 000 hours agricultural flight time including 250 hours logged on spraying operations excluding the training specified in subparagraph 5.1 (1) and any time gained in agricultural aircraft in the course of navigation and ferry flights.

(2A) For the purposes of subparagraph 5.1 (2), an applicant for an agricultural pilot (aeroplane) rating grade 1 must:

(a) hold a commercial pilot (aeroplane) licence or an air transport pilot (aeroplane) licence; and

(b) hold, or have held, an agricultural pilot (aeroplane) rating grade 2.

(3) Aeronautical experience gained in approved synthetic flight trainers shall not contribute to the minimum aeronautical experience requirements specified in this section.

5.2

(1) An applicant for an agricultural pilot (helicopter) rating grade 2 must hold a commercial pilot (helicopter) licence or an air transport pilot (helicopter) licence, have at least 200 hours of flight time in helicopters and must satisfactorily complete a course of helicopter flying training consisting of:

(a) initial agricultural flying training as set out at Appendix III Syllabus 1. This training shall be conducted by a pilot approved under subregulation 5.20 (1) for the purpose and shall comprise a minimum of 3 hours dual instruction. The aircraft used for the initial training shall be of the same type as that which will be used for the operational training; and

(b) operational agricultural flying training as set out at Appendix III Syllabus 2. This training shall be conducted by a pilot approved under subregulation 5.20 (1) to give agricultural operational flying training in helicopters and shall comprise a minimum of 7 hours dual instruction; and

(c) conversion training as required, prior to commencement of the training specified in (a) and (b), on the helicopter type in which this training is to be conducted.

(2) An applicant for an agricultural pilot (helicopter) rating grade 1 must satisfy the requirements of subparagraph 5 (2A) and must have a minimum of 500 hours aeronautical experience logged on helicopter agricultural operations including operations using sling load equipment but excluding the training specified in subparagraph 5.2 (1) and any time gained in agricultural helicopters in the course of navigation and ferry flights.

(2A) For the purposes of subparagraph 5.2 (2), an applicant for an agricultural pilot (helicopter) rating grade 1 must:

(a) hold a commercial pilot (helicopter) licence or an air transport pilot (helicopter) licence; and

(b) hold, or have held, an agricultural pilot (helicopter) rating grade 2.

(3) Aeronautical experience gained in approved synthetic flight trainers shall not contribute to the minimum aeronautical experience specified in this section.

6 Aeronautical skill

6.1 An applicant for the issue of an agricultural pilot (aeroplane) rating must pass a flight test of his or her ability to carry out in an aeroplane all normal and emergency flight manoeuvres and procedures which may be encountered in the performance of all types of agricultural operations.

6.2 An applicant for the issue of an agricultural pilot (helicopter) rating must pass a flight test of his or her ability to carry out in a helicopter all normal and emergency flight manoeuvres and procedures which may be encountered in the performance of all types of agricultural operations.

Note Requirements for the conduct of the test are set out in subsection 10.

7 Authority given by rating

7.1 Unless specifically approved by CASA the holder of an agricultural pilot (aeroplane) rating, or an agricultural pilot (helicopter) rating may not engage in aerial work agricultural operations unless he or she is employed by or contracted to the holder of an aerial work agricultural operator licence.

7.1.1 Subject to this subsection, an agricultural pilot (aeroplane) rating authorises the holder of the rating to fly as pilot in command, or co-pilot, of an aeroplane that is engaged in agricultural operations.

7.2

(1) Following the initial issue of an agricultural pilot (aeroplane) rating grade 2 a pilot shall remain under the direct or indirect supervision of an approved agricultural (aeroplane) pilot for a minimum of 110 hours flight time logged on agricultural operations. The initial 10 hours of this period shall be under direct supervision followed by a further 10 hours direct supervision during the next 100 hours gained upon agricultural operations. The approved pilot shall certify in the pilots logbook when the periods of supervision have been completed and notify CASA in writing in accordance with Appendix IV.

Note Where possible the initial 10 hours direct supervision on agricultural operations should be provided by the Agricultural Flying School where training for issue of the rating was carried out.

(2) An agricultural pilot (aeroplane) rating does not authorise the holder of the rating to fly a particular type of aeroplane in agricultural operations unless the holder also holds an aircraft endorsement for that type of aeroplane and has experienced, at a safe altitude, the stall characteristics and turning performance of the specific type of aeroplane in a configuration where it is equipped for agricultural operations and is loaded to a representative operational weight. This experience shall be obtained under the direct supervision of an approved agricultural (aeroplane) pilot who is himself or herself experienced on that type of aeroplane.

7.2.1 Subject to this subsection, an agricultural pilot (helicopter) rating authorises the holder of the rating to fly as pilot in command, or co-pilot, of a helicopter that is engaged in agricultural operations.

