CIVIL AVIATION GUIDANCE MATERIAL – 8601

MAINTENANCE ORGANISATION APPROVAL

CAAM Part 145

CIVIL AVIATION AUTHORITY OF MALAYSIA

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Introduction

This Civil Aviation Guidance Material 8601 (CAGM - 8601) is issued by the Civil Aviation Authority of Malaysia (CAAM) to provide guidance for Maintenance Organisation Approval (CAAM Part 145), pursuant to Civil Aviation Directives 8601 – Maintenance Organisation Approval (CAAM Part 145).

Organisations may use these guidelines to demonstrate compliance with the provisions of the relevant CAD's issued. Notwithstanding Regulation 204 and Regulation 205 of the Malaysian Civil Aviation Regulations 2016 (MCAR 2016), when the CAGMs issued by the CAAM are used, the related requirements of the CAD's are considered as met, and further demonstration may not be required.

(Captain Chester Voo Chée Soon)
Chief Executive Officer
Civil Aviation Authority of Malaysia

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

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1 Application of Maintenance Organisation Approval (CAD 8601 2)

1.1 CAD 8601 2.1 – Application form

1.1.1 An application for the issuance, renewal or variation should be made on an CAAM/AW/8601-01 application form.

1.1.2 An appropriate fee shall be made upon the submission and proof of payment shall be attached with the application.

1.1.3 The applicant who intends to apply for Maintenance Organisation approval shall be subjected to the 5 Phases process as follow-

a) Pre-application phase;

1) Pre-application phase is an introductory process where the applicant who intended to acquire an AMO approval from CAAM shall be briefed on the procedures and processes involved prior to the approval.

2) The applicant shall provide a reasonable timeline that covers all related aspects of the processes until their expected date of getting the approval. The CAAM may advise on the duration of the process and may advise further on the timeline.

3) The applicant, at this phase, shall provide CAAM with a set of a company profile that contains the information but not limited to the status of the organisation, place of business, organisation structure, post holders, aircraft type to be managed, capability request, financial capacity, prospective maintenance organisation and any other information that could assist the applicant evaluation.

4) The applicant will be advised to further submit the formal application if the CAAM is satisfied with the pre-application phase.

b) Formal application phase;

1) This stage is a formal application process where the applicant will submit all required documents to CAAM.

2) The applicant shall submit the application form CAAM/AW/8601-01 and evidence that adequate payment has been made for the application.

3) The applicant shall submit a complete draft of the exposition and together with the Maintenance Organisation Exposition (MOE) checklist form CAAM/AW/8601-06.

4) The applicant shall submit the compliance checklist CAAM/AW/8601-07 as part of the application package.

5) The applicant shall submit CAAM Form 4 for the accountable manager and nominated post holder(s). CAAM Form 4 shall be accompanied with curriculum vitae, supporting documents to show the experience and qualification and internal assessment record.

6) The applicant shall present the timeline to the CAAM inspector for his agreement. The timeline is however a living document and it might be changed from time to time, the applicant shall inform and update the CAAM inspector for his agreement.

c) Document evaluation phase;

1) This is the phase where the CAAM inspector will review the organisation submission documents and this includes the assessment on the accountable manager and the management personnel (nominated post holder).

2) The process of reviewing the submitted documents will be carried out once the nominated post holders have been accepted by CAAM.

3) The nominated post holder shall be called for regular meetings to review the submitted documents.

4) The documents review will cover the organisation's exposition and its supporting documents such as the procedure manual including forms and checklists.

d) Demonstration and inspection phase; and

1) The organisation shall ensure that at this phase they are ready for the certification audit. This is where the evaluation of the organisation's readiness to function as maintenance organisation will be performed by the CAAM inspector and/or a team of airworthiness inspectors.

2) Prior to that, an internal audit by the Quality System shall be carried out by the organisation and once ready, an official request shall be sent to the CAAM inspector for the certification audit scheduling.

3) When the certification audit has been successfully carried out, the organisation will be issued a Provisional Certificate of Approval. This approval will not entitle the organisation to issue maintenance release.

4) The Provisional Certificate of Approval is valid for 1 (one) year from the date of issue.

5) To acquire a Certificate of Approval that reflects the organisation's privileges, a Technical Competency Audit shall be carried out. At this stage, the organisation should be able to demonstrate to the CAAM that they are competent as an AMO organisation.

e) Certification phase.

1) Once the demonstration and inspection phase completed, the organisation will be issued with the Certificate of Approval reflecting the privileges that the organisation is deemed to have based on its capabilities.

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2 Facility Requirements (CAD 8601 5.1)

2.1 CAD 8601 5.1(a) – Work area

2.1.1 Where the hangar is not owned by the organisation, it may be necessary to establish proof of tenancy. In addition, sufficiency of hangar space to carry out planned base maintenance should be demonstrated by the preparation of a projected aircraft hangar visit plan relative to the maintenance programme. The aircraft hangar visit plan should be updated on a regular basis.

2.1.2 Protection from the weather elements relates to the normal prevailing local weather elements that are expected throughout any twelve month period. Aircraft hangar and component workshop structures should prevent the ingress of rain, hail, ice, snow, wind and dust etc. Aircraft hangar and component workshop floors should be sealed to minimise dust generation.

2.1.3 For line maintenance of aircraft, hangars are not essential but it is recommended that access to hangar accommodation be demonstrated for usage during inclement weather for minor scheduled work and lengthy defect rectification.

2.1.4 Aircraft maintenance staff should be provided with an area where they may study maintenance instructions and complete maintenance records in a proper manner.

2.2 CAD 8601 5.1(b) – Office

2.2.1 It is acceptable to combine any or all of the office accommodation requirements into one office subject to the staff having sufficient room to carry out the assigned tasks.

2.2.2 In addition, as part of the office accommodation, aircraft maintenance staff should be provided with an area where they may study maintenance instructions and complete maintenance records in a proper manner.

2.3 CAD 8601 5.1(d) – Storage

2.3.1 Storage facilities for serviceable aircraft components should be clean, well-ventilated and maintained at a constant dry temperature to minimise the effects of condensation. Manufacturer's storage recommendations should be followed for those aircraft components identified in such published recommendations.

2.3.2 Storage racks should be strong enough to hold aircraft components and provide sufficient support for large aircraft components such that the component is not distorted during storage.

2.3.3 All aircraft components, wherever practicable, should remain packaged in protective material to minimise damage and corrosion during storage.

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3 Personnel Requirements (CAD 8601 5.2)

3.1 CAD 8601 5.2(a) – Accountable manager

3.1.1 With regard to the accountable manager, it is normally intended to mean the chief executive officer of the approved maintenance organisation, who by virtue of position has overall (including in particular financial) responsibility for running the organisation. The accountable manager may be the accountable manager for more than one organisation and is not required to be necessarily knowledgeable on technical matters as the maintenance organisation exposition defines the maintenance standards. When the accountable manager is not the chief executive officer the authority will need to be assured that such an accountable manager has direct access to chief executive officer and has a sufficiency of 'maintenance funding' allocation.

3.2 CAD 8601 5.2(b) – Nominated personnel

3.2.1 Dependent upon the size of the organisation, the CAAM Part-145 functions may be subdivided under individual managers or combined in any number of ways

3.2.2 The organisation should have, dependent upon the extent of approval, a base maintenance manager, a line maintenance manager, a workshop manager and a quality manager, all of whom should report to the accountable manager except in small CAAM Part-145 organisation where any one manager may also be the accountable manager, as determined by the CAAM, he/she may also be the line maintenance manager or the workshop manager.

3.2.3 The base maintenance manager is responsible for ensuring that all maintenance required to be carried out in the hangar, plus any defect rectification carried out during base maintenance, is carried out to the design and quality standards specified in 5.12(b) of CAD 8601. The base maintenance manager is also responsible for any corrective action resulting from the quality compliance monitoring of 5.12(c) of CAD 8601.

3.2.4 The line maintenance manager is responsible for ensuring that all maintenance required to be carried out on the line including line defect rectification is carried out to the standards specified in 5.12(b) of CAD 8601 and also responsible for any corrective action resulting from the quality compliance monitoring of 5.12(c) of CAD 8601.

3.2.5 The workshop manager is responsible for ensuring that all work on aircraft components is carried out to the standards specified in 5.12(b) of CAD 8601 and also responsible for any corrective action resulting from the quality compliance monitoring of 5.12(c) of CAD 8601.

3.2.6 The quality manager's responsibility is specified in paragraph 5.2(c) of CAD 8601.

3.2.7 Notwithstanding the example CAD 8601 5.2 sub-paragraphs (b) – (f) titles, the organisation may adopt any title for the foregoing managerial positions but should identify to the CAAM the titles and persons chosen to carry out these functions.

3.2.8 Where an organisation chooses to appoint managers for all or any combination of the identified CAAM Part-145 functions because of the size of the undertaking, it is necessary that these managers report ultimately through either the base maintenance manager or line maintenance manager or workshop manager or quality manager, as appropriate, to the accountable manager.

NOTE: Certifying staff may report to any of the managers specified depending upon which type of control the approved maintenance organisation uses (for example licensed engineers/independent inspection/dual function supervisors etc.) so long as the quality compliance monitoring staff specified in 5.12(c)(1) of CAD 8601 remain independent.

3.3 CAD 8601 5.2(c) – Quality system personnel

3.3.1 Monitoring the quality system includes requesting remedial action as necessary by the accountable manager and the nominated persons referred to in 5.2(b) of CAD 8601.

3.4 CAD 8601 5.2(d) – Man-hour plan

3.4.1 Has sufficient staff means that the organisation employs or contracts competent staff, as detailed in the man-hour plan, of which at least half the staff that perform maintenance in each workshop, hangar or flight line on any shift should be employed to ensure organisational stability. For the purpose of meeting a specific operational necessity, a temporary increase of the proportion of contracted staff may be permitted to the organisation by the CAAM, in accordance with an approved procedure which should describe the extent, specific duties, and responsibilities for ensuring adequate organisation stability. For the purpose of this subparagraph, employed means the person is directly employed as an individual by the maintenance organisation approved under CAAM Part-145, whereas contracted means the person is employed by another organisation and contracted by that organisation to the maintenance organisation approved under CAAM Part-145.

3.4.2 The maintenance man-hour plan should take into account all maintenance activities carried out outside the scope of the CAAM Part-145 approval. The planned absence (for training, vacations, etc.) should be considered when developing the man-hour plan.

3.4.3 The maintenance man-hour plan should relate to the anticipated maintenance work load except that when the organisation cannot predict such workload, due to the short term nature of its contracts, then such plan should be based upon the minimum maintenance workload needed for commercial viability. Maintenance work load includes all necessary work such as, but not limited to, planning,

maintenance record checks, production of worksheets/cards in paper or electronic form, accomplishment of maintenance, inspection and the completion of maintenance records.

3.4.4 In the case of aircraft base maintenance, the maintenance man-hour plan should relate to the aircraft hangar visit plan as specified in paragraph 2.1 of this CAGM.

3.4.5 In the case of aircraft component maintenance, the maintenance man-hour plan should relate to the aircraft component planned maintenance as specified in 5.1(a)(2) of CAD 8601.

3.4.6 The quality monitoring compliance function man-hours should be sufficient to meet the requirement of 5.12(c) of CAD 8601 which means taking into account paragraph 13.5 of this CAGM. Where quality monitoring staff perform other functions, the time allocated to such functions needs to be taken into account in determining quality monitoring staff numbers.

3.4.7 The maintenance man-hour plan should be reviewed at least every 3 months and updated when necessary.

3.4.8 Significant deviation from the maintenance man-hour plan should be reported through the departmental manager to the quality manager and the accountable manager for review. Significant deviation means more than a 25% shortfall in available man-hours during a calendar month for any one of the functions specified in 5.2(d) of CAD 8601.

3.5 CAD 8601 5.2(e) – Competence of personnel

3.5.1 Competence should be defined as a measurable skill or standard of performance, knowledge and understanding, taking into consideration attitude and behaviour.

3.5.2 The referenced procedure requires amongst others that planners, mechanics, specialised services staff, supervisors and certifying staff, whether employed or contracted, are assessed for competence before unsupervised work commences and competence is controlled on a continuous basis.

3.5.3 Competence should be assessed by evaluation of:

a) on-the-job performance and/or testing of knowledge by appropriately qualified personnel, and

b) records for basic, organisational, and/or product type and differences training, and

c) experience records.

3.5.4 Validation of the above could include a confirmation check with the organisation(s) that issued such document(s). For that purpose, experience/training may be

recorded in a document such as a log book or based on the suggested template in paragraph 3.11 of this CAGM.

3.5.5 As a result of this assessment, an individual's qualification should determine:

a) which level of ongoing supervision would be required or whether unsupervised work could be permitted.

b) whether there is a need for additional training.

3.5.6 A record of such qualification and competence assessment should be kept.

3.5.7 This should include copies of all documents that attest to qualification, such as the licence and/or any authorisation held, as applicable.

3.5.8 For a proper competence assessment of its personnel, the organisation should consider that:

a) In accordance with the job function, adequate initial and recurrent training should be provided and recorded to ensure continued competence so that it is maintained throughout the duration of employment/contract.

b) All staff should be able to demonstrate knowledge of and compliance with the maintenance organisation procedures, as applicable to their duties.

c) All staff should be able to demonstrate an understanding of human factors and human performance issues in relation with their job function and be trained as per 3.6 of this CAGM.

d) To assist in the assessment of competence and to establish the training needs analysis, job descriptions are recommended for each job function in the organisation. Job descriptions should contain sufficient criteria to enable the required competence assessment.

e) Criteria should allow the assessment to establish that, among others (titles might be different in each organisation):

1) Managers are able to properly manage the work output, processes, resources and priorities described in their assigned duties and responsibilities in a safe compliant manner in accordance with regulations and organisation procedures.

2) Planners are able to interpret maintenance requirements into maintenance tasks, and have an understanding that they have no authority to deviate from the maintenance data.

3) Supervisors are able to ensure that all required maintenance tasks are carried out and, where not completed or where it is evident that a particular maintenance task cannot be carried out to the maintenance data, then such problems will be reported to the 5.2(c) of CAD 8601 person for appropriate action. In addition, for those supervisors, who also

carry out maintenance tasks, that they understand such tasks should not be undertaken when incompatible with their management responsibilities.

4) Mechanics are able to carry out maintenance tasks to any standard specified in the maintenance data and will notify supervisors of defects or mistakes requiring rectification to re-establish required maintenance standards.

5) Specialised services staff are able to carry out specialised maintenance tasks to the standard specified in the maintenance data. They should be able to communicate with supervisors and report accurately when necessary.

6) Certifying staff are able to determine that relevant tasks or inspections have been carried out to the required standard.

7) Certifying staff are able to determine when the aircraft or aircraft component is ready to release to service and when it should not be released to service.

8) Quality audit staff are able to monitor compliance with CAAM Part-145 identifying noncompliance in an effective and timely manner so that the organisation may remain in compliance with CAAM Part-145.

3.5.9 Competence assessment should be based upon the procedure specified in paragraph 3.10 of this CAGM.

3.6 CAD 8601 5.2(e) – Application of human factors and human performance

3.6.1 In respect to the understanding of the application of human factors and human performance issues, all maintenance organisation personnel should have received an initial and continuation human factors training. This should concern to a minimum:

a) Post-holders, managers, supervisors;

b) Certifying staff and mechanics;

c) Technical support personnel such as planners, engineers, technical record staff;

d) Quality control/assurance staff;

e) Specialised services staff;

f) Human factors staff/human factors trainers;

g) Store department staff, purchasing department staff;

h) Ground equipment operators

3.6.2 Initial human factors training should cover all the topics of the training syllabus specified in paragraph 3.9 of this CAGM either as a dedicated course or else

integrated within other training. The syllabus may be adjusted to reflect the particular nature of the organisation. The syllabus may also be adjusted to meet the particular nature of work for each function within the organisation. For example:

a) small organisations not working in shifts may cover in less depth subjects related to teamwork and communication;

b) planners may cover in more depth the scheduling and planning objective of the syllabus and in less depth the objective of developing skills for shift working.

3.6.3 All personnel, including personnel being recruited from any other organisation should receive initial human factors training compliant with the organisation's training standards prior to commencing actual job function, unless their competence assessment justifies that there is no need for such training. Newly directly employed personnel working under direct supervision may receive training within 6 months after joining the maintenance organisation.

3.6.4 The purpose of human factors continuation training is primarily to ensure that staff remain current in terms of human factors and also to collect feedback on human factors issues. Consideration should be given to the possibility that such training has the involvement of the quality department. There should be a procedure to ensure that feedback is formally passed from the trainers to the quality department to initiate action where necessary.

3.6.5 Human factors continuation training should be of an appropriate duration in each two-year period in relation to relevant quality audit findings and other internal/external sources of information on human errors in maintenance available to the organisation.

3.6.6 Human factors training may be conducted by the maintenance organisation itself, or independent trainers, or any training organisations acceptable to the CAAM

3.6.7 The human factors training procedures should be specified in the maintenance organisation exposition.

3.7 CAD 8601 5.2(e) – Fuel tank safety

3.7.1 Additional training in fuel tank safety as well as associated inspection standards and maintenance procedures should be required for maintenance organisations' technical personnel, especially technical personnel involved in the compliance of CDCCL tasks.

3.7.2 CAAM guidance is provided for training to maintenance organisation personnel in paragraph 17.1 of this CAGM.

3.8 CAD 8601 5.2(e) – EWIS training

3.8.1 Competence assessment should include the verification for the need of additional EWIS training when relevant.

3.9 CAD 8601 5.2(e) – Training Syllabus for Initial Human Factors Training

3.9.1 The training syllabus below identifies the topics and subtopics to be addressed during the human factors training.

3.9.2 The maintenance organisation may combine, divide, or change the order of any subject of the syllabus to suit its own needs, as long as all subjects are covered to a level of detail appropriate to the organisation and its personnel.

3.9.3 Some of the topics may be covered in separate training (health and safety, management, supervisory skills, etc.) in which case duplication of training is not necessary.

3.9.4 Where possible, practical illustrations and examples should be used, especially accident and incident reports.

3.9.5 Topics should be related to existing legislation, where relevant. Topics should be related to existing guidance/advisory material, where relevant (e.g. ICAO HF Digests and Training Manual).

3.9.6 Topics should be related to maintenance engineering where possible; too much unrelated theory should be avoided.

1. General/Introduction to human factors
   - 1.1. Need to address human factors
   - 1.2. Statistics
   - 1.3. Incidents
2. Safety Culture/Organisational factors
3. Human Error
   - 3.1. Error models and theories
   - 3.2. Types of errors in maintenance tasks
   - 3.3. Violations
   - 3.4. Implications of errors

3.5. Avoiding and managing errors

3.6. Human reliability

4. Human performance & limitations

4.1. Vision

4.2. Hearing

4.3. Information-processing

4.4. Attention and perception

4.5. Situational awareness

4.6. Memory

4.7. Claustrophobia and physical access

4.8. Motivation

4.9. Fitness/Health

4.10. Stress

4.11. Workload management

4.12. Fatigue

4.13. Alcohol, medication, drugs

4.14. Physical work

4.15. Repetitive tasks/complacency

5. Environment

5.1. Peer pressure

5.2. Stressors

5.3. Time pressure and deadlines

5.4. Workload

5.5. Shift Work

5.6. Noise and fumes

5.7. Illumination

5.8. Climate and temperature

5.9. Motion and vibration

5.10. Complex systems

5.11. Hazards in the workplace

5.12. Lack of manpower

5.13. Distractions and interruptions

6. Procedures, information, tools and practices

6.1. Visual Inspection

6.2. Work logging and recording

6.3. Procedure - practice/mismatch/norms

6.4. Technical documentation - access and quality

6.5. Critical maintenance tasks and error-capturing methods (independent inspection, re-inspection, etc.)

7. Communication

7.1. Shift/Task handover

7.2. Dissemination of information

7.3. Cultural differences

8. Teamwork

8.1. Responsibility

8.2. Management, supervision and leadership

8.3. Decision making

9. Professionalism and integrity

9.1. Keeping up to date; currency

9.2. Error provoking behaviour

9.3. Assertiveness

10. Organisation’s HF program

10.1. Reporting errors 10.2. Disciplinary policy 10.3. Error investigation 10.4. Action to address problems 10.5. Feedback

Table 1: Training Syllabus for Initial Human Factors Training

3.10 CAD 8601 5.2(e) – Competence assessment procedure

3.10.1 The organisation should develop a procedure describing the process of competence assessment of personnel. The procedure should specify:

a) persons responsible for this process,

b) when the assessment should take place,

c) credits from previous assessments,

d) validation of qualification records,

e) means and methods for the initial assessment,

f) means and methods for the continuous control of competence including feedback on personnel performance,

g) competences to be observed during the assessment in relation with each job function,

h) actions to be taken when assessment is not satisfactory,

i) recording of assessment results.

3.10.2 For example, according to the job functions and the scope, size and complexity of the organisation, the assessment may consider the following (the table is not exhaustive):

	Managers	Planners	Supervisor	Certifying staff	Mechanics	Specialised Service staff	Quality Audit Staff
Knowledge of applicable officially recognised standards						X	X
Knowledge of auditing techniques: planning, conducting and reporting							X
Knowledge of human factors, human performance and limitations	X	X	X	X	X	X	X

Knowledge of logistics processes	X	X	X				
Knowledge of organisation capabilities, privileges and limitations	X	X	X	X		X	X
Knowledge of CAAM Part-M, CAAM Part-145 and any other relevant regulations	X	X	X	X			X
Knowledge of relevant parts of the maintenance organisation exposition and procedures	X	X	X	X	X	X	X
Knowledge of occurrence reporting system and understanding of the importance of reporting occurrences, incorrect maintenance data and existing or potential defects		X	X	X	X	X	
Knowledge of safety risks linked to the working environment	X	X	X	X	X	X	X
Knowledge on CDCCL when relevant	X	X	X	X	X	X	X
Knowledge on EWIS when relevant	X	X	X	X	X	X	X
Understanding of professional integrity, behaviour and attitude towards safety	X	X	X	X	X	X	X
Understanding of conditions for ensuring continuing airworthiness of aircraft and components				X			X
Understanding of his/her own human performance and limitations	X	X	X	X	X	X	X
Understanding of personnel authorisations and limitations	X	X	X	X	X	X	X
Understanding critical maintenance task		X	X	X	X		X
Ability to compile and control completed work cards		X	X	X			
Ability to consider human performance and limitations.	X	X	X	X			X
Ability to determine required qualifications for task performance		X	X	X			
Ability to identify and rectify existing and potential unsafe conditions			X	X	X	X	X
Ability to manage third parties involved in maintenance activity		X	X				
Ability to confirm proper accomplishment of maintenance tasks			X	X	X	X	
Ability to identify and properly plan performance of critical maintenance tasks		X	X	X			
Ability to prioritise tasks and report discrepancies		X	X	X	X		
Ability to process the work requested by the operator		X	X	X			
Ability to promote the safety and quality policy	X		X				
Ability to properly process removed, uninstalled and rejected parts			X	X	X	X	
Ability to properly record and sign for work accomplished			X	X	X	X	
Ability to recognise the acceptability of parts to be installed prior to fitment				X	X		
Ability to split complex maintenance tasks into clear stages		X					

Ability to understand work orders, work cards and refer to and use applicable maintenance data		X	X	X	X	X	X
Ability to use information systems	X	X	X	X	X	X	X
Ability to use, control and be familiar with required tooling and/or equipment			X	X	X	X	
Adequate communication and literacy skills	X	X	X	X	X	X	X
Analytical and proven auditing skills (for example, objectivity, fairness, open-mindedness, determination, …)							X
Maintenance error investigation skills							X
Resources management and production planning skills	X	X	X				
Teamwork, decision-making and leadership skills	X		X				

Table 2: Assessment criteria for personnel requirement

3.11 CAD 8601 5.2(e) – Template for recording experience / training

3.11.1 The following template may be used to record the professional experience gained in an organisation and the training received and be considered during the competence assessment of the individual in another organisation.

Aviation Maintenance personnel experience credential	
Name	Given name
Address Telephone	E-mail
Independent worker [ ] Trade Group: airframe [ ] engine [ ] electric [ ] avionics [ ] other (specify) [ ] ……	
Employer's details (when applicable) Name Address Telephone	
Maintenance organisation details Name Address	

Telephone		
Approval Number		
Period of employment	From:	To:

Domain of employment

[ ] Planning	[ ] Engineering	[ ] Technical records
[ ] Store department	[ ] Purchasing	

Mechanics/Technician

[ ] Line Maintenance	[ ] Base Maintenance	[ ] Component Maintenance
[ ] Servicing	[ ] Removal/installation	[ ] Testing/inspection
[ ] Scheduled Maintenance	[ ] Inspection	[ ] Repair
[ ] Trouble-shooting	[ ] Trouble-shooting	[ ] Overhaul
	[ ] Repair	[ ] Re-treatment
		[ ] Reassembly
A/C type	A/C type	Component type

Certifying Staff and support staff

[ ] Cat. A	[ ] Cat. B1	[ ] Cat. B2	[ ] Cat. C	[ ] Component type	[ ] Other (e.g. NDT)
A/C Type	A/C Type	A/C Type	A/C Type	Component Type	Specify

Certification privileges: Yes [ ] / No [ ]

[ ] Specialised services	Speciality *(NDT, composites, welding, etc.)*:
[ ] Skilled personnel	Speciality *(sheet metal, structures, wireman, upholstery, etc.)*:
[ ] Ground equipment operation	
[ ] Quality control	[ ] Quality assurance [ ] Training

Total number of check boxes ticked: [ ]

Details of employment

Training received from the contracting organisation	
Date	Nature of training
Certified by:	
Name:	Date:
Position:	Signature:
Contact details:	
Advisory note: A copy of the present credential will be kept for at least 3 years from its issuance by the maintenance organisation.	

Table 3: Template for recording experience/training

3.12 CAD 8601 5.2(f) – Non-destructive testing personnel

3.12.1 Continued airworthiness non-destructive testing means such testing specified by the type certificate holder /aircraft or engine or propeller manufacturer in accordance with the maintenance data as specified in paragraph 5.6 of CAD 8601 for in service aircraft/aircraft components for the purpose of determining the continued fitness of the product to operate safely.

3.12.2 Appropriately qualified means to Level 1, 2 or 3 as defined by the European Standard EN 4179 dependent upon the non-destructive testing function to be carried out.

3.12.3 Notwithstanding the fact that Level 3 personnel may be qualified via EN 4179 to establish and authorise methods, techniques, etc., this does not permit such personnel to deviate from methods and techniques published by the type certificate holder/manufacturer in the form of continued airworthiness data, such as in non-destructive test manuals or service bulletins, unless the manual or service bulletin expressly permits such deviation.

3.12.4 Notwithstanding the general references in EN 4179 to a national aerospace non-destructive testing (NDT) board, all examinations should be conducted by personnel or organisations under the general control of such a board.

3.12.5 Particular non-destructive test means any one or more of the following; Dye penetrant, magnetic particle, eddy current, ultrasonic and radiographic methods including X ray and gamma ray.

3.12.6 It should be noted that new methods are and will be developed, such as, but not limited to thermography and shearography, which are not specifically addressed by EN 4179. Until the time this agreed standard is established, such methods should be carried out in accordance with the particular equipment manufacturer's recommendations including any training and examination process to ensure competence of the personnel in the process.

3.12.7 Any maintenance organisation approved under CAAM Part-145 that carries out NDT should establish NDT specialist qualification procedures detailed in the exposition and accepted by the CAAM.

3.12.8 Boroscoping and other techniques such as delamination coin tapping are non-destructive inspections rather than non-destructive testing. Notwithstanding such differentiation, the maintenance organisation should establish an exposition procedure accepted by the CAAM to ensure that personnel who carry out and interpret such inspections are properly trained and assessed for their competence in the process. Non-destructive inspections, not being considered as NDT by CAAM Part-145 under rating D1.

3.12.9 The referenced standards, methods, training and procedures should be specified in the maintenance organisation exposition.

3.12.10 Any such personnel who intend to carry out and/or control a non-destructive test for which they were not qualified prior to the effective date of CAAM Part-145 should qualify for such non-destructive test in accordance with EN 4179.

3.12.11 In this context officially recognised standard means those standards established or published by an official body whether having legal personality or not, which are widely recognised by the air transport sector as constituting good practice.

3.13 CAD 8601 5.2(g) – Certifying staff for line maintenance

3.13.1 For the purposes of certifying staff qualified as category A and B2 personnel, minor scheduled line maintenance means any minor scheduled inspection/check up to and including a weekly check specified in the aircraft maintenance programme. For aircraft maintenance programmes that do not specify a weekly check, the CAAM will determine the most significant check that is considered equivalent to a weekly check.

3.13.2 Typical tasks permitted after appropriate task training to be carried out by the certifying staff qualified as category A and B2 personnel for the purpose of these personnel issuing an aircraft maintenance release as specified in paragraph 5.9 of CAD 8601 as part of minor scheduled line maintenance or simple defect rectification are contained in the following list:

a) Replacement of wheel assemblies.

b) Replacement of wheel brake units.

c) Replacement of emergency equipment.

d) Replacement of ovens, boilers and beverage makers.

e) Replacement of internal and external lights, filaments and flash tubes.

f) Replacement of windscreen wiper blades.

g) Replacement of passenger and cabin crew seats, seat belts and harnesses.

h) Closing of cowlings and refitment of quick access inspection panels.

i) Replacement of toilet system components but excluding gate valves.

j) Simple repairs and replacement of internal compartment doors and placards but excluding doors forming part of a pressure structure.

k) Simple repairs and replacement of overhead storage compartment doors and cabin furnishing items.

l) Replacement of static wicks.

m) Replacement of aircraft main and APU aircraft batteries.

n) Replacement of in-flight entertainment system components other than public address.

o) Routine lubrication and replenishment of all system fluids and gases.

p) The de-activation only of sub-systems and aircraft components as permitted by the operator's minimum equipment list where such de-activation is agreed by the CAAM as a simple task.

q) Inspection for and removal of de-icing/anti-icing fluid residues, including removal/closure of panels, cowls or covers or the use of special tools.

r) Any other task agreed by the CAAM as a simple task for a particular aircraft type. This may include defect deferment when all the following conditions are met:

1) There is no need for troubleshooting; and

2) The task is in the MEL; and

3) The maintenance action required by the MEL is agreed by the CAAM to be simple.

In the particular case of helicopters, and in addition to the items above, the following:

s) removal and installation of Helicopter Emergency Medical Service (HEMS) simple internal medical equipment.

t) removal and installation of external cargo provisions (i.e., external hook, mirrors) other than the hoist.

u) removal and installation of quick release external cameras and search lights.

v) removal and installation of emergency float bags, not including the bottles.

w) removal and installation of external doors fitted with quick release attachments.

x) removal and installation of snow pads/skid wear shoes/slump protection pads.

No task which requires troubleshooting should be part of the authorised maintenance actions. Release to service after rectification of deferred defects should be permitted as long as the task is listed above.

3.13.3 The requirement of having appropriate aircraft-rated certifying staff qualified as category B1, B2, as appropriate, in the case of aircraft line maintenance does not imply that the organisation must have B1 and B2 personnel at every line station. The MOE should have a procedure on how to deal with defects requiring those categories of certifying staff.

3.13.4 The CAAM may accept that in the case of aircraft line maintenance an organisation has only B1 or B2 certifying staff, as appropriate, provided that the CAAM is satisfied that the scope of work, as defined in the MOE, does not need the availability of all those categories of certifying staff. Special attention should be taken to clearly limit the scope of scheduled and non-scheduled line maintenance (defect rectification) to only those tasks that can be certified by the available category of certifying staff.

3.14 CAD 8601 5.2(j)(4) – Limited certification authorisation

3.14.1 For the issue of a limited certification authorisation:

a) the commander should hold either an air transport pilots license (ATPL), or a commercial pilots license (CPL).

b) The flight engineer should hold either an ATPL, CPL or a national flight engineer licence acceptable to the CAAM on the aircraft type.

3.14.2 In addition, the limited certification authorisation is subject to the maintenance organisation exposition containing procedures to address the personnel requirements of 5.2(e) of CAD 8601 and associated guidance material. The procedures should be accepted by the CAAM and should include as a minimum:

a) Completion of adequate maintenance airworthiness regulation training.

b) Completion of adequate task training for the specific task on the aircraft. The task training should be of sufficient duration to ensure that the individual has a thorough understanding of the task to be completed and will involve training in the use of associated maintenance data.

c) Completion of the procedural training as specified in CAAM Part-145.

3.14.3 Typical tasks that may be certified and/or carried out by the commander holding an ATPL or CPL are minor maintenance or simple checks included in the following list:

a) Replacement of internal lights, filaments and flash tubes.

b) Closing of cowlings and refitment of quick access inspection panels.

c) Role changes e.g. stretcher fit, dual controls, FLIR, doors, photographic equipment etc.

d) Inspection for and removal of de-icing/anti-icing fluid residues, including removal/closure of panels, cowls or covers that are easily accessible but not requiring the use of special tools.

e) Any check/replacement involving simple techniques consistent with this CAGM and as agreed by the CAAM.

3.14.4 Holders of flight engineer licence acceptable to CAAM on the aircraft type, may only exercise this limited certification authorisation privilege when performing the duties of a flight engineer.

3.14.5 In addition to paragraph 3.14.3 (a) to (e), other typical minor maintenance or simple defect rectification tasks that may be carried out are included in the following list:

a) Replacement of wheel assemblies.

b) Replacement of simple emergency equipment that is easily accessible.

c) Replacement of ovens, boilers and beverage makers.

d) Replacement of external lights.

e) Replacement of passenger and cabin crew seats, seat belts and harnesses.

f) Simple replacement of overhead storage compartment doors and cabin furnishing items.

g) Replacement of static wicks.

h) Replacement of aircraft main and APU aircraft batteries.

i) Replacement of in-flight entertainment system components other than public address.

j) The de-activation only of sub-systems and aircraft components as permitted by the operator's minimum equipment list where such de-activation is agreed by the CAAM as a simple task.

k) Re-setting of tripped circuit breakers under the guidance of maintenance control.

l) Any other task agreed by the CAAM as a simple task for a particular aircraft type.

3.14.6 The authorisation should have a finite life of twelve months subject to satisfactory recurrent training on the applicable aircraft type.

3.15 CAD8601 5.2(j)(5) – One-off authorisation

3.15.1 For the purposes of this sub-paragraph ‘unforeseen’ means that the aircraft grounding could not reasonably have been predicted by the operator because the defect was unexpected due to being part of a hitherto reliable system.

3.15.2 A one-off authorisation should only be considered for issue by the quality department of the contracted organisation after it has made a reasoned judgement that such a requirement is appropriate under the circumstances and at the same time maintaining the required airworthiness standards. The organisation’s quality department will need to assess each situation individually prior to the issuance of a one-off authorisation.

3.15.3 A one-off authorisation should not be issued where the level of certification required could exceed the knowledge and experience level of the person it is issued to. In all cases, due consideration should be given to the complexity of the work involved and the availability of required tooling and/or test equipment needed to complete the work.

3.16 CAD 8601 5.2(j)(5)(i) – One-off authorisation requirement

3.16.1 In those situations, where the requirement for a one-off authorisation to issue a maintenance release for a task on an aircraft type for which certifying staff does not hold a type-rated authorisation has been identified, the following procedure is recommended:

a) Flight crew should communicate full details of the defect to the operator's supporting maintenance organisation. If necessary, the supporting maintenance organisation will then request the use of a one-off authorisation from the quality department.

b) When issuing a one-off authorisation, the quality department of the organisation should verify that:

1) Full technical details relating to the work required to be carried out have been established and passed on to the certifying staff.

2) The organisation has an approved procedure in place for coordinating and controlling the total maintenance activity undertaken at the location under the authority of the one-off authorisation.

3) The person to whom a one-off authorisation is issued has been provided with all the necessary information and guidance relating to maintenance data and any special technical instructions associated with the specific task undertaken. A detailed step by step worksheet has been defined by the organisation, communicated to the one-off authorisation holder.

4) The person holds authorisations of equivalent level and scope on other aircraft type of similar technology, construction and systems.

c) The one-off authorisation holder should sign off the detailed step by step worksheet when completing the work steps. The completed tasks should be verified by visual examination and/or normal system operation upon return to an appropriately approved CAAM Part-145 maintenance facility.

3.17 CAD 8601 5.2(j)(5)(ii) – One-off authorisation to person outside of the organisation

3.17.1 This paragraph addresses staff not employed by the maintenance organisation who meet the requirements of 5.2(j)(5) of CAD 8601. In addition to the items listed in paragraph 3.16.1, sub-paragraph (a), (b)1), (b)2) and (b)3) and (c) the quality department of the organisation may issue such one-off authorisation providing full qualification details relating to the proposed certifying personnel are verified by the quality department and made available at the location.

4 Certifying Staff (CAD 8601 5.3)

4.1 CAD 8601 5.3(a) – Certifying staff competency

4.1.1 Holding a CAAM Part-66 licence with the relevant type/group rating, or a national qualification in the case of components, does not mean by itself that the holder is qualified to be authorised as certifying staff. The organisation is responsible to assess the competence of the holder for the scope of maintenance to be authorised.

4.1.2 The sentence 'the organisation shall ensure that certifying staff and support staff have an adequate understanding of the relevant aircraft and/or components to be maintained together with the associated organisation procedures' means that the person has received training and has been successfully assessed on:

a) the type of aircraft or component;

b) the differences on:

1) the particular model/variant;

2) the particular configuration.

4.1.3 The organisation should specifically ensure that the individual competencies have been established with regard to:

a) relevant knowledge, skills and experience in the product type and configuration to be maintained, taking into account the differences between the generic aircraft type rating training that the person received and the specific configuration of the aircraft to be maintained.

b) appropriate attitude towards safety and observance of procedures.

c) knowledge of the associated organisation and operator procedures (i.e. handling and identification of components, MEL use, Technical Log use, independent checks, etc.).

4.1.4 Some special maintenance tasks may require additional specific training and experience, including but not limited to:

a) in-depth troubleshooting;

b) very specific adjustment or test procedures;

c) rigging;

d) engine run-up, starting and operating the engines, checking engine performance characteristics, normal and emergency engine operation, associated safety precautions and procedures;

e) extensive structural/system inspection and repair;

f) other specialised maintenance required by the maintenance programme.

For engine run-up training, simulators and/or real aircraft should be used.

4.1.5 The satisfactory assessment of the competence should be conducted in accordance with a procedure approved by CAAM (item 3.4 of the MOE, as described in paragraph 14.1 of this CAGM.

4.1.6 The organisation should hold copies of all documents that attest the competence and recent experience for the period described in paragraph 5.3(k) of CAD 8601.

4.2 CAD 8601 5.3(b) – Certification authorisation

4.2.1 The organisation issues the certification authorisation when satisfied that compliance has been established with the appropriate paragraphs of CAAM Part-145 and CAAM Part-66. In granting the certification authorisation the maintenance organisation approved under CAAM Part-145 needs to be satisfied that the person holds a valid CAAM Part-66 aircraft maintenance licence and may need to confirm such fact with the CAAM about the licence issued.

4.3 CAD 8601 5.3(d) – Currency

4.3.1 For the interpretation of ‘6 months of actual relevant aircraft maintenance experience in any consecutive 2-year period’, the provisions of CAGM 1801 are applicable.

4.4 CAD 8601 5.3(e) – Continuation training

4.4.1 Continuation training is a two way process to ensure that certifying staff remain current in terms of procedures, human factors and technical knowledge and that the organisation receives feedback on the adequacy of its procedures and maintenance instructions. Due to the interactive nature of this training, consideration should be given to the possibility that such training has the involvement of the quality department to ensure that feedback is actioned. Alternatively, there should be a procedure to ensure that feedback is formally passed from the training department to the quality department to initiate action.

4.4.2 Continuation training should cover changes in relevant requirements such as CAAM Part-145, changes in organisation procedures and the modification standard of the products being maintained plus human factor issues identified from any internal or external analysis of incidents. It should also address instances where staff failed to follow procedures and the reasons why particular procedures are not always followed. In many cases the continuation training will reinforce the need to follow procedures and ensure that incomplete or incorrect procedures are identified to the company in order that they can be corrected. This does not preclude the possible need to carry out a quality audit of such procedures.

4.4.3 Continuation training should be of sufficient duration in each 2 year period to meet the intent of paragraph 5.3(d) of CAD 8601 and may be split into a number of separate elements. Paragraph 5.3(d) of CAD 8601 requires such training to keep

certifying staff updated in terms of relevant technology, procedures and human factors issues which means it is one part of ensuring quality. Therefore, sufficient duration should be related to relevant quality audit findings and other internal / external sources of information available to the organisation on human errors in maintenance. This means that in the case of an organisation that maintains aircraft with few relevant quality audit findings, continuation training could be limited to days rather than weeks, whereas a similar organisation with a number of relevant quality audit findings, such training may take several weeks. For an organisation that maintains aircraft components, the duration of continuation training would follow the same philosophy but should be scaled down to reflect the more limited nature of the activity. For example certifying staff who release hydraulic pumps may only require a few hours of continuation training whereas those who release turbine engine may only require a few days of such training. The content of continuation training should be related to relevant quality audit findings and it is recommended that such training is reviewed at least once in every 24 month period.

4.4.4 The method of training is intended to be a flexible process and could, for example, include a CAAM Part-147 continuation training course, aeronautical college courses, internal short duration courses, seminars, etc. The elements, general content and length of such training should be specified in the maintenance organisation exposition unless such training is undertaken by an organisation approved under CAAM Part-147 when such details may be specified under the approval and cross referenced in the maintenance organisation exposition.

4.5 CAD 8601 5.3(e) – Continuation training programme

4.5.1 The programme for continuation training should list all certifying staff and when training will take place, the elements of such training and an indication that it was carried out reasonably on time as planned. Such information should subsequently be transferred to the certifying staff record as required by paragraph 5.3(j) of CAD 8601.

4.6 CAD 8601 5.3(f) – Competency assessment

4.6.1 As stated in paragraph 5.3(f) of CAD 8601, except where any of the unforeseen cases of paragraph 5.2(j)(5) of CAD 8601 applies, all prospective certifying staff and support staff should be assessed for competence related to their intended duties in accordance with paragraphs 3.5, 3.6, 3.7 and 3.8 of this CAGM to paragraph 5.2(e) of CAD 8601, as applicable.

4.7 CAD 8601 5.3(k) – Certifying staff record

4.7.1 The following minimum information as applicable should be kept on record in respect of each certifying staff:

a) Name

b) Date of Birth

c) Basic Training

d) Type Training

e) Continuation Training

f) Experience

g) Qualifications relevant to the authorisation

h) Scope of the authorisation

i) Date of first issue of the authorisation

j) If appropriate - expiry date of the authorisation

k) Identification Number of the authorisation

4.7.2 The record may be kept in any format but should be controlled by the organisation's quality department. This does not mean that the quality department should run the record system.

4.7.3 Persons authorised to access the system should be maintained at a minimum to ensure that records cannot be altered in an unauthorised manner or that such confidential records become accessible to unauthorised persons.

4.7.4 The CAAM has the right to the records system for initial and continued approval and when the CAAM has cause to doubt the competence of a particular person.

4.8 CAD 8601 5.3(o) – Task training

4.8.1 It is the responsibility of the CAAM Part-145 organisation issuing the category A certifying staff authorisation to ensure that the task training received by this person covers all the tasks to be authorised. This is particularly important in those cases where the task training has been provided by a CAAM Part-147 organisation or by a CAAM Part-145 organisation different from the one issuing the authorisation.

4.8.2 ‘Appropriately approved in accordance with CAD 1821’ means an organisation holding an approval to provide category A task training for the corresponding aircraft type.

4.8.3 ‘Appropriately approved in accordance with this Directive’ means an organisation holding a maintenance organisation approval for the corresponding aircraft type.

4.9 CAD 8601 5.3(p) – Certification privilege of B2 licence holder

4.9.1 The privilege for a B2 licence holder to release minor scheduled line maintenance and simple defect rectification in accordance with CAD 1801 can only be granted by the CAAM Part-145 approved organisation where the licence holder is employed/contracted after meeting all the requirements specified in paragraph 5.3(o) of CAD 8601. This privilege cannot be transferred to another CAAM Part-145 approved organisation.

4.9.2 When a B2 licence holder already holds a certifying staff authorisation containing minor scheduled line maintenance and simple defect rectification for a particular aircraft type, new tasks relevant to category A can be added to that type without requiring another 6 months of experience. However, task training (theoretical plus practical hands-on) and examination/assessment for these additional tasks is still required.

4.9.3 When the certifying staff authorisation intends to cover several aircraft types, the experience may be combined within a single 6-month period.

4.9.4 For the addition of new types to the certifying staff authorisation, another 6 months should be required unless the aircraft is considered similar per CAGM 1801 to the one already held.

4.9.5 The term ‘6 months of experience’ may include full-time employment or part-time employment. The important aspect is that the person has been involved during a period of 6 months (not necessarily every day) in those tasks which are going to be part of the authorisation.

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5 Equipment, tools and material (CAD 8601 5.4)

5.1 CAD 8601 5.4(a) – Equipment, tools and material availability

5.1.1 Once the applicant for approval has determined the intended scope of work for consideration by the CAAM, it will be necessary to show that all tools and equipment as specified in the maintenance data can be made available when needed. All such tools and equipment that require to be controlled in terms of servicing or calibration by virtue of being necessary to measure specified dimensions and torque figures, etc., should be clearly identified and listed in a control register including any personal tools and equipment that the organisation agrees can be used.

5.2 CAD 8601 5.4(b) – Control of equipment and tools

5.2.1 The control of these tools and equipment requires that the organisation has a procedure to inspect/service and, where appropriate, calibrate such items on a regular basis and indicate to users that the item is within any inspection or service or calibration time-limit. A clear system of labelling all tooling, equipment and test equipment is therefore necessary giving information on when the next inspection or service or calibration is due and if the item is unserviceable for any other reason where it may not be obvious. A register should be maintained for all precision tooling and equipment together with a record of calibrations and standards used.

5.2.2 Inspection, service or calibration on a regular basis should be in accordance with the equipment manufacturers' instructions except where the organisation can show by results that a different time period is appropriate in a particular case.

5.2.3 In this context standard acceptable by CAAM means those standards established or published by an official body whether having legal personality or not, which are widely recognised by the air transport sector as constituting good practice.

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6 Acceptance of Components (CAD 8601 5.5)

6.1 CAD 8601 5.5(a)(2) – Unserviceable components

6.1.1 The organisation should ensure the proper identification of any unserviceable components. The unserviceable status of the component should be clearly declared on a tag together with the component identification data and any information that is useful to define actions that are necessary to be taken. Such information should state, as applicable, in-service times, maintenance status, preservation status, failures, defects or malfunctions reported or detected, exposure to adverse environmental conditions, and whether the component is installed on an aircraft that was involved in an accident or incident. Means should be provided to prevent unintentional separation of this tag from the component.

6.1.2 Unserviceable components should typically undergo maintenance due to:

a) expiry of the service life limit as defined in the aircraft maintenance programme;

b) non-compliance with the applicable airworthiness directives and other continuing airworthiness requirements mandated by the CAAM;

c) absence of the necessary information to determine the airworthiness status or eligibility for installation;

d) evidence of defects or malfunctions; or

e) being installed on an aircraft that was involved in an incident or accident likely to affect the component's serviceability.

6.2 CAD 8601 5.5(a)(3) – Unsalvageable components

6.2.1 The following types of components should typically be classified as unsalvageable:

a) components with non-repairable defects, whether visible or not to the naked eye;

b) components that do not meet design specifications, and cannot be brought into conformity with such specifications;

c) components subjected to unacceptable modification or rework that is irreversible;

d) certified life-limited parts that have reached or exceeded their certified life limits, or have missing or incomplete records;

e) components whose airworthy condition cannot be restored due to exposure to extreme forces, heat or adverse environmental conditions;

f) components for which conformity with an applicable airworthiness directive cannot be accomplished;

g) components for which maintenance records and/or traceability to the manufacturer cannot be retrieved.

6.3 CAD 8601 5.5(a)(4) – Standards parts

6.3.1 Standard parts are parts that are manufactured in complete compliance with an established industry, CAAM or other government specification which includes design, manufacturing, test and acceptance criteria, and uniform identification requirements. The specification should include all the information that is necessary to produce and verify conformity of the part. It should be published so that any party may manufacture the part.

6.3.2 To designate a part as a standard part, the Type Certificate (TC) holder may issue a standard parts manual accepted by the authority of the original TC holder or may make reference in the parts catalogue to the specification to be met by the standard part. Documentation that accompanies standard parts should clearly relate to the particular parts and contain a conformity statement plus both the manufacturing and supplier source. Some materials are subject to special conditions, such as storage conditions or life limitation, etc., and this should be included in the documentation and/or the material's packaging.

6.3.3 A CAAM Form 1 or equivalent is not normally issued and, therefore, none should be expected.

6.4 CAD 8601 5.5(a)(5) – Material

6.4.1 Consumable material is any material which is only used once, such as lubricants, cements, compounds, paints, chemical dyes and sealants, etc.

6.4.2 Raw material is any material that requires further work to make it into a component part of the aircraft, such as metal, plastic, wood, fabric, etc.

6.4.3 Material both raw and consumable should only be accepted when satisfied that it is to the required specification. To be satisfied, the material and/or its packaging should be marked with the applicable specification and, where appropriate, the batch number.

6.4.4 Documentation that accompanies all materials should clearly relate to the particular material and contain a conformity statement plus both the manufacturing and supplier source. Some materials are subject to special conditions, such as storage conditions or life limitation, etc., and this should be included in the documentation and/or the material's packaging.

6.4.5 A CAAM Form 1 or equivalent should not be issued for such materials and, therefore, none should be expected. The material specification is normally identified in the (S)TC holder's data except in the case where the authority has agreed otherwise.

6.5 CAD 8601 5.5(b) – Acceptance of components for installation

6.5.1 The procedures for the acceptance of components, standard parts and materials should have the objective of ensuring that the components, standard parts and materials are in satisfactory condition and meet the organisation's requirements. These procedures should be based upon incoming inspections which include:

a) physical inspection of the components, standard parts and materials;

b) review of the accompanying documentation and data, which should be acceptable in accordance with paragraph 5.5(a) of CAD 8601. For the acceptance of components, standard parts and materials from suppliers, the above procedures should include supplier evaluation procedures.

6.6 CAD 8601 5.5(b) – Incoming physical inspection

6.6.1 To ensure that components, standard parts and materials are in satisfactory condition, the organisation should perform incoming physical inspections.

6.6.2 The incoming physical inspection should be performed before the component is installed on the aircraft.

6.6.3 The following list, although not exhaustive, contains typical checks to be performed:

a) verify the general condition of the components and their packaging in relation to damages that could affect their integrity;

b) verify that the shelf life of the component has not expired;

c) verify that items are received in the appropriate package in respect of the type of the component: e.g. correct ATA 300 or electrostatic sensitive devices packaging, when necessary;

d) verify that the component has all plugs and caps appropriately installed to prevent damage or internal contamination. Care should be taken when tape is used to cover electrical connections or fluid fittings/openings because adhesive residues can insulate electrical connections and contaminate hydraulic or fuel units.

6.6.4 Items (fasteners, etc.) purchased in batches should be supplied in a package. The packaging should state the applicable specification/standard, part number, batch number, and the quantity of the items. The documentation that accompanies the material should contain the applicable specification/standard, part number, batch number, supplied quantity, and the manufacturing sources. If the material is acquired from different batches, acceptance documentation for each batch should be provided.

6.7 CAD 8601 5.5(b) – Examples of supplies

6.7.1 A supplier could be any source that provides components, standard parts or materials to be used for maintenance. Possible sources could be: CAAM Part-145 organisations, Part 21 Subpart G organisations, operators, stockist, distributors, brokers, aircraft owners/lessees, etc.

6.8 CAD 8601 5.5(b) – Supplier evaluation

6.8.1 The following elements should be considered for the initial and recurrent evaluation of a supplier's quality system to ensure that the component and/or material is supplied in satisfactory condition:

a) availability of appropriate up-to-date regulations, specifications (such as component handling/storage data) and standards;

b) standards and procedures for the training of personnel and competency assessment;

c) procedures for shelf-life control;

d) procedures for handling of electrostatic sensitive devices;

e) procedures for identifying the source from which components and materials were received;

f) purchasing procedures that identify documentation to accompany components and materials for subsequent use by approved CAAM Part-145 maintenance organisations;

g) procedures for incoming inspection of components and materials;

h) procedures for control of measuring equipment that provide for appropriate storage, usage, and for calibration when such equipment is required;

i) procedures to ensure appropriate storage conditions for components and materials that are adequate to protect the components and materials from damage and/or deterioration. Such procedures should comply with the manufacturers' recommendations and relevant standards;

j) procedures for adequate packing and shipping of components and materials to protect them from damage and deterioration, including procedures for proper shipping of dangerous goods (e.g. ICAO and ATA specifications);

k) procedures for detecting and reporting of suspected unapproved components;

l) procedures for handling unsalvageable components in accordance with applicable regulations and standards;

m) procedures for batch splitting or redistribution of lots and handling of the related documents;

n) procedures for notifying purchasers of any components that have been shipped and have later been identified as not conforming to the applicable technical data or standard;

o) procedures for recall control to ensure that components and materials shipped can be traced and recalled if necessary;

p) procedures for monitoring the effectiveness of the quality system.

6.8.2 Supplier evaluation may depend on different factors, such as the type of component, whether or not the supplier is the manufacturer of the component, the TC holder or a maintenance organisation, or even specific circumstances such as aircraft on ground. This evaluation may be limited to a questionnaire from the CAAM Part-145 organisation to its suppliers, a desktop evaluation of the supplier's procedures or an on-site audit, if deemed necessary.

6.9 CAD 8601 5.5(b) – Installation of components

6.9.1 Components, standard parts and materials should only be installed when they are specified in the applicable maintenance data. This could include parts catalogue (IPC), service bulletins (SBs), aircraft maintenance manual (AMM), component maintenance manual (CMM) etc. So, the installation of a component, standard part or material can only be done after checking the applicable maintenance data.

6.9.2 This check should ensure that the part number, modification status, limitations, etc., of the component, standard part or material are the ones specified in the applicable maintenance data of the particular aircraft or component (i.e. IPC, SB, AMM, CMM, etc.) where the component, standard part or material is going to be installed. The organisation should establish procedures to ensure that this check is performed before installation.

6.10 CAD 8601 5.5(f) – Fabrication of parts for installation

6.10.1 The agreement of the CAAM on the fabrication of parts by the approved maintenance organisation should be formalised through the approval of a detailed procedure in the Maintenance Organisation Exposition (MOE). This guidance contains principles and conditions to be taken into account for the preparation of an acceptable procedure.

6.10.2 Fabrication, inspection, assembly and test should be clearly within the technical and procedural capability of the organisation.

6.10.3 All necessary data to fabricate the part should be approved either by the CAAM or the type certificate (TC) holder, or Part 21 design organisation approval holder, or supplemental type certificate (STC) holder.

6.10.4 Items that are fabricated by an organisation approved under CAAM Part-145 may only be used by that organisation in the course of overhaul, maintenance,

modifications, or repair of aircraft or components, performing work at its own facilities. The permission to fabricate does not constitute approval for manufacture, or to supply externally, and the parts do not qualify for CAAM Form 1 certification. This prohibition also applies to the bulk transfer of surplus inventory, in that locally fabricated parts are physically segregated and excluded from any delivery certification.

6.10.5 Fabrication of parts, modification kits, etc., for onward supply and/or sale may not be conducted by an organisation that is approved under CAAM Part-145.

6.10.6 The data specified in 6.10.3 may include repair procedures that involve the fabrication of parts. Where the data on such parts is sufficient to facilitate fabrication, the parts may be fabricated by an organisation that is approved under CAAM Part-145. Care should be taken to ensure that the data include details of part numbering, dimensions, materials, processes, and any special manufacturing techniques, special raw material specification and/or incoming inspection requirement, and that the approved organisation has the necessary capability to fabricate those parts. That capability should be defined by way of exposition content. Where special processes or inspection procedures are defined in the approved data which are not available at the organisation, the organisation cannot fabricate the part unless the TC/STC holder gives an approved alternative.

6.10.7 Examples of fabrication within the scope of a CAAM Part-145 approval may include but are not limited to the following:

a) fabrication of bushes, sleeves and shims;

b) fabrication of secondary structural elements and skin panels;

c) fabrication of control cables;

d) fabrication of flexible and rigid pipes;

e) fabrication of electrical cable looms and assemblies;

f) formed or machined sheet metal panels for repairs.

All the above-mentioned fabricated parts should be in accordance with the data provided in the overhaul or repair manuals, modification schemes and service bulletins, drawings, or should be otherwise approved by the CAAM.

Note. – It is not acceptable to fabricate any item to pattern unless an engineering drawing of the item is produced which includes any necessary fabrication process and which is acceptable to the CAAM.

6.10.8 Where a TC holder or an approved production organisation is prepared to make available complete data which is not referred to in the aircraft manuals or service bulletins but provides manufacturing drawings for items specified in parts lists, the fabrication of these items is not considered to be within the scope of an approval

unless agreed otherwise by the CAAM in accordance with a procedure specified in the exposition.

6.10.9 Inspection and identification

Any locally fabricated part should be subject to inspection before, separately, and preferably independently from any inspection of its installation. The inspection should establish full compliance with the relevant manufacturing data, and the part should be unambiguously identified as fit for use by stating conformity to the approved data. Adequate records should be maintained of all such fabrication processes including heat treatment and final inspections. All parts, except those that do not have enough space, should carry a part number which clearly relates it to the manufacturing/inspection data. In addition to the part's number, the organisation's identity should be marked on the part for traceability purposes.

6.11 CAD 8601 5.5(g) – Segregation of components

6.11.1 Unserviceable components should be identified and stored in a secure location that is under the control of the maintenance organisation until a decision is made on the future status of such components. The organisation that declared the component to be unserviceable may transfer its custody after identifying it as unserviceable to the aircraft owner provided that such transfer is reflected in the aircraft logbook, or engine logbook, or component logbook.

6.11.2 'Secure location under the control of an approved maintenance organisation' refers to a secure location whose security is the responsibility of the approved maintenance organisation. This may include facilities that are established by the organisation at locations different from the main maintenance facilities. These locations should be identified in the relevant procedures of the organisation.

6.11.3 In the case of unsalvageable components, the organisation should:

a) retain such component in the secure location referred to in paragraph 6.11.2;

b) arrange for the component to be mutilated in a manner that ensures that they are beyond economic salvage or repair before disposing it; or

c) mark the component indicating that it is unsalvageable, when in agreement with the component owner, the component is disposed of for legitimate non-flight uses (such as training and education aids, research and development), or for non-aviation applications, mutilation is often not appropriate. Alternatively to marking, the original part number or data plate information can be removed or a record kept of the disposal of the components.

6.12 CAD 8601 5.5(g) – Mutilation of components

6.12.1 Mutilation should be accomplished in such a manner that the components become permanently unusable for their originally intended use. Mutilated components should not be able to be reworked or camouflaged to provide the appearance of

being serviceable, such as by replating, shortening and rethreading long bolts, welding, straightening, machining, cleaning, polishing, or repainting.

6.12.2 Mutilation may be accomplished by one or a combination of the following procedures:

a) grinding;

b) burning;

c) removal of a major lug or other integral feature;

d) permanent distortion of parts;

e) cutting a hole with cutting torch or saw;

f) melting;

g) sawing into many small pieces; and

h) any other method accepted by the CAAM.

6.12.3 The following procedures are examples of mutilation that are often less successful because they may not be consistently effective:

a) stamping or vibro-etching;

b) spraying with paint;

c) small distortions, incisions, or hammer marks;

d) identification by tags or markings;

e) drilling small holes; and

f) sawing in two pieces only.

7 Maintenance Data (CAD 8601 5.6)

7.1 CAD 8601 5.6(c) – Maintenance data inaccuracy

7.1.1 The referenced procedure should ensure that when maintenance personnel discover inaccurate, incomplete or ambiguous information in the maintenance data they should record the details. The procedure should then ensure that the CAAM Part-145 approved maintenance organisation notifies the problem to the author of the maintenance data in a timely manner. A record of such communications to the author of the maintenance data should be retained by the CAAM Part-145 approved organisation until such time as the type certificate holder has clarified the issue by e.g. amending the maintenance data.

7.1.2 The referenced procedure should be specified in the maintenance organisation exposition.

7.2 CAD 8601 5.6(d) – Modified maintenance instruction

7.2.1 The referenced procedure should address the need for a practical demonstration by the mechanic to the quality personnel of the proposed modified maintenance instruction. When satisfied the quality personnel should approve the modified maintenance instruction and ensure that the type certificate or supplementary type certificate holder is informed of the modified maintenance instruction. The procedure should include a paper/electronic traceability of the complete process from start to finish and ensure that the relevant maintenance instruction clearly identifies the modification. Modified maintenance instructions should only be used in the following circumstances:

a) Where the type certificate / supplementary type certificate holders original intent can be carried out in a more practical or more efficient manner.

b) Where the type certificate / supplementary type certificate holders original intent cannot be achieved by following the maintenance instructions. For example, where a component cannot be replaced following the original maintenance instructions.

c) For the use of alternative tools / equipment.

Important Note: Critical Design Configuration Control Limitations (CDCCL) are airworthiness limitations. Any modification of the maintenance instructions linked to CDCCL constitutes an aircraft modification that should be approved in accordance with CAAM Part-21.

7.3 CAD 8601 5.6(e) – Maintenance data transcription

7.3.1 The maintenance organisation should:

a) transcribes accurately the maintenance data onto such work cards or worksheets, or

b) makes precise reference to the particular maintenance task(s) contained in such maintenance data, which already identifies the task as a CDCCL where applicable.

7.3.2 Relevant parts of the organisation means with regard to aircraft base maintenance, aircraft line maintenance, engine workshops, mechanical workshops and avionic workshops. Therefore, engine workshops for example should have a common system throughout such engine workshops that may be different to that in the aircraft base maintenance.

7.3.3 The work cards should differentiate and specify, when relevant, disassembly, accomplishment of task, reassembly and testing. In the case of a lengthy maintenance task involving a succession of personnel to complete such a task, it may be necessary to use supplementary work cards or worksheets to indicate what was actually accomplished by each individual person.

7.4 CAD 8601 5.6(f) – Maintenance data availability

7.4.1 Data being made available to personnel maintaining aircraft means that the data should be available in close proximity to the aircraft being maintained for supervisors, mechanics and certifying staff to study.

7.4.2 Where computer systems are used, the number of computer terminals should be sufficient in relation to the size of the work programme to enable easy access, unless the computer system can produce paper copies. Where microfilm or microfiche readers/printers are used, a similar requirement is applicable.

7.5 CAD 8601 5.6(g) – Maintenance data currency

7.5.1 To keep data up-to-date, a procedure should be set up to monitor the amendment status of all data and maintain a check that all amendments are being received by being a subscriber to any document amendment scheme. Special attention should be given to TC related data such as certification life limited parts, airworthiness limitations and Airworthiness Limitation Items (ALI), etc.

8 Production Planning (CAD 8601 5.7)

8.1 CAD 8601 5.7(a) – Production planning system

8.1.1 Depending on the amount and complexity of work generally performed by the maintenance organisation, the planning system may range from a very simple procedure to a complex organisational set-up including a dedicated planning function in support of the production function.

8.1.2 For the purpose of CAAM Part-145, the production planning function includes two complementary elements:

a) scheduling the maintenance work ahead, to ensure that it will not adversely interfere with other work as regards the availability of all necessary personnel, tools, equipment, material, maintenance data and facilities.

b) during maintenance work, organising maintenance teams and shifts and provide all necessary support to ensure the completion of maintenance without undue time pressure.

8.1.3 When establishing the production planning procedure, consideration should be given to the following:

a) logistics,

b) inventory control,

c) square meters of accommodation,

d) man-hours estimation,

e) man-hours availability,

f) preparation of work,

g) hangar availability,

h) environmental conditions (access, lighting standards and cleanliness),

i) co-ordination with internal and external suppliers, etc.

j) scheduling critical maintenance tasks during periods when staff are likely to be most alert.

8.2 CAD 8601 5.7(b) – Limitations of human performance

8.2.1 Limitations of human performance, in the context of planning safety related tasks, refers to the upper and lower limits, and variations, of certain aspects of human performance (Circadian rhythm / 24 hours body cycle) which personnel should be aware of when planning work and shifts.

8.3 CAD 8601 5.7(c) – Information handover

8.3.1 The primary objective of the changeover / handover information is to ensure effective communication at the point of handing over the continuation or completion of maintenance actions. Effective task and shift handover depends on three basic elements:

a) The outgoing person's ability to understand and communicate the important elements of the job or task being passed over to the incoming person.

b) The incoming person's ability to understand and assimilate the information being provided by the outgoing person.

c) A formalised process for exchanging information between outgoing and incoming persons and a planned shift overlap and a place for such exchanges to take place.

9 Performance of Maintenance (CAD 8601 5.8)

9.1 CAD 8601 5.8(b) – Error-capturing method identification

9.1.1 The procedure should identify the error-capturing methods, the critical maintenance tasks, the training and qualification of staff applying error-capturing methods, and how the organisation ensures that its staff is familiar with critical maintenance tasks and error-capturing methods.

9.2 CAD 8601 5.8(b) – Critical Maintenance Tasks

9.2.1 The procedure should ensure that the following maintenance tasks are reviewed to assess their impact on flight safety:

a) tasks that may affect the control of the aircraft flight path and attitude, such as installation, rigging and adjustments of flight controls;

b) aircraft stability control systems (autopilot, fuel transfer);

c) tasks that may affect the propulsive force of the aircraft, including installation of aircraft engines, propellers and rotors; and

d) overhaul, calibration or rigging of engines, propellