CIVIL AVIATION GUIDANCE MATERIAL – 1801

AIRCRAFT MAINTENANCE LICENCE

CAAM Part 66

CIVIL AVIATION AUTHORITY OF MALAYSIA

ISSUE 01
REVISION 01 – 15TH NOVEMBER 2022

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Civil Aviation Guidance Material Components and Editorial practices

This Civil Aviation Guidance Material is made up of the following components and are defined as follows:

Standards: Usually preceded by words such as *"shall"* or *"must"*, are any specification for physical characteristics, configuration, performance, personnel or procedure, where uniform application is necessary for the safety or regularity of air navigation and to which Operators must conform. In the event of impossibility of compliance, notification to the CAAM is compulsory.

Recommended Practices: Usually preceded by the words such as "*should"* or "*may*", are any specification for physical characteristics, configuration, performance, personnel or procedure, where the uniform application is desirable in the interest of safety, regularity or efficiency of air navigation, and to which Operators will endeavour to conform.

Appendices: Material grouped separately for convenience but forms part of the Standards and Recommended Practices stipulated by the CAAM.

Definitions: Terms used in the Standards and Recommended Practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have an independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.

Tables and Figures: These add to or illustrate a Standard or Recommended Practice and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

Notes: Included in the text, where appropriate, Notes give factual information or references bearing on the Standards or Recommended Practices in question but not constituting part of the Standards or Recommended Practices;

Attachments: Material supplementary to the Standards and Recommended Practices or included as a guide to their application.

It is to be noted that some Standards in this Civil Aviation Guidance Material incorporates, by reference, other specifications having the status of Recommended Practices. In such cases, the text of the Recommended Practice becomes part of the Standard.

The units of measurement used in this document are in accordance with the International System of Units (SI) as specified in CAD 5. Where CAD 5 permits the use of non-SI alternative units, these are shown in parentheses following the basic units. Where two sets of units are quoted it must not be assumed that the pairs of values are equal and interchangeable. It may, however, be inferred that an equivalent level of safety is achieved when either set of units is used exclusively.

Any reference to a portion of this document, which is identified by a number and/or title, includes all subdivisions of that portion.

Throughout this Civil Aviation Guidance Material, the use of the male gender should be understood to include male and female persons.

Record of Revisions

Revisions to this CAGM shall be made by authorised personnel only. After inserting the revision, enter the required data in the revision sheet below. The *'Initials'* has to be signed off by the personnel responsible for the change.

Rev No.	Revision Date	Revision Details	Initials
ISS01/REV01	15th November 2022	Refer to summary highlights	CAAM

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Summary of Changes

ISS/REV no.	Item no.	Revision Details
ISS01/REV01	Para 1.1.7	Added requirement on renewal application
	Para 1.1.8	Added requirement on renewal application
	Para 3.4	Title reworded for clarity
	Appendix 1 – Para 2.4	Incorporated content of CAC 08/2021

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1 General (CAD 1801 1)

1.1 CAD 1801 1.7 – Application for Aircraft Maintenance Licence

1.1.1 Maintenance experience should be written up in a manner that the reader has a reasonable understanding of where, when and what maintenance constitutes the experience. A task by task account is not necessary but at the same time a blank statement 'X years maintenance experience completed is not acceptable. A log book of maintenance experience is desirable and may require such log book to be kept. It is acceptable to cross refer in the CAAM Part 66 Aircraft Maintenance Experience Logbook to other documents containing information on maintenance.

1.1.2 Applicants claiming the maximum reduction in CAD 1801 paragraph 3.2 total experience based upon having successfully completed of approved basic training should include the Part-147 certificate of recognition for approved basic training.

1.1.3 Applicants claiming reduction in CAD 1801 paragraph 3.2 total experience based upon having successfully completed technical training in an organisation or institute which is accepted by CAAM as an organisation or institute, should include the relevant certificate of successful completion of training.

1.1.4 An application for Category C as specified in CAD 1801 paragraph 3.2.1, shall be accompanied with evidence of needs by the Approved Maintenance Organisation (AMO) and supported with completed assessment by the person responsible for quality assurance in the organisation. Additionally, the application shall include evidence of involvement in exercising the privileges in a scheduled base maintenance environment.

1.1.5 An application for issuance of AML and type rating may be submitted concurrently provided the applicant fulfilled the requirements in CAD 1801 paragraph 1.7.2.

1.1.6 Practical assessment should have been completed within 7 years and part of practical assessment must be recent at least 12 months prior to application of issuance of AML as required by CAD 1801 paragraph 1.7.2.(a)(1)(ii).

1.1.7 An application for renewal shall be made within 60 days preceding the date of expiry of the AML.

1.1.8 An application for AML which has expired shall be supported with a letter from the Quality Department of CAAM Part 145 approved maintenance organisation under which the applicant is employed, to declare that the licence holder has not been exercising the certification privileges of the licence since expiry.

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2 Privileges (CAD 1801 2)

2.1 CAD 1801 2.1 – Definitions

2.1.1 **Electrical system** means the aircraft electrical power supply source, plus the distribution system to the different components contained in the aircraft and relevant connectors. Lighting systems are also included in this definition. When working on cables and connectors which are part of these electrical systems, the following typical practices are included in the privileges:

a) Continuity, insulation and bonding techniques and testing;

b) Crimping and testing of crimped joints;

c) Connector pin removal and insertion;

d) Wiring protection techniques.

2.1.2 **Avionics system** means an aircraft system that transfers, processes, displays or stores analogue or digital data using data lines, data buses, coaxial cables, wireless or other data transmission medium, and includes the system's components and connectors. Examples of avionics systems include the following:

a) Autoflight;

b) Communication, Radar and Navigation;

c) Instruments (see NOTE below);

d) In Flight Entertainment Systems;

e) Integrated Modular Avionics (IMA);

f) On-Board Maintenance Systems;

g) Information Systems;

h) Fly by Wire Systems (related to ATA 27 'Flight Controls');

i) Fibre Optic Control Systems.

NOTE: Instruments are formally included within the privileges of the B2 licence holders. However, maintenance on electromechanical and pitot-static components may also be released by a B1 license holder.

2.1.3 **Simple test** means a test described in approved maintenance data and meeting all the following criteria:

a) The serviceability of the system can be verified using aircraft controls, switches, Built-in Test Equipment (BITE), Central Maintenance Computer (CMC) or external test equipment not involving special training.

b) The outcome of the test is a unique go – no go indication or parameter, which can be a single value or a value within an interval tolerance. No interpretation of the test result or interdependence of different values is allowed.

c) The test does not involve more than 10 actions as described in the approved maintenance data (not including those required to configure the aircraft prior to the test, i.e. jacking, flaps down, etc, or to return the aircraft to its initial configuration). Pushing a control, switch or button, and reading the corresponding outcome may be considered as a single step even if the maintenance data shows them separated.

2.1.4 **Troubleshooting** means the procedures and actions necessary, using approved maintenance data, in order to identify the root cause of a defect or malfunction. It may include the use of BITE or external test equipment.

2.1.5 **Line maintenance** means any maintenance that is carried out before flight to ensure that the aircraft is fit for the intended flight. It may include:

a) trouble shooting;

b) defect rectification;

c) component replacement with use of external test equipment, if required. Component replacement may include components such as engines and propellers;

d) scheduled maintenance and/or checks including visual inspections that will detect obvious unsatisfactory conditions/discrepancies but do not require extensive in depth inspection. It may also include internal structure, systems and powerplant items which are visible through quick opening access panels/doors;

e) minor repairs and modifications which do not require extensive disassembly and can be accomplished by simple means;

f) for temporary or occasional cases such as Airworthiness Directives, hereinafter AD; service bulletins, hereinafter SB, the quality manager may accept base maintenance tasks to be performed by a line maintenance organisation provided all requirements are fulfilled. In such cases, CAAM will prescribe the conditions under which these tasks may be performed.

2.1.6 **Base Maintenance** means any task falling outside the criteria that are given above for Line Maintenance.

NOTE: Aircraft maintained in accordance with 'progressive' type programmes need to be individually assessed in relation to this paragraph. In principle, the decision to allow some 'progressive' checks to be carried out is determined by

the assessment that all tasks within the particular check can be carried out safely to the required standards at the designated line maintenance station.

2.1.7 The category C licence permits certification of single maintenance release following a scheduled base maintenance for the complete aircraft after the completion of all such maintenance. The basis for this certification is that the maintenance has been carried out by competent certifying staff from category or subcategory B1 and B2, as appropriate, have signed for the maintenance tasks under their respective authorisation. The principal function of the category C certifying staff is to ensure that all required maintenance has been called up and signed off by the competent certifying staff from category or subcategory B1 and B2, as appropriate, before issue a single maintenance release following a scheduled base maintenance on aircraft. Only category C personnel who also hold category or subcategory B1 and B2 qualifications may perform both roles in base maintenance.

2.2 CAD 1801 2.2.2 – 'In the preceding 24 months period he/she has, either had 6 months of maintenance experience'

2.2.1 The 6 months maintenance experience in 24 months should be understood as consisting of two elements, duration and nature of the experience.

2.2.2 Duration

2.2.2.1 Within an approved maintenance organization:

a) 6 months continuous employment within the same organisation; or

b) 6 months split up into different blocks, employed within the same or in different organisations.

2.2.2.2 The 6 months period can be replaced by 100 days of maintenance experience in accordance with the privileges within the approved maintenance organisation.

2.2.2.3 When licence holder maintains and releases aircraft in accordance with CAD 8602 Chapter 13 in certain circumstances this number of days may even be reduced by 50% when agreed in advance by CAAM. These circumstances consider the cases where the licence holder happens to be the owner of an aircraft and carries out maintenance on his own aircraft, or where a licence holder maintains an aircraft operated for low utilization, that does not allow the licence holder to accumulate the required experience. This reduction should not be combined with the 20% reduction permitted when carrying out technical support, or maintenance planning, continuing airworthiness management or engineering activities. To avoid a too long period without experience, the working days should be spread over the intended 6 months period.

2.2.3 Nature of the experience:

2.2.3.1 Depending on the category of the aircraft maintenance licence, the following activities are considered relevant for maintenance experience:

a) Servicing;

b) Inspection;

c) Operational and functional testing;

d) Trouble-shooting;

e) Repairing;

f) Modifying;

g) Changing component;

h) Supervising these activities;

i) Releasing aircraft to service.

2.2.3.2 For these elements, the minimum requirements to be met may vary depending on the size and complexity of the aircraft and type of operation and maintenance.

2.2.3.3 For category A licence holders, the experience should include exercising the privileges, by means of performing tasks related to the authorization on at least one aircraft type for each licence subcategory. This means tasks as mentioned in CAD 8601 paragraph 5.2 (g), including servicing, component changes and simple defect rectifications.

2.2.3.4 For category B1 and B2 for every aircraft included in the authorisation the experience should be on that particular aircraft or on a similar aircraft within the same licence (sub)category. Two aircraft can be considered to be similar when they have similar technology, construction and comparable systems, which means equally equipped with the following (as applicable to the licence category):

a) Propulsion systems (piston, turboprop, turbofan, turboshaft, jet-engine or push propellers); and

b) Flight control systems (only mechanical controls, hydro-mechanically powered controls or electro-mechanically powered controls); and

c) Avionic systems (analogue systems or digital systems); and

d) Structure (manufactured of metal, composite or wood).

2.2.3.5 For a combination of categories, the experience should include some activities of the nature shown in paragraph 2.2.3 in each category.

2.2.3.6 A maximum of 20% of the experience duration required may be replaced by the following relevant activities on an aircraft type of similar technology, construction and with comparable systems:

a) Aircraft maintenance related training as an instructor/assessor or as a student;

b) Maintenance technical support/engineering;

c) Maintenance management/planning.

2.2.3.7 The experience should be documented in CAAM Part 66 Aircraft Maintenance Experience Logbook or in any other recording system (which may be an automated one) containing the following data:

a) Date;

b) Aircraft type;

c) Aircraft identification i.e. registration;

d) ATA chapter (optional);

e) Operation performed i.e. 100 FH check, MLG wheel change, engine oil check and complement, SB embodiment, trouble shooting, structural repair, STC embodiment, etc.;

f) In the particular case of Part-145 organisations, the type of maintenance i.e. base, line;

g) Type of activity i.e. perform, supervise, release;

h) Category used A, B1, B2, or C.

i) Duration in days or partial-days.

2.3 CAD 1801 2.2.2 – 'Met the provision for the issue of the appropriate privileges'

2.3.1 The sentence 'met the provision for the issue of the appropriate privileges' means that during the previous 2 years the person has met all the requirements for the endorsement of the corresponding aircraft rating. This supersedes the need for 6 months of experience for the first 2 years. However, the requirement of 6 months of experience in the preceding 2 years will need to be met after the second year.

2.4 CAD 1801 2.2.4 – English language

2.4.1 Holders of a CAAM Part-66 AML may not exercise certification privileges unless they have a general knowledge of the language used within the maintenance environment including knowledge of common aeronautical terms

in the language. The level of knowledge should be such that the licence holder is able to:

a) read and understand the instructions and technical manuals used for the performance of maintenance;

b) make written technical entries and any maintenance documentation entries, which can be understood by those with whom they are normally required to communicate;

c) read and understand the maintenance organisation procedures;

d) communicate at such a level as to prevent any misunderstanding when exercising certification privileges.

2.4.2 In all cases, the level of understanding should be compatible with the level of certification privileges exercised.

2.5 CAD 1801 2.2.3 – Adequate competency

2.5.1 The sentence 'has the adequate competency to certify maintenance on the corresponding aircraft' means that the licence holder and, if applicable, the organisation where he/she is contracted/employed, should ensure that he/she has acquired the appropriate knowledge, skills, attitude and experience to release the aircraft being maintained. This is essential because some systems and technology present in the particular aircraft being maintained may not have been covered by the training/examination/experience required to obtain the licence and ratings.

2.5.2 This is typically the case, among others, in the following situations:

a) Type ratings which have been endorsed on a licence in accordance with CAAM Part 66 Aircraft Type Rating List as published by CAAM after attending type training/on-the-job training which did not cover all the models/variants included in such rating. For example, a licence endorsed with the rating Airbus A318/A319/A320/A321 (CFM56) after attending type training/on-the-job training covering only the Airbus 320 (CFM56).

b) Type ratings which have been endorsed on a licence in accordance with CAAM Part 66 Aircraft Type Rating List as published by CAAM after a new variant has been added to the rating, without performing difference training. For example, a licence endorsed with the rating Boeing 737-600/700/800/900 for a person who already had the rating Boeing 737-600/700/800, without performing any differences training for the 737-900.

c) Work being carried out on a model/variant for which the technical design and maintenance techniques have significantly evolved from the original model used in the type training/on-the-job training.

d) Specific technology and options selected by each customer which may not have been covered by the type training/on-the-job training.

e) Changes in the basic knowledge requirements of Appendix 1 of CAD 1801 not requiring re-examination of existing licence holders (grandfathered privileges).

f) Persons meeting the requirements of 6 months of experience every 2 years only on certain similar aircraft types as allowed by CAGM 1801 paragraph 2.2.

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3 Requirements (CAD 1801 3)

3.1 CAD 1801 3.1 – Basic knowledge requirements

3.1.1 The levels of knowledge for each licence (sub)category are directly related to the complexity of the certifications related to the corresponding licence (sub)category, which means that category A should demonstrate a limited but adequate level of knowledge, whereas category B1 and B2 should demonstrate a complete level of knowledge in the appropriate subject modules.

3.1.2 An applicant for AML who did not attend basic training course in accordance with CAD 1821 Chapter 5 shall only sit for CAAM Part 66 examination at CAAM Examination centre and/or appropriate Maintenance Training Organisation (MTO).

3.1.3 Applicant in paragraph 3.1.2 shall complete practical assessment at the MTO which he/she sit for examination, or complete practical assessment at any appropriate MTO or AMO if the applicant has completed examination at CAAM examination centre. Practical assessment may be completed at appropriate AMO, subject to acceptance by CAAM.

3.1.4 AMO which intent to conduct practical assessment for its own employee that has completed all the Basic Examination as specified in CAD 1801 para 3.1, examination at CAAM centre is subject to CAAM acceptance.

3.2 CAD 1801 3.2.1 – Basic experience requirements

3.2.1 While an applicant to a category C licence may be qualified by having 3 years' experience as category B1 or B2 certifying staff only in line maintenance, it is however recommended that any applicant to a category C holding a B1 or B2 licence demonstrate at least 12 months experience as a B1 or B2 base maintenance certifying staff.

3.2.2 A skilled worker is a person who has successfully completed a training, acceptable to the CAAM, involving the manufacture, repair, overhaul or inspection of mechanical, electrical or electronic equipment.

3.2.3 Maintenance experience on operating aircraft:

a) means the experience of being involved in maintenance tasks on aircraft which are being operated by airlines, other air operators, aero clubs, owners, etc., as relevant to the licence category/subcategory:

b) should cover a wide range of tasks in terms of length, complexity and variety;

c) aims at gaining sufficient experience in the real environment of maintenance as opposed to only the training school environment;

d) may be gained within different types of maintenance organisations;

e) may be combined with CAAM Part-147 approved training (or other training approved by the CAAM) so that periods of training can be intermixed with periods of experience, similar to an apprenticeship;

f) may be full-time or part-time, either as professional or on a voluntary basis;

3.2.4 In the case of an applicant for an AML including several categories/subcategories, it is acceptable to combine the periods of experience as long as there is a sufficient experience for each category/subcategory during the required period. Examples:

a) Application for a B1.1 (turbine aeroplanes) + B1.3 (turbine helicopters): The requirement requires 5 years of experience for B1.1 and 5 years of experience for B1.3 for an applicant with no relevant previous technical training:

1) It is not acceptable to combine the experience in a single 5-year period where the applicant has been working for 3 years on turbine aeroplanes and 2 years on turbine helicopters.

2) However, it is acceptable to combine the experience in a single 5-year period if the applicant has been working for 5 years on turbine aeroplanes and turbine helicopters (for example, aeroplanes in the morning, helicopters in the afternoon, or a few days every week on aeroplanes and a few days every week on helicopters).

b) Application for a B1.1 (turbine aeroplanes) + B2 (avionics): The requirement requires 5 years of experience for B1.1 and 5 years of experience for B2 for an applicant with no relevant previous technical training.

1) It is not acceptable to combine the experience in a single 5-year period where the applicant has been working for 3 years on turbine aeroplanes (with no avionics work) and 2 years on avionics systems.

2) However, it is acceptable to combine the experience in a single 5-year period if the applicant has been working for 5 years on structures, powerplant, mechanical and electrical systems and avionics (for B1.1 tasks in the morning, B2 tasks in the afternoon, or a few days every week for B1.1 tasks and a few days every week for B2 tasks).

c) Application for a B1.1, B1.2, B1.3, B1.4 and B2: The requirement requires 5 years of experience for B1.1, B1.3 and B2 and 3 years of experience for B1.2 and B1.4 for an applicant with no relevant previous technical training.

1) In this case, it is very unlikely that the experience for each category/subcategory would be sufficient.

3.3 CAD 1801 3.2.4 – Recent experience

3.3.1 To be considered as recent experience; at least 50% of the required 12-month recent experience should be gained within the 12-month period prior to the date

of application for the aircraft maintenance licence. The remainder of the recent experience should have been gained within the 10-year period prior to application. It must be noted that the rest of the basic experience required by CAD 1801 paragraph 3.2 must be obtained within the 7 years prior to the application.

3.4 CAD 1801 3.2.5 – Experience gained outside civil aircraft maintenance environment

3.4.1 For category A, the additional experience of civil aircraft maintenance should be a minimum of 6 months. For category B1 and B2 the additional experience of civil aircraft maintenance should be a minimum of 12 months.

3.4.2 Aircraft maintenance experience gained outside a civil aircraft maintenance environment may include aircraft maintenance experience gained in armed forces, coast guards, police etc. or in aircraft manufacturing.

3.5 CAD 1801 3.3 – Endorsement with aircraft ratings

3.5.1 When a person already holds a type rating on the licence and such type rating is amended in the CAAM Part 66 'List of Type Ratings' in order to include additional models/variants, there is no need for additional type training for the purpose of amending the type rating in the licence. The rating should be amended to include the new variants, upon request by the applicant, without additional requirements. However, it is the responsibility of the licence holder and, if applicable, the maintenance organisation where he/she is employed to comply with CAD 1801 paragraph 2, CAD 8601 paragraph 5.3 and CAD 8602 Chapter 8, as applicable, before he/she exercises certification privileges.

3.5.2 Similarly, type training courses covering certain, but not all the models/variants included in a type rating, are valid for the purpose of endorsing the full type rating.

3.5.3 The 'practical experience' should cover a representative cross section including at least 50% of tasks contained in Appendix 2 to this CAGM relevant to the licence category and to the applicable aircraft type ratings or aircraft (sub)group ratings being endorsed. This experience should cover tasks from each paragraph of the Appendix 2 list. Other tasks than those in the Appendix 2 may be considered as a replacement when they are relevant.

3.6 CAD 1801 3.4 – Limitations

3.6.1 The application for the limitation removal should be supported by a record of experience signed by the authorised certifying staff or by an assessment signed by the manufacturer after completion of the applicable theoretical and practical training.

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4 Continued Validity of Aircraft Maintenance Licence (CAD 1801 4)

4.1 CAD 1801 4.1 – General

4.1.1 The validity of the aircraft maintenance licence is not affected by recency of maintenance experience whereas the validity of the CAD 1801 paragraph 2, privileges is affected by maintenance experience as specified in CAD 1801 paragraph 2.2.

4.1.2 Any certification privileges based upon an invalid AML, becomes invalid as soon as the AML is invalid.

4.1.3 Personnel exercising certification privileges shall produce their licence, as evidence of qualification, within 24 hours upon request by an authorised person.

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5 Appendices

5.1 Appendix 1 – Aircraft Type Training and Examination Standard, On The Job Training

1 Aircraft Type Training

1.1 Aircraft type training may be sub-divided in airframe and/or powerplant and/or avionics/electrical systems type training courses.

a) Airframe type training course means a type training course including all relevant aircraft structure and electrical and mechanical systems excluding the powerplant.

b) Powerplant type training course means a type training course on the bare engine, including the build-up to a quick engine change unit.

c) The interface of the engine/airframe systems should be addressed by either airframe or powerplant type training course. In some cases, such as for general aviation, it may be more appropriate to cover the interface during the airframe course due to the large variety of aircraft that can have the same engine type installed.

d) Avionics/electrical systems type training course means type training on avionics and electrical systems covered by but not necessarily limited to ATA (Air Transport Association) Chapters 22, 23, 24, 25, 27, 31, 33, 34, 42, 44, 45, 46, 73 and 77 or equivalent.

1.2 Practical training may be performed either following or integrated with the theoretical elements. However, it should not be performed before theoretical training.

1.3 The content of the theoretical and practical training should:

a) address the different parts of the aircraft which are representative of the structure, the systems/components installed and the cabin; and

b) include training on the use of technical manuals, maintenance procedures and the interface with the operation of the aircraft.

1.4 Therefore it should be based on the following elements:

a) Type design including relevant type design variants, new technology and techniques;

b) Feedback from in-service difficulties, occurrence reporting, etc;

c) Significant applicable airworthiness directives and service bulletins;

d) Known human factor issues associated with the particular aircraft type;

e) Use of common and specific documentation, (when applicable, such as MMEL, AMM, MPD, TSM, SRM, WD, AFM, tool handbook), philosophy of the troubleshooting, etc.;

f) Knowledge of the maintenance on-board reporting systems and ETOPS maintenance conditions where applicable;

g) Use of special tooling and test equipment and specific maintenance practises including critical safety items and safety precautions;

h) Significant and critical tasks/aspects from the MMEL, CDL, Fuel Tank Safety (FTS), airworthiness limitation items (ALI) including Critical Design Configuration Control Limitations (CDCCL), CMR and all ICA documentation such as MRB, MPD, SRM, AMM, etc., when applicable.

i) Maintenance actions and procedures to be followed as a consequence of specific certification requirements, such as, but not limited to, RVSM (Reduced Vertical Separation Minimum) and NVIS (Night Vision Imaging Systems);

j) Knowledge of relevant inspections and limitations as applicable to the effects of environmental factors or operational procedures such as cold and hot climates, wind, moisture, sand, de-icing / anti-icing, etc.

1.5 The type training does not necessarily need to include all possible customer options corresponding to the type rating described in the CAAM Part-66 Type Rating List.

1.6 Limited avionic system training should be included in the category B1 type training as the B1 privileges include work on avionics systems requiring simple tests to prove their serviceability.

1.7 Electrical systems should be included in both categories of B1 and B2 type training.

1.8 The theoretical and practical training should be complementary and may be:

a) Integrated or split

b) Supported by the use of training aids, such as trainers, virtual aircraft, aircraft components, synthetic training devices (STD), computer based training devices (CBT), etc.

2 Practical Element of the Aircraft Type Training

2.1 The practical training may include instruction in a classroom or in simulators but part of the practical training should be conducted in a real maintenance or manufacturer environment.

2.2 The tasks should be selected because of their frequency, complexity, variety, safety, criticality, novelty, etc. The selected tasks should cover all the chapters described in the table contained in paragraph 3.0 of Appendix 3 of CAD 1801.

2.3 The duration of the practical training should ensure that the content of training required by paragraph 3.1 (b) of Appendix 3 to CAD 1801 is completed.

Nevertheless, for aeroplanes with a MTOM equal or above 30000kg, the duration for the practical element of a type rating training course should not be less than two weeks unless a shorter duration meeting the objectives of the training and taking into account pedagogical aspects (maximum duration per day) is justified to the CAAM.

2.4 The approved Part 147 organisation providing the practical element of the type training should provide trainees a schedule or plan indicating the list of tasks to be performed under instruction or supervision. A record of the tasks completed should be entered into a logbook which should be designed such that each task or group of tasks may be countersigned by the appropriately qualified practical assessor. The logbook format and its use shall meet the aircraft type practical training logbook format and standard published by CAAM.

2.5 In paragraph 4.2 of Appendix 3 to CAD 1801, the term 'appropriately qualified practical assessors' means that the assessors should demonstrate training and experience on the assessment process being undertaken and qualified and be authorised to do so by the organisation.

Further guidance about the assessment and the appropriately qualified practical assessors is provided in Appendix 3 to this CAGM.

2.6 The practical element (for powerplant and avionic systems) of the type training may be subcontracted by the approved Part-147 organisation under its quality system according to the provisions of CAD 1821 paragraph 7.2 and the corresponding CAGM 1821.

3 Differences Training

3.1 Approved difference training is not required for different variants within the same aircraft type rating (CAAM Part-66 Type Rating List) for the purpose of type rating on the aircraft maintenance licence.

3.2 However, this does not necessarily mean that no training is required before a certifying staff authorisation can be issued by the maintenance organisation (refer to CAGM 1801 paragraph 2.2).

4 Training Needs Analysis for the Theoretical Element of the Aircraft Type Training

4.1 The minimum duration for the theoretical element of the type rating training course, as described in Appendix 3 of CAD 1801, has been determined based on generic categories of aircraft and minimum standard equipment fit.

4.2 The purpose of the Training Needs Analysis (TNA) is to adapt and justify the duration of the course for a specific aircraft type. This means that the TNA is the main driver for determining the duration of the course, regardless of whether it is above or below the minimum duration described in Appendix 3 of CAD 1801.

4.3 The content and the duration deriving from this TNA may be supported by an analysis from the Type Certificate holder or other means to support the justification.

4.4 In order to approve a reduction of such minimum duration, the evaluation done by the CAAM should be performed on a case-by-case basis appropriate to the aircraft type. For example, while it would be exceptional for a theoretical course for a transport category large aircraft such as an A330 or B757 to be below the minimum duration shown, it would not necessarily be exceptional in the case of a General Aviation (GA) business aircraft. Typically the TNA for a GA aircraft course would demonstrate that a course of a shorter duration satisfies the requirements.

4.5 When developing the TNA the following should be considered:

a) The TNA should include an analysis identifying all the areas and elements where there is a need for training as well as the associated learning objectives, considering the design philosophy of the aircraft type, the operational environment, the type of operations and the operational experience. This analysis should be written in a manner which provides a reasonable understanding of which areas and elements constitute the course in order to meet the learning objectives.

b) As a minimum, the Training Need Analysis (TNA) should take into account all the applicable elements contained in paragraph 3.1 of CAD 1801 Appendix 3 and associated CAGMs.

c) The TNA should set-up the course content considering the Appendix 3 objectives for each level of training and the prescribed topics in the theoretical element table contained in paragraph 3.1 of CAD 1801 Appendix 3.

d) For each chapter described in the theoretical element table contained in paragraph 3.1 of CAD 1801 Appendix 3, the corresponding training time should be recorded.

e) Typical documents to be used in order to identify the areas and elements where there is a need for training typically include, among others, the Aircraft Maintenance Manual, MRB report, CMRs, airworthiness limitations, Troubleshooting Manual, Structural Repair Manual, Illustrated Parts Catalogue, Airworthiness Directives and Service Bulletins.

f) During the analysis of these documents:

1) Consideration should be given to the following typical activities:

2) Activation/reactivation;

3) Removal/Installation;

4) Testing;

5) Servicing;

6) Inspection, check and repairs;

7) Troubleshooting / diagnosis.

8) For the purpose of identifying the specific elements constituting the training course, it is acceptable to use a filtering method based on criteria such as:

i) Frequency of the task;

ii) Human factor issues associated to the task;

iii) Difficulty of the task;

iv) Criticality and safety impact of the task;

v) In-service experience;

vi) Novel or unusual design features (not covered by CAD 1801 Appendix 1);

vii) Similarities with other aircraft types;

viii) Special tests and tools/equipment.

ix) It is acceptable to follow an approach based on:

x) Tasks or groups of tasks, or

xi) Systems or subsystems or components.

g) The TNA should:

1) Identify the learning objectives for each task, group of tasks, system, subsystem or component;

2) Associate the identified tasks to be trained to the regulatory requirements (table in Paragraph 3.1 of Appendix 3 of CAD 1801);

3) Organise the training into modules in a logical sequence (adequate combination of chapters as defined in Appendix 3 of CAD 1801);

4) Determine the sequence of learning (within a lesson and for the whole syllabus);

5) Identify the scope of information and level of detail with regard the minimum standard to which the topics of the TNA should be taught according to the set-up objectives.

6) Address the following:

i) Description of each system/component including the structure (where applicable);

ii) System/component operation taking into account:

- Complexity of the system (e.g. the need of further break down into subsystems, etc.);
- Design specifics which may require more detailed presentation or may contribute to maintenance errors;
- Normal and emergency functioning;
- Troubleshooting;
- Interpretation of indications and malfunctions;
- Use of maintenance publications;
- Identification of special tools and equipment required for servicing and maintaining the aircraft;
- Maintenance Practices;

- Routine inspections, functional or operational tests, rigging/adjustment, etc.

iii) Describe the following:

- The instructional methods and equipment, teaching methods and blending of the teaching methods in order to ensure the effectiveness of the training;
- The maintenance training documentation/material to be delivered to the student;
- Facilitated discussions, questioning session, additional practiced-oriented training, etc.;
- The training provider's resources available to the learner.

h) It is acceptable to differentiate between issues which have to be led by an instructor and issues which may be delivered through interactive simulation training devices and/or covered by web based elements. Overall time of the course will be allocated accordingly.

i) The maximum number of training hours per day for the theoretical element of type training should not be more than 6 hours. A training hour means 60 minutes of tuition excluding any breaks, examination, revision, preparation and aircraft visit. In exceptional cases, the CAAM may allow deviation from this standard when it is properly justified that the proposed number of hours follows pedagogical and human factors principles. These principles are especially important in those cases where:

1) Theoretical and practical training are performed at the same time;

2) Training and normal maintenance duty/apprenticeship are performed at the same time.

j) The minimum participation time for the trainee in order to meet the objectives of the course should not be less than 90 % of the tuition hours of the theoretical training course. Additional training may be provided by the training organisation in order to meet the minimum participation time. If the minimum participation defined for the course is not met, a certificate of recognition should not be issued.

k) The TNA is a living process and should be reviewed/updated based on operation feedback, maintenance occurrences, airworthiness directives, major service bulletins impacting maintenance activities or requiring new competencies for mechanics, alert service bulletins, feedback from trainees or customer satisfaction, evolution of the maintenance documentation such as MRBs, MPDs, MMs, etc. The frequency at which the TNA should be reviewed/updated is left to the discretion of the organisation conducting the course.

NOTE: The examination is not part of the TNA. However, it should be prepared in accordance with the learning objectives described in the TNA.

5 On-the-Job Training (OJT)

5.1 'A maintenance organisation appropriately approved for the maintenance of the particular aircraft type' means a CAAM Part 145 or CAAM Part M Subpart F approved maintenance organisation holding an A rating for such aircraft.

5.2 The OJT should include one to one supervision and should involve actual work task performance on aircraft/components, covering line and/or base maintenance tasks.

5.3 The use of only simulators for OJT should not be allowed but part of the OJT should be conducted in a real maintenance or manufacturer environment.

5.4 The OJT should cover at least 50% of the tasks contained in Appendix 2 of CAGM 1801. Some tasks should be selected from each paragraph of the Appendix 2 list. Tasks should be selected among those applicable to the type of aircraft and licence (sub)category applied for. Other tasks than those in the Appendix 2 may be considered as a replacement when they are relevant. Typically, in addition to the variety and the complexity, the OJT tasks should be selected because of their frequency, safety, novelty, etc.

5.5 Up to 50% of the required OJT may be undertaken before the aircraft theoretical type training starts.

5.6 The approved Part 147 organisation providing the on-the-job training should provide trainees a schedule or plan indicating the list of tasks to be performed under supervision. A record of the tasks completed should be entered into a logbook which should be designed such that each task or group of tasks is countersigned by the corresponding supervisor. The logbook format and its use should be clearly defined.

5.7 Regarding the day-to-day supervision of the OJT programme in the approved maintenance organisation and the role of the supervisor(s), the following should be considered:

a) It is sufficient that the completion of individual OJT tasks is confirmed by the direct supervisor(s), without being necessary the direct evaluation of the assessor.

b) During the day-to-day OJT performance, the supervision aims at overseeing the complete process, including task completion, use of manuals and procedures, observance of safety measures, warnings and recommendations and adequate behaviour in the maintenance environment.

c) The supervisor(s) should personally observe the work being performed to ensure the safe completeness and should be readily available for consultation, if needed during the OJT performance.

d) The supervisor(s) should countersign the tasks and release the maintenance tasks as the trainee is still not qualified to do so.

e) The supervisor(s) should therefore:

1) have certifying staff privileges relevant to the OJT tasks;

2) be competent for the selected tasks;

3) be safety-orientated;

4) be capable to coach (setting objectives, giving training, performing supervision, evaluating, handling trainee's reactions and cultural issues, managing objectively and positively debriefing sessions, determining the need for extra training or reorientate the training, reporting, etc.);

5) be designated by the approved maintenance organisation to carry out the supervision.

5.8 Regarding the assessor, the following should be considered:

a) The function of an assessor is to conduct the final assessment of the completed OJT. This assessment should include confirmation of the completion of the required diversity and quantity of OJT and should be based on the supervisor(s) reports and feedback.

b) In Appendix 3, paragraph 6 of CAD 1801, the term 'appropriately qualified practical assessors' means that the assessor should demonstrate training and experience on the assessment process being undertaken and should be authorised to do so by the organisation. Further guidance about the assessment and the appropriately qualified practical assessors is provided in Appendix 3 of this CAGM.

5.9 In such cases where the maintenance organisation has an arrangement with an approved Part 147 organisation, the procedures for OJT should be included into the Maintenance Organisation Exposition (MOE) of the approved maintenance organisation.

5.2 Appendix 2 – Aircraft Type Practical Experience and On-the-Job Training

1 List of Tasks

1.1 Time limits/Maintenance checks

100 hour check (general aviation aircraft).

'B' or 'C' check (transport category aircraft).

Assist carrying out a scheduled maintenance check i.a.w. AMM.

Review Aircraft maintenance log for correct completion.

Review records for compliance with Airworthiness Directives.

Review records for compliance with component life limits.

Procedure for inspection following heavy landing.

Procedure for inspection following lightning strike.

1.2 Dimensions/Areas

Locate component(s) by zone/station number.

Perform symmetry check.

1.3 Lifting and Shoring

Assist in:

Jack aircraft nose or tail wheel.

Jack complete aircraft.

Sling or trestle major component.

1.4 Levelling/Weighing

Level aircraft.

Weigh aircraft.

Prepare weight and balance amendment.

Check aircraft against equipment list.

1.5 Towing and Taxiing

Prepare for aircraft towing.

Tow aircraft.

Be part of aircraft towing team.

1.6 Parking and mooring

Tie down aircraft.

Park, secure and cover aircraft.

Position aircraft in dock.

Secure rotor blades.

1.7 Placards and Markings

Check aircraft for correct placards.

Check aircraft for correct markings.

1.8 Servicing

Refuel aircraft.

Defuel aircraft.

Carry out tank to tank fuel transfer.

Check/adjust tire pressures.

Check/replenish oil level.

Check/replenish hydraulic fluid level.

Check/replenish accumulator pressure.

Charge pneumatic system.

Grease aircraft.

Connect ground power.

Service toilet/water system

Perform pre-flight/daily check.

1.9 Vibration and Noise Analysis

Analyse helicopter vibration problem.

Analyse noise spectrum.

Analyse engine vibration.

1.10 Air Conditioning

Replace combustion heater.

Replace flow control valve.

Replace outflow valve.

Replace safety valve.

Replace vapour cycle unit.

Replace air cycle unit.

Replace cabin blower.

Replace heat exchanger.

Replace pressurisation controller.

Clean outflow valves.

Deactivate/reactivate cargo isolation valve.

Deactivate/reactivate avionics ventilation components.

Check operation of air conditioning/heating system.

Check operation of pressurisation system.

Troubleshoot faulty system.

1.11 Auto flight

Install servos.

Rig bridle cables Replace controller.

Replace amplifier.

Replacement of the auto flight system LRUs in case of fly-by-wire aircraft.

Check operation of auto-pilot.

Check operation of auto-throttle/auto-thrust.

Check operation of yaw damper.

Check and adjust servo clutch.

Perform autopilot gain adjustments.

Perform mach trim functional check.

Troubleshoot faulty system.

Check autoland system.

Check flight management systems.

Check stability augmentation system.

1.12 Communications

Replace VHF COM unit.

Replace HF COM unit.

Replace existing antenna.

Replace static discharge wicks.

Check operation of radios.

Perform antenna VSWR check.

Perform SELCAL operational check.

Perform operational check of passenger address system.

Functionally check audio integrating system.

Repair coaxial cable.

Troubleshoot faulty system.

Check SATCOM.

1.13 Electrical Power

Charge lead/acid battery.

Charge Ni-Cad battery.

Check battery capacity.

Deep-cycle Ni-Cad battery.

Replace integrated drive/generator/alternator.

Replace switches.

Replace circuit breakers.

Adjust voltage regulator.

Change voltage regulator.

Amend electrical load analysis report.

Repair/replace electrical feeder cable.

Troubleshoot faulty system.

Perform functional check of integrated drive/generator/alternator.

Perform functional check of voltage regulator.

Perform functional check of emergency generation system.

1.14 Equipment/Furnishings

Replace carpets

Replace crew seats.

Replace passenger seats.

Check inertia reels.

Check seats/belts for security.

Check emergency equipment.

Check ELT for compliance with regulations.

Repair toilet waste container.

Remove and install ceiling and sidewall panels.

Repair upholstery.

Change cabin configuration.

Replace cargo loading system actuator.

Test cargo loading system.

Replace escape slides/ropes.

1.15 Fire protection

Check fire bottle contents.

Check/test operation of fire/smoke detection and warning system.

Check cabin fire extinguisher contents.

Check lavatory smoke detector system.

Check cargo panel sealing.

Install new fire bottle.

Replace fire bottle squib.

Troubleshoot faulty system.

Inspect engine fire wire detection systems.

1.16 Flight Controls

Inspect primary flight controls and related components i.a.w. AMM.

Extending/retracting flaps & slats.

Replace horizontal stabiliser.

Replace spoiler/lift damper.

Replace elevator.

Deactivation/reactivation of aileron servo control.

Replace aileron.

Replace rudder.

Replace trim tabs.

Install control cable and fittings.

Replace slats.

Replace flaps.

Replace powered flying control unit.

Replace flat actuator.

Rig primary flight controls.

Adjust trim tab.

Adjust control cable tension.

Check control range and direction of movement.

Check for correct assembly and locking.

Troubleshoot faulty system.

Functional test of primary flight controls.

Functional test of flap system.

Operational test of the side stick assembly.

Operational test of the THS.

THS system wear check.

1.17 Fuel

Water drain system (operation).

Replace booster pump.

Replace fuel selector.

Replace fuel tank cells.

Replace/test fuel control valves.

Replace magnetic fuel level indicators.

Replace water drain valve.

Check/calculate fuel contents manually.

Check filters.

Flow check system.

Check calibration of fuel quantity gauges.

Check operation feed/selectors.

Check operation of fuel dump/jettison system.

Fuel transfer between tanks.

Pressure defuel.

Pressure refuel (manual control).

Deactivation/reactivation of the fuel valves (transfer defuel, X-feed, refuel).

Troubleshoot faulty system.

1.18 Hydraulics

Replace engine driven pump.

Check/replace case drain filter.

Replace standby pump.

Replace hydraulic motor pump/generator.

Replace accumulator.

Check operation of shut off valve.

Check filters/clog indicators.

Check indicating systems.

Perform functional checks.

Pressurisation/depressurisation of the hydraulic system.

Power Transfer Unit (PTU) operation.

Replacement of PTU.

Troubleshoot faulty system.

1.19 Ice and rain protection

Replace pump.

Replace timer.

Inspect repair propeller deice boot.

Test propeller de-icing system.

Inspect/test wing leading edge de-icer boot.

Replace anti-ice/deice valve.

Install wiper motor.

Check operation of systems.

Operational test of the pitot-probe ice protection.

Operational test of the TAT ice protection.

Operational test of the wing ice protection system.

Assistance to the operational test of the engine air-intake ice protection (with engines operating).

Troubleshoot faulty system.

1.20 Indicating/recording systems

Replace flight data recorder.

Replace cockpit voice recorder.

Replace clock.

Replace master caution unit.

Replace FDR.

Perform FDR data retrieval.

Troubleshoot faulty system.

Implement ESDS procedures.

Inspect for HIRF requirements.

Start/stop EIS procedure.

Bite test of the CFDIU.

Ground scanning of the central warning system.

1.21 Landing Gear

Build up wheel.

Replace main wheel.

Replace nose wheel.

Replace steering actuator.

Replace truck tilt actuator.

Replace gear retraction actuator.

Replace uplock/downlock assembly.

Replace shimmy damper.

Rig nose wheel steering.

Functional test of the nose wheel steering system.

Replace shock strut seals.

Replace brake unit.

Replace brake control valve.

Bleed brakes.

Replace brake fan.

Test anti-skid unit.

Test gear retraction.

Change bungees.

Adjust micro switches/sensors.

Charge struts with oil and air.

Troubleshoot faulty system.

Test auto-brake system.

Replace rotorcraft skids.

Replace rotorcraft skid shoes.

Pack and check floats.

Flotation equipment.

Check/test emergency blowdown (emergency landing gear extension).

Operational test of the landing gear doors.

1.22 Lights

Repair/replace rotating beacon.

Repair/replace landing lights.

Repair/replace navigation lights.

Repair/replace interior lights.

Replace ice inspection lights.

Repair/replace logo lights.

Repair/replace emergency lighting system.

Perform emergency lighting system checks.

Troubleshoot faulty system

1.23 Instruments

Troubleshoot faulty system.

Calibrate magnetic direction indicator.

Replace airspeed indicator.

Replace altimeter.

Replace air-data computer.

Replace ADI.

Replace HSI.

Check pitot static system for leaks.

Check operation of directional gyro.

Check calibration of pitot static instruments.

Compass replacement direct/indirect.

Functional check flight director system.

1.24 Surveillance

Troubleshoot faulty system.

Functional check weather radar.

Functional check doppler.

Functional check TCAS.

Functional check ATC transponder.

Check calibration of pressure altitude reporting system.

1.25 Navigation

Functional check inertial navigation system.

Complete quadrantal error correction of ADF system.

Check GPS.

Test AVM.

Check marker systems.

Functional check DME.

1.26 Oxygen

Inspect on board oxygen equipment.

Purge and recharge oxygen system.

Replace regulator.

Replace oxygen generator.

Test crew oxygen system.

Perform auto oxygen system deployment check.

Troubleshoot faulty system.

Pneumatic systems

Replace filter.

Replace air shut off valve.

Replace pressure regulating valve.

Replace compressor.

Recharge dessicator.

Adjust regulator.

Check for leaks.

Troubleshoot faulty system.

1.27 Vacuum systems

Inspect the vacuum system i.a.w. AMM.

Replace vacuum pump.

Check/replace filters.

Adjust regulator.

Troubleshoot faulty system.

1.28 Water/Waste

Replace water pump.

Replace tap.

Replace toilet pump.

Perform water heater functional check.

Troubleshoot faulty system.

Inspect waste bin flap closure.

1.29 Central Maintenance System

Retrieve data from CMU.

Replace CMU.

Perform Bite check.

Troubleshoot faulty system.

1.30 Airborne Auxiliary power

Install APU.

Inspect hot section.

Troubleshoot faulty system.

1.31 Structures

Assessment of damage.

Sheet metal repair.

Fibre glass repair.

Wooden repair.

Fabric repair.

Recover fabric control surface.

Treat corrosion.

Apply protective treatment.

1.32 Doors

Inspect passenger door i.a.w. AMM.

Rig/adjust locking mechanism.

Adjust air stair system.

Check operation of emergency exits.

Test door warning system.

Troubleshoot faulty system.

Remove and install passenger door i.a.w. AMM.

Remove and install emergency exit i.a.w. AMM.

Inspect cargo door i.a.w. AMM.

1.33 Windows

Replace windshield.

Replace direct vision window.

Replace cabin window.

Repair transparency.

1.34 Wings

Skin repair.

Recover fabric wing.

Replace tip.

Replace rib.

Replace integral fuel tank panel.

Check incidence/rig.

1.35 Propeller

Assemble prop after transportation.

Replace propeller.

Replace governor.

Adjust governor.

Perform static functional checks.

Check operation during ground run.

Check track.

Check setting of micro switches.

Assessment of blade damage i.a.w. AMM.

Dynamically balance prop.

Troubleshoot faulty system.

1.36 Main Rotors

Install rotor assembly.

Replace blades.

Replace damper assembly.

Check track.

Check static balance.

Check dynamic balance.

Troubleshoot.

1.37 Rotor Drive

Replace mast.

Replace drive coupling.

Replace clutch/freewheel unit

Replace drive belt.

Install main gearbox.

Overhaul main gearbox.

Check gearbox chip detectors.

1.38 Tail Rotors

Install rotor assembly.

Replace blades.

Troubleshoot.

1.39 Tail Rotor Drive

Replace bevel gearbox.

Replace universal joints.

Overhaul bevel gearbox.

Install drive assembly.

Check chip detectors.

Check/install bearings and hangers.

Check/service/assemble flexible couplings.

Check alignment of drive shafts.

Install and rig drive shafts.

1.40 Rotorcraft flight controls

Install swash plate.

Install mixing box.

Adjust pitch links.

Rig collective system.

Rig cyclic system.

Rig anti-torque system.

Check controls for assembly and locking.

Check controls for operation and sense.

Troubleshoot faulty system.

1.41 Power Plant

Build up ECU.

Replace engine.

Repair cooling baffles.

Repair cowling.

Adjust cowl flaps.

Repair faulty wiring.

Troubleshoot.

Assist in dry motoring check.

Assist in wet motoring check.

Assist in engine start (manual mode).

1.42 Piston Engines

Remove/install reduction gear.

Check crankshaft run-out.

Check tappet clearance.

Check compression.

Extract broken stud.

Install helicoil.

Perform ground run.

Establish/check reference RPM.

Troubleshoot.

1.43 Turbine Engines

Replace module.

Replace fan blade.

Hot section inspection/boroscope check.

Carry out engine/compressor wash.

Carry out engine dry cycle.

Engine ground run.

Establish reference power.

Trend monitoring/gas path analysis.

Troubleshoot.

1.44 Fuel and control, piston

Replace engine driven pump.

Adjust AMC.

Adjust ABC.

Install carburettor/injector.

Adjust carburettor/injector.

Clean injector nozzles.

Replace primer line.

Check carburettor float setting.

Troubleshoot faulty system.

1.45 Fuel and control, turbine

Replace FCU.

Replace Engine Electronic Control Unit (FADEC).

Replace Fuel Metering Unit (FADEC).

Replace engine driven pump.

Clean/test fuel nozzles.

Clean/replace filters.

Adjust FCU.

Troubleshoot faulty system.

Functional test of FADEC.

1.46 Ignition systems, piston

Change magneto.

Change ignition vibrator.

Change plugs.

Test plugs.

Check H.T. leads.

Install new leads.

Check timing.

Check system bonding.

Troubleshoot faulty system.

1.47 Ignition systems, turbine

Perform functional test of the ignition system.

Check glow plugs/ignitors.

Check H.T. leads.

Check ignition unit.

Replace ignition unit.

Troubleshoot faulty system.

1.48 Engine Controls

Rig thrust lever.

Rig RPM control.

Rig mixture HP cock lever.

Rig power lever.

Check control sync (multi-eng).

Check controls for correct assembly and locking.

Check controls for range and direction of movement.

Adjust pedestal micro-switches.

Troubleshoot faulty system.

1.49 Engine Indicating

Replace engine instruments(s).

Replace oil temperature bulb.

Replace thermocouples.

Check calibration.

Troubleshoot faulty system.

1.50 Exhaust, piston

Replace exhaust gasket.

Inspect welded repair.

Pressure check cabin heater muff.

Troubleshoot faulty system.

1.51 Exhaust, turbine

Change jet pipe.

Change shroud assembly.

Install trimmers.

Inspect/replace thrust reverser.

Replace thrust reverser component.

Deactivate/reactivate thrust reverser.

Operational test of the thrust reverser system.

1.52 Oil

Change oil.

Check filter(s).

Adjust pressure relief valve.

Replace oil tank.

Replace oil pump.

Replace oil cooler.

Replace firewall shut off valve.

Perform oil dilution test.

Troubleshoot faulty system.

1.53 Starting

Replace starter.

Replace start relay.

Replace start control valve.

Check cranking speed.

Troubleshoot faulty system.

1.54 Turbines, piston engines

Replace PRT.

Replace turbo-blower.

Replace heat shields.

Replace waste gate.

Adjust density controller.

1.55 Engine water injection

Replace water/methanol pump.

Flow check water/methanol system.

Adjust water/methanol control unit.

Check fluid for quality.

Troubleshoot faulty system

1.56 Accessory gear boxes

Replace gearbox.

Replace drive shaft.

Inspect magnetic chip detector.

1.57 APU

Removal/installation of the APU.

Removal/installation of the inlet guide-vane actuator.

Operational test of the APU emergency shut-down test.

Operational test of the APU.

5.3 Appendix 3 – Evaluation of the Competence: Assessment and Assessors

This Appendix applies to the competence assessment performed by the appropriately qualified practical assessors' (and their qualifications).

1 What does 'competence' mean and areas of focus for assessment

1.1 The assessment should aim at measuring the competence by evaluating three major factors associated to the learning objectives:

a) Knowledge

b) Skills

c) Attitude

1.2 Generally, knowledge is evaluated by examination. The purpose of this document is not to describe the examination process: this material mainly addresses the evaluation of 'skills' and 'attitude' after training containing practical elements. Nevertheless, the trainee needs to demonstrate to have sufficient knowledge to perform the required tasks.

1.3 'Attitude' is indivisible from the 'skill' as this greatly contributes to the safe performance of the tasks.

1.4 The evaluation of the competence should be based on the learning objectives of the training, in particular:

a) the (observable) desired performance. This covers what the trainee is expected to be able to do and how the trainee is expected to behave at the end of the training;

b) the (measurable) performance standard that must be attained to confirm the trainee's level of competence in the form of tolerances, constraints, limits, performance rates or qualitative statements; and

c) the conditions under which the trainee will demonstrate competence. Conditions consist of the training methods, the environmental, situational and regulatory factors.

1.5 The assessment should focus on the competencies relevant to the basic practical skills, aircraft type and its maintenance such as, but not limited to:

a) Environment awareness (act safely, apply safety precautions and prevent dangerous situations);

b) Systems integration (demonstrate understanding of aircraft systems interaction – identify, describe, explain, plan, execute);

c) Knowledge and understanding of areas requiring special emphasis or novelty (areas peculiar to the aircraft type, practical training elements that cannot be imparted through simulation devices, etc.);

d) Using reports and indications (the ability to read and interpret);

e) Aircraft documentation finding and handling (identify the appropriate aircraft documentation, navigate, execute and obey the prescribed maintenance procedures);

f) Perform maintenance actions (demonstrate safe handling of aircraft, engines, components and tools);

g) Aircraft final/close-up and report (apply close up, initiate appropriate actions/follow-up/records of testing, establish and sign maintenance records/logbooks).

2 How to assess

2.1 As far as feasible, the objectives of the assessment should be associated with the learning objectives and the passing level; it means that observable criteria should be set in order to measure the performance and should remain as objective as possible.

2.2 The general characteristics of effective assessment are: objective, flexible, acceptable, comprehensive, constructive, organised and thoughtful. At the conclusion, the trainee should have no doubt about what he/she did well, what he/she did poorly and how he/she can improve.

2.3 The following is a non-exhaustive list of questions that may be posed to assist assessment:

a) What are the success factors for the job?

b) What are typical characteristics of a correct behaviour for the task?

c) What criteria should be observed?

d) What level of expertise is expected?

e) Is there any standard available?

f) What is the pass mark? For example:

1) ‘Go-no go’ situation;

2) How to allocate points? Minimum amount to succeed;

3) ‘Must know or execute’ versus ‘Good to know or execute’ versus ‘Don’t expect the candidate to be an expert’.

g) Minimum or maximum time to achieve? Use time effectively and efficiently.

h) What if the trainee fails? How many times is the trainee allowed to fail?

i) When and how should the trainee be prepared for the assessment?

j) What proportion of judgment by the instructor out of collaboration with the trainee is needed during the evaluation stage?

2.4 The assessment may be:

a) diagnostic (prior to a course), formative (re-orientate the course on areas where there is a need to reinforce) or summative (partial or final evaluation);

b) performed task-by-task, as a group of tasks or as a final assessment;

2.5 One method might be an initial assessment to be performed by the trainee himself, then discussing areas where the perceptions of the trainee's performance by the assessors differ in order to:

a) develop the self-assessment habits;

b) make the assessment more acceptable and understandable to both parties.

2.6 Many other aspects should be appropriately considered during the assessment process such as stress and environmental conditions, difficulty of the test, history of evaluation (such as tangible progresses or sudden and unexpected poor performance made by the trainee), amount of time necessary to build competence, etc.

2.7 All these reasons place more emphasis on the assessor and highlight the function of the organisation's approval.

3 Who should assess

3.1 In order to qualify, the assessor should:

a) Be proficient and have sufficient experience or knowledge in:

1) human performance and safety culture;

2) the aircraft type (necessary to have the certifying staff privileges in case of CRS issuances);

3) training/coaching/testing skills;

4) instructional tools to use;

b) Understand the objective and the content of the practical elements of the training that is being assessed;

c) Have interpersonal skills to manage the assessment process (professionalism, sincerity, objectivity and neutrality, analysis skills, sense of judgement, flexibility, capability of evaluating the supervisor's or instructor's reports, handling of trainee's reactions to failing assessment with the cultural environment, being constructive, etc.);

d) Be ultimately designated by the organisation to carry out the assessment.

e) Meet the intent of CAGM 1823.

3.2 The roles may be combined for:

a) the assessor and the instructor for the practical elements; or

b) the assessor and the supervisor for the On-the-Job Training.

3.3 Provided that the objectives associated to each role are clearly understood and that the competence and qualification criteria according to the company's procedures are met for both functions. Whenever possible (depending on the size of the organisation), it is recommended to split the roles (two different persons) in order to avoid any conflicts of interests.

3.4 When the functions are not combined, the role of each function should be clearly understood.