7.3

(1) Following the initial issue of an agricultural pilot (helicopter) rating grade 2, a pilot shall remain under the direct supervision of an approved agricultural (helicopter) pilot for a minimum of 20 hours flight time logged on agricultural operations in a helicopter before he or she may operate on an unrestricted basis. The approved pilot shall certify in the pilot's logbook when the period of supervision has been completed and notify CASA in writing in accordance with Appendix V.

8 Exemptions

8.1 An applicant for issue of an agricultural pilot (aeroplane) rating who is able to produce satisfactory evidence that he or she:

(a) is the holder of an agricultural rating that meets the training and experience requirements of this section and has obtained a minimum of 150 hours agricultural flight time including 50 hours flight time on agricultural operations during the previous 12 months; or

(b) has a minimum of 250 hours agricultural flight time with 50 hours gained in spraying operations and including 50 hours on agricultural operations during the previous 12 months;

may be exempt from the training specified at subparagraph 5.1 (1), and the supervision periods specified at subparagraph 7.3 (1) of this section. Such an applicant will be required to pass the written examination specified at subsection 4 and satisfactorily complete the flight test required by paragraph 6.1 of this section.

8.2 An applicant for issue of an agricultural pilot (aeroplane) rating grade 2 who is able to produce satisfactory evidence that he has completed a course of training that is equivalent to that specified at Appendix II may be exempt from the training specified at subparagraph 5.1 (1) of this section. Such an applicant will be required to pass the written examination specified at subsection 4 and satisfactorily complete the flight test required by paragraph 6.1 of this section.

8.3 An applicant for issue of an agricultural pilot (helicopter) rating who is able to produce satisfactory evidence that he or she has obtained a minimum of 75 hours helicopter agricultural flight time may be exempt from the training specified at subparagraph 5.2 (1) and the supervision period specified at subparagraph 7.3 (1). Such an applicant will be required to pass the written examination specified at subsection 4 and to satisfactorily complete the flight test required by paragraph 6.2.

9 Duration

9.1 For the purposes of subregulation 5.17 (3), an agricultural pilot (aeroplane) rating remains in force until the holder of the rating no longer holds a commercial pilot (aeroplane) licence or an air transport pilot (aeroplane) licence.

9.2 For the purposes of subregulation 5.17 (3), an agricultural pilot (helicopter) rating remains in force until the holder of the rating no longer holds a commercial pilot (helicopter) licence or an air transport pilot (helicopter) licence.

10 Examinations and tests

10.1 An applicant for an agricultural pilot (aeroplane) rating or an agricultural pilot (helicopter) rating must pass an oral examination, and a flight test, conducted by:

(a) an approved person; or

(b) an approved testing officer; or

(c) CASA and either:

(i) an approved person; or

(ii) an approved testing officer.

10.1.1 The flight test mentioned in paragraph 6.1 must be conducted in a dual equipped agricultural aeroplane and in a single place agricultural aeroplane.

10.2 The examination and test shall be conducted at a time and a place mutually convenient to the applicant, the approved pilot and CASA.

10.3 Aircraft to be used in flight tests

(1) For the dual flight tests the applicant shall provide an agricultural aircraft of a type, mutually agreed upon with the person conducting the test, which shall be equipped:

(a) with fully functioning dual controls; and

(b) with electronic intercommunication; and

(c) to simulate spraying operations; and

(d) to provide adequate vision for the applicant and the person conducting the test; and

(e) to carry and jettison a representative agricultural load.

(2) For the solo flight test the applicant shall provide the agricultural aeroplane of the type used in his solo training.

10.4 If a person:

(a) attempts the flight test mentioned in paragraph 6.1 before he or she has passed the examination mentioned in paragraph 4.1; or

(b) attempts the flight test mentioned in paragraph 6.2 before he or she has passed the examination mentioned in paragraph 4.2;

the person is taken not to have passed the flight test.

10.5 CASA may approve a person for the purposes of subparagraph 10.1 (a) or 10.1 (c).

11 Recent experience requirements

11.1 The holder of an agricultural pilot (aeroplane) rating must not fly an aeroplane that is engaged in agricultural operations unless:

(a) the holder has, within the period of 1 year immediately before the day of the proposed flight, flown at least 50 hours of flight time as pilot in command of an aeroplane engaged in agricultural operations; or

(b) he or she has, within the period of 1 year immediately before the day of the proposed flight, satisfied the requirements of paragraph 12.1.

11.2 The holder of an agricultural pilot (helicopter) rating must not fly a helicopter that is engaged in agricultural operations unless:

(a) the holder has, within the period of 1 year immediately before the day of the proposed flight, flown at least 50 hours of flight time as pilot in command of a helicopter engaged in agricultural operations; or

(b) he or she has, within the period of 1 year immediately before the day of the proposed flight, satisfied the requirements of paragraph 12.2.

12 Flight check required

12.1 For the purposes of subregulation 5.16 (1), it is a condition of each agricultural pilot (aeroplane) rating grade 2 that the holder must comply with paragraph 12.2.

12.1.1 For the purposes of subregulation 5.16 (1), it is a condition of each agricultural pilot (helicopter) rating grade 2 that the holder must comply with paragraph 12.2.3.

12.2 The holder of an agricultural pilot (aeroplane) rating grade 2 must not fly an aeroplane in agricultural operations if 13 months have passed since the grade 2 rating was initially issued to the holder unless he or she has satisfactorily completed an agricultural aeroplane flight check conducted in accordance with paragraph 12.2.1.

12.2.1 An agricultural aeroplane flight check must be conducted by:

(a) CASA and an approved agricultural (aeroplane) pilot; or

(b) an approved testing officer;

and not before 9 months after the grade 2 rating was initially issued to the holder.

12.2.2 If the requirements of paragraph 12.2.1 are not satisfied in relation to an agricultural aeroplane flight check, the holder is taken not to have satisfactorily completed the check.

12.2.3 The holder of an agricultural pilot (helicopter) rating grade 2 must not fly a helicopter in agricultural operations if 13 months have passed since the grade 2 rating was initially issued to the holder unless he or she has satisfactorily completed an agricultural helicopter flight check conducted in accordance with paragraph 12.2.4.

12.2.4 An agricultural helicopter flight check must be conducted by:

(a) CASA and an approved agricultural (helicopter) pilot; or

(b) an approved testing officer;

and not before 9 months after the grade 2 rating was initially issued to the holder.

12.2.5 If the requirements of paragraph 12.2.4 are not satisfied in relation to an agricultural helicopter flight check, the holder is taken not to have satisfactorily completed the check.

12.3 In this subsection:

agricultural aeroplane flight check means a check of the aeronautical skills and aeronautical knowledge relevant to agricultural operations conducted in an aeroplane of the person undertaking the check.

agricultural helicopter flight check means a check of the aeronautical skills and aeronautical knowledge relevant to agricultural operations conducted in a helicopter of the person undertaking the check.

13 Approved pilots

13.1 An applicant for approval to conduct initial agricultural flying training or operational flying training shall have the following minimum experience on agricultural operations in the kind of aircraft for which he or she requests approval:

(a) aeroplanes — 2 000 hours of which a minimum of 1 000 hours shall have been gained on spraying operations and 500 hours on top dressing operations; or

(b) helicopters — 1 000 hours or such lesser amount as may be approved by CASA.

The applicant shall also pass a flight test and an oral examination to the satisfaction of CASA. For the flight test, the applicant shall provide an aircraft equipped as specified in subparagraph 10.3 (1) of this section.

13.2 An applicant for approval to conduct direct and indirect supervision or agricultural conversion training shall have the following minimum experience on agricultural operations in the kind of aircraft for which he requests approval:

(a) aeroplanes — 1 000 hours of which a minimum of either 250 hours shall have been gained upon spraying operations or 250 hours upon top dressing operations, depending on the applicable operation; or

(b) helicopters — 500 hours or such lesser amount as may be approved by CASA.

13.3 Approvals for initial and operational agricultural flying training may be renewed annually subject to the applicant having obtained a minimum of 100 hours on agricultural operations during the previous 12 months and also, as required by CASA, subject to the satisfactory completion of a flight test.

13.4 Approval for direct or indirect supervision or agricultural aircraft conversion or endorsement training may be renewed with the agricultural rating.

14 Logging of flight time

14.1 All flight time flown on agricultural operations shall be entered in the pilot's log book as such, and entries shall indicate the particular type of operation e.g. spraying, top dressing and the geographical area in which the flight time was gained.

14.2 Agricultural operations under supervision shall be annotated as such, including the name of the supervising pilot, and the log book entries shall indicate whether the supervision was direct or indirect.

14.3 Flight time entered in pilots log book shall be certified:

(a) by the approved pilot — on completion of the operational agricultural flying training; or

(b) by the Company Chief Pilot:

(i) on termination of employment; and

(ii) as required by CASA.

Appendix 1

Aeronautical knowledge standards

Syllabus of training for agricultural rating

Note The aeronautical knowledge standards are common to both piston and turbine-powered aeroplanes and helicopters, except where specifically stated.

1 Aircraft and equipment

1.1 Care and maintenance of aircraft and role of equipment in the field

1.1.1 Explain pilot responsibilities for the following:

(a) maintenance releases;

(b) repair, replacement and overhaul of fitted role equipment.

1.1.2 List maintenance that may be carried out by Commercial Pilot Licence (***CPL***) or Airline Transport Pilot Licence (***ATPL***) holders.

1.1.3 Explain the following:

(a) minimum equipment list for flights under Visual Flight Rules (***V.F.R.***);

(b) permissible unserviceability;

(c) minimum instruments required for aerial application operations under V.F.R.

1.2 Servicing and ground handling

Explain operation and removal of tie down equipment, locking and safety devices (e.g. gust locks), covers, etc. and procedure for use of towing vehicles.

1.3 Pre-flight and after-flight inspection

1.3.1 Explain areas for particular attention (e.g. precautions for hosing down, how to identify damage/cracks/corrosion, care of brakes, undercarriage, etc.).

1.3.2 Describe inspection and flight preparation of aircraft exposed to outside parking and harsh environmental conditions (e.g. wing and control surfaces exposed to freezing conditions, engine, battery care, etc.).

1.3.3 Explain inspection requirements for aircraft role and equipment, including secure fittings of booms, spreader, hoses, pumps and operations of the dump equipment.

1.3.4 Explain fuelling procedures, including drum stowage, use and care of pumps, fuel testing, use of safety equipment/fire extinguishers, vehicle positioning and fuel quantity checks.

1.3.5 Explain the responsibilities of the pilot in command and the operator in hot refuelling, including:

(a) the procedures and equipment required for hot refuelling; and

(b) the inspection and testing of the fuel system; and

(c) the safety precautions with regard to radio transmissions.

1.3.6 Explain action in event of fire hazard.

1.4 Starting and ground operations of engines

1.4.1 Explain inspection requirement for fire hazard prior to starting and state fire safety precautions.

1.4.2 State engine-start safety distances and sectors from buildings, other aircraft, exposed public areas and fuelling equipment.

2 Operational planning and operations

2.1 Ground inspection

2.1.1 Explain operating area inspection methods and purpose.

2.1.2 Explain limitations of ground inspections.

2.2 Flight between airstrip and operating area

2.2.1 Explain low flying permission relating to aerial application operations, including the associated inspection flights and transit flights from aerodrome or aircraft landing area (***ALA***) to a treatment area.

2.2.2 Explain the low flying restrictions, planning notice, precautions and procedures with respect to overflying or in close proximity to buildings during aerial application operations, including stating the required safety distances and minimum height from buildings.

2.3 Operations on, or in vicinity of, non-controlled and controlled aerodromes or airstrips

2.3.1 State restrictions and conditions on aerial application operations at aerodromes with movements of regular public transport aircraft.

2.3.2 Explain the circuit requirements at various types of aerodromes and ALA, including conditions applying to exemption from compliance with CASA notified procedures.

2.4 Aerial inspection

2.4.1 Explain the method and purpose [*i.e. how and what are you looking for?*].

2.4.2 Explain the use of mnemonics as an aide-mémoire to key operational planning issues (e.g. “WISHSTANDE”).

2.4.3 Explain key considerations for operations between airstrip and the treatment area and for general low level navigation.

2.4.4 Describe how to locate and plan for the management of obstructions and ground undulations from the air.

2.4.5 Explain low level map reading procedures, including interpretation of topographical details on different maps.

2.5 Weather

2.5.1 State when the use of weather forecast is necessary, including the authorised sources and the conditions governing their uses.

2.5.2 Explain how to obtain and interpret aviation meteorological forecasts and charts.

2.5.3 Describe the effects of inversion on aerial application.

2.5.4 Describe indicators of mechanical and thermal turbulence and shifting wind and explain implications for low level aerial application.

2.5.5 Describe cloud types as indicators of approaching or existing weather conditions, including associated flying conditions.

2.5.6 Describe winds affecting low level flying and associated flying conditions.

2.5.7 Describe the effect of mountainous influence on airflow and associated flying conditions.

2.5.8 Describe types of fog and their formation.

2.5.9 Describe weather phenomena hazardous to low flying operations.

2.5.10 Recall the terrain and weather conditions that may lead to disorientation during low level flight (e.g. flight into rising ground and toward low ground, false horizons, ridgeline and valley effects) and explain pilot corrective action.

2.5.11 Explain typical terrain and seasonal effects on local wind direction, strength and mechanical or thermal turbulence.

2.6 Planning and risk control

Describe the planning tools available to an aerial application pilot, including:

(a) explaining SWOT analysis and identifying elements of strength, weakness, opportunities and threats in SWOT analysis in planning the conduct of an aerial application; and

(b) describing the process of risk assessment, including the following:

(i) identifying potential hazards or risk using SWOT analysis;

(ii) describing what a risk assessment matrix is, and how to use it;

(iii) assessing risk — probability versus severity, bias in assessments of risk;

(iv) assigning priority to identified risk; and

(c) describing risk management, including:

(i) explaining the use of risk management hierarchy such as eliminating risk, substituting for a smaller risk, engineering around risk and administering around risk; and

(ii) describing typical strategies to apply for each level of the risk management hierarchy; and

(iii) identifying who will do what, when and how and with what resources; and

(d) explaining what is an aerial Application Management Plan (***AMP***), including:

(i) describing its key components and how it affects safety of the flight (but excluding those related to chemicals and their handling); and

(ii) the importance of decision making, including the influence of capture error and inexperience; and

(iii) the importance of monitoring an AMP, and the need for pilots to match changing conditions; and

(iv) describing typical changing weather conditions that require monitoring, for example, wind direction and speed and estimating their magnitude and direction; inversions and changing atmospheric stability; position of the sun and the danger of its glare; and importance of maintaining a clean, clear and serviceable windscreen.

2.7 Loading

2.7.1 Explain considerations for dumping.

2.7.2 Convert between metric, imperial weights and US weights and measures.

2.7.3 Convert volume to weight for fuel and hopper loading.

3 Operational techniques

3.1 Treatment area

3.1.1 Describe methods of treatment (for main runs and clean up swaths), given:

(a) wind direction; and

(b) sun glare; and

(c) obstructions, particularly wires and powerlines; and

(d) irregular shaped areas; and

(e) types of application (e.g. spraying, seeding, top dressing, etc).

3.1.2 Describe problems associated with top dressing application, such as hilly terrain, downdraughts, turbulence, false horizon effect, high country and irregular areas.

3.1.3 Explain precautionary actions before starting a clean-up.

3.1.4 Explain selection, placement and type of markers.

3.1.5 Explain how to identify wire runs, and minimise associated risks, with the following:

(a) preliminary inspection of treatment area;

(b) how to judge distance to the wire;

(c) the danger and forms of distraction;

(d) considerations for flying above or under the wire;

(e) considerations for crossing oblique wires;

(f) visual cues of wire locations such as pole runs, type, numbers and attitude of insulators, cross stress and angle of cross stress, supplementary or spur wires and buildings;

(g) characteristics and dangers of high wires and guy wires;

(h) factors affecting misjudgement of wire clearance;

(i) how to maintain awareness of located wires;

(j) the hazards of mental overload.

3.2 Describe the operation of DGPS for track guidance, including the importance of maintaining an active scan outside the cockpit while referencing the DGPS.

4 Human factors

4.1 Dehydration

4.1.1 Describe the symptoms of dehydration.

4.1.2 List fluids suitable for re-hydration and explain why.

4.2 Fatigue

4.2.1 Recall and explain single pilot V.F.R. fatigue symptoms and management.

4.2.2 Explain what are “acute” and “chronic” fatigues.

4.2.3 Explain the effects of fatigue on information processing.

4.2.4 Explain how to prevent and treat cases of flight crew fatigue.

4.2.5 Explain the biological clock and how it affects flight crew.

4.3 Stress

Explain:

(a) the effects of stress on information processing; and

(b) the relationship between stress and arousal; and

(c) the management of stress; and

(d) the physical stress of acceleration forces on the human body and recall the “g” limitations for the average pilot.

4.4 Drugs

4.4.1 Explain the undesirable effects of over the counter and prescription drugs, in particular, the side effects of:

(a) aspirin, antihistamines, nasal decongestants; and

(b) amphetamines, tranquillisers, sedatives, antibiotics; and

(c) cold and cough mixtures; and

(d) excessive caffeine.

4.4.2 Explain what safety precautions a pilot must observe when taking “over the counter” or prescription drugs.

4.5 Spatial disorientation and illusions

4.5.1 Describe and explain:

(a) flight circumstances that may produce disorientations and visual illusions such as false horizon, illusions encountered in manoeuvring and illusions encountered in approach and landing; and

(b) equilibrium system illusions such as flicker vertigo, somatogravic and somatogyral illusion.

4.5.2 Explain how to identify, prevent and overcome states of disorientation and illusion.

4.6 Influences on safe aerial application operations

Explain how safe aerial application may be influenced by:

(a) attitude, culture, and climate; and

(b) operational awareness; and

(c) planning and risk control.

4.7 Hazardous attitudes

Explain attitudes such as:

(a) anti-authority; and

(b) deference; and

(c) invulnerability; and

(d) impulsiveness; and

(e) macho; and

(f) resignation.

4.8 Conflict management

Describe the symptoms of conflict and explain the strategies that can be implemented to manage conflict.

4.9 Organisational culture

Explain how organisational culture and safety climate affects safe operations, including the following:

(a) recall and explain Reason's 4 essential components of a genuine safety culture;

(b) recall and explain Westrum's 3 types of organisational culture;

(c) influence of pilots on organisational culture;

(d) relationship between organisational culture and safety climate.

4.10 Decision making

Explain decision-making concepts, including the following:

(a) models of decision making;

(b) role of memory and experience in decision making;

(c) relationship between situation awareness and decision making.

4.11 Aeronautical risk management

Explain decision-making traps, such as:

(a) simple rules; and

(b) law of small numbers; and

(c) confirmation bias; and

(d) "get-home-itis" (motivation); and

(e) gambler's fallacy (misconceptions of chance); and

(f) false hypothesis; and

(g) experience biases (capture error); and

(h) problems with checklists.

4.12 Source of social influence on pilots

Explain the types and sources of social influence on pilots, including the following:

(a) authority;

(b) peers;

(c) competition;

(d) perfection;

(e) groupthink;

(f) risky shift.

5 Legislation relating to aerial application operations

5.1 Calculate flight and duty time limitations.

5.2 Explain the privileges and limitations of an agricultural rating.

5.3 State the requirements for supervision of a pilot who has a grade 2 agricultural rating.

5.4 Explain low flying permissions and restrictions for aircraft engaged in ferry to/from and during aerial application operations.

5.5 State requirements applicable to aerial application operations in the vicinity of government or licensed aerodromes.

5.6 Explain weight and performance applicable to aerial application operations.

6 Aircraft performance (aeroplane only)

6.1 Explain the reasons and how temperature, height above mean sea level (***AMSL***), pressure, humidity, weight, field surface and relative wind affect:

(a) lift-off distance; and

(b) climb angle, rate of climb; and

(c) landing stop distance.

6.2 Explain the reasons and how temperature, pressure, height and humidity affect power available, including calculating pressure and density height.

6.3 Determine weight and balance and take-off distance from performance charts, including:

(a) maximum payload/fuel that may be carried; and

(b) the position of the CG under different load configurations; and

(c) ensuring that the CG remains within limits throughout the flight.

6.4 Explain how loads and turn rate affect aircraft performance (stall speed, angle of attack, inertia).

6.5 Describe the minimum physical standards for an aerial application airstrip.

6.6 Explain the aerodynamic forces at play during maximum rate turning and incipient stall.

6.7 Explain the effects of rolling "G" on aircraft.

6.8 Given a nominal straight and level stall speed, calculate stall speed at 30º, 45º and 60º angles of bank.

6.9 Explain factors to be considered during fixed radius turns onto downwind (e.g. effect of wind gradient, rolling "g", bank angle on stall speed, sensory illusion of groundspeed (G/S) versus IAS, drift, slip, skid).

6.10 Explain ground effect.

6.11 Explain possible aerodynamic and controllability effects associated with load dumping.

7 Aircraft performance (helicopter only)

7.1 Explain the reasons and how temperature, pressure, height AMSL, humidity, weight, ground surface and relative wind affect:

(a) hover performance; and

(b) distance to achieve translational lift; and

(c) climb angle, rate of climb.

7.2 Explain the reasons and how temperature, pressure, altitude and humidity affect power available and power required to calculate pressure and density height.

7.3 Determine payload (under IGE and OGE conditions) and helicopter balance using performance charts, including the following:

(a) maximum payload/fuel that may be carried;

(b) calculation of CG under different load configurations;

(c) calculation of payload and fuel to retain CG within limits throughout the flight;

(d) arithmetic calculations to reposition internal equipment to adjust CG position;

(e) distribution of internal equipment in accordance with deck loading limits.

7.4 Recall the standards recommended for "basic" and "standard" helicopter landing sites (***HLS***).

7.5 Explain ground effect, Vne and retreating blade stall.

7.6 Rotor disc behaviour under reduced/negative "g"

7.6.1 Explain the relationship between cyclic input, disc attitude, rotor hub/shaft position and fuselage responsiveness on a teetering head helicopter system under 1 "g", negative "g" and normal disc loading conditions.

7.7 Explain "control power".

7.8 Dynamic rollover

Explain:

(a) what is dynamic rollover; and

(b) how to avoid dynamic rollover; and

(c) how to correct in a dynamic rollover situation.

7.9 Loss of tail rotor effectiveness (***LTE***)

Explain:

(a) the phenomenon of LTE; and

(b) factors that contribute to LTE (high density altitude, high gross weight, turning down wind at low airspeed i.e. below the speed for minimum powered level flight, exceeding manufacturer recommended relative wind and operating gross weight limits); and

(c) indications of LTE; and

(d) recovery from LTE.

7.10 Explain the implications of flying inside the helicopter height or velocity avoid curve.

7.11 Explain the degradation of performance with contamination on rotor blades (e.g. mud picked up by rotor wash during hovering operations).

Appendix II

Agricultural pilot rating

Flying training for issue of agricultural pilot (aeroplane) rating

Syllabus 1 — initial agricultural flying training

Minimum flight time — 10 hours dual

Sequences		Dual allocation (guide)
1	**Low level familiarisation**	2 hours
	(a) Low flying (50-100 feet).	
	(b) Medium, steep and maximum rates turns reducing to 300 ft (effect of wind — apparent slip and skid).	
	(c) Climbing turns.	
	(d) Engine failure (forced landings from low altitude) and methods of losing height.	
	(e) Full stall recovery by 300 ft. Incipient stall at 300 ft with maximum height loss of 100 ft.	
2	**Take-off and landing**	1½ hours
	(a) Short take-off and landing revision.	
	(b) Cross wind take-off and landing revision.	
	(c) Down wind take-off and landing.	
	(d) Effect of wind on take-off distance and angle of climb.	
	(e) Engine failure on take-off.	
	(f) Effect of airstrip surface, gradient.	
3	Top dressing technique — familiarisation	
	(a) Flying at top dressing height. Estimation and maintenance of height.	
	(b) Selection of natural markers.	
	(c) Procedure turns. Use of flap.	
	(d) Low flying in hilly terrain (top dressing height).	
	(e) Approach to high ground — escape route.	
	(f) False horizon effect.	
	(g) Effect of wind, turbulence, up and down draughts.	
4	**Low flying near to power lines — familiarisation**	2 hours
	(a) Assessment and location of power line runs. Visual clues. Poles, cross trees, insulators as indicators of wire runs.	
	(b) Low flying adjacent to power lines.	
	(c) Problems of judgement associated with power lines — use of natural markers to indicate wire position.	

(d) Flying under power lines.

5 Spraying technique — familiarisation 3 hours

(a) Low flying at spraying height.

(b) Procedure turns, racetrack patterns.

(c) Lining up and tracking on markers.

(d) Pull up and let down over obstacles.

(e) Flying between and adjacent to obstacles — effect of wind.

(f) Use of power.

(g) Effect of wind. Turbulence, wind gradient, constant groundspeed over treatment area.

(h) Forced landings from low altitude.

Syllabus 2 — operational agricultural flying training

Minimum flight time 30 hours of which 20 hours shall be dual instruction and 10 hours shall be solo flying in a single place agricultural aeroplane. A minimum of 10 hours each must be completed in both top dressing and spraying techniques. All flying to be conducted as far as practicable, under operational or highly simulated operational conditions, with aircraft progressively loaded to agricultural maximum take-off weight. With the exception of sequence number 2 solo sequences at agricultural maximum take-off weight are to be confined to application techniques and are not to be attempted until a minimum of 18 hours dual instruction has been completed. Solo sequences should be confined to the less hazardous areas of training. Experience in operating from agricultural airstrips is to be included, and in particular top dressing strips.

Sequences **Flight time allocation (guide)**

1 Pre-operational planning — home base. Ground training.

2 Conversion onto single place agricultural aircraft — with particular reference to aircraft characteristics at the threshold of the stall at agricultural loadings. 1 hour solo

3 Flight to and landing at operational airstrip 2 hours dual
1 hour solo

(a) Low level map reading, including interpretation of ordinance survey maps.

(b) Airstrip identification, following interrogation of farmer regarding airstrips physical features and local hazards.

(c) Approach and landing.

(d) Effect of surface conditions, gradient, cross winds and wind gradients.

4 Operational planning Ground training plus
2 hours dual

(a) Aerial inspection of treatment area.

(b) Times for supplementary ground inspection.

(c) The treatment plan — considerations.

(d) Briefing loader-driver and markers.

(e) Effect of sun glare and turbulence.

(f) Possibility of conflicting low level traffic.

5 Flight between operational airstrip and treatment area 1 hour dual
1 hour solo

(a) Departure and cruise — engine failure.

(b) Flying parallel to high ground — turbulence.

(c) Flying up and down slopes — up and down draughts.

(d) Flight into valleys and across ridges — false horizon and turbulence.

6 Flying adjacent to wires 2 hours dual
1 hour solo

(a) Revision of clues and indications of wire runs.

(b) Flying over, under, parallel to and converging with wires.

(c) Familiarisation with problems associated with wires. Sag between poles — ambient temperature and sag relationship, junction of several wires to 1 pole — how many are acceptable. Stay and guy wires. Judgement of distance from wires — high and low wires together. Poles hidden in trees. Single wire earth return systems (SWER lines) likely places for wires — common sense. Dangers of familiarity and complacency.

7 Application techniques — top dressing 4 hours dual
2 hours solo

(a) Operational planning: shape, terrain, obstacles, sun, wind.

(b) Application: height to fly, selection of natural markers, keeping straight on markers, estimation of swath width, adjustment of swath width to load, output rate and length of run, appreciation of drift.

(c) Procedure turns — use of flap and power.

(d) Operation of spreading control.

(e) Operation and effect of dump — correct time to dump.

(f) Effect of changing load on trim, control and performance.

(g) Positioning of aircraft at loader.

(h) Complete treatment of area: clean up runs, re-assessment of obstacles.

(i) Engine failure.

(j) Effect of application equipment upon aircraft performance.

8 Application techniques — spraying 9 hours dual
4 hours solo

(a) Operational planning. Calibration of aircraft's application equipment.

(b) Use of human markers: briefing, positioning for visibility and safety from aircraft and spray drift.

(c) Appreciation of drift, and use of drift and turbulence as aids to deposition.

(d) Tracking on markers including use of natural markers.

(e) Procedure turns — use of flap. Race track patterns.

(f) Operation of spray control.

(g) Operation and effect of dump — correct time to dump.

(h) Effect of changing load on trim, control and performance.

(i) Swath laying in relation to wires.

(j) Complete treatment of area: clean up runs, re-assessment of obstacles.

(k) Engine failure.

(l) Dangers of excessive mental load and distractions from actual job in hand.

(m) Appreciation of various application heights required and associated problems.

Appendix III

Agricultural pilot rating

Flying training for issue of agricultural pilot (helicopter) rating

Syllabus 1 — initial agricultural flying training

Minimum flight time — 3 hours dual

1. Hover and slow flight.

   In and out of ground effect, pattern flying, manoeuvring close to obstructions, upwind, downwind, crosswind.

2. Translational flight (20-40 kts).

   Low level, steep turns, climbing turns, tracking cross wind, quick stops, torque control.

3. Autorotative landings.

   Normal, low level and from the hover.

4. Take-offs and landings.

   Restricted area operation.

   Note Maximum all up weight operations should be included in all training above.

Syllabus 2 — operational agricultural flying training

Minimum flight time — 7 hours dual. To be conducted under operational conditions with spraying equipment installed and including a minimum of 4 hours on actual spraying training.

1. Treatment area — inspection.

   (a) from ground;

   (b) from air.

   Obstructions, boundaries, markers, plan of operation.

2. Flight to and from treatment area.

   Route selection, height to fly, identification of treatment area.

3. Treatment — general.

   Height to fly, speed to fly, manoeuvring turns, use of markers.

4. Treatment of difficult area.

   Manoeuvring close to obstructions, height to fly, speed to fly, flight over and under wires, crop protections, irregular terrain, contour flying.

   Dangers of excessive mental load and distraction from the actual job in hand.

Appendix IV

Aeroplanes — certification on completion of period under supervision

This is to certify that ..... has completed

..... hours aerial agricultural operations including

.....hours under direct supervision.

I consider that he is competent to undertake these operations on an unrestricted basis.

Date ..... Signed ..... Approved pilot

Note The approved pilot is required to:

(a) certify as shown above in the pilot's log book; and

(b) complete the certificate above and forward it to CASA.

Appendix V

Helicopters — certification on completion of direct supervision

This is to certify that..... has completed .....hours agricultural operations on helicopters under my direct supervision according to the requirements of subparagraph 7.3 (1) of CAO 40.6 and is competent to undertake these operations without supervision.

Date .....Signed .....Approved pilot

Note The approved pilot is required to:

(a) certify as shown above in the pilot's log book; and

(b) complete the certificate above and forward it to CASA.

Notes to Civil Aviation Order 40.6

Note 1

The Civil Aviation Order (in force under the *Civil Aviation Regulations 1988*) as shown in this compilation comprises Civil Aviation Order 40.6 amended as indicated in the Tables below.

Table of Orders

Year and number	Date of notification in *Gazette*/ registration on FRLI	Date of commencement	Application, saving or transitional provisions
CAO 2004 No. R42	8 December 2004	8 December 2004 (*see* s. 2)	
CAO 40.6 2008 No. 1	FRLI 17 April 2008 (*see* F2008L01010)	18 April 2008 (*see* s. 2)	

Table of Amendments

ad. = added or inserted am. = amended rep. = repealed rs. = repealed and substituted

Provision affected	How affected
s. 40.6	rs. CAO 2004 No. R42
Appendix 1	rs. CAO 40.6 2008 No. 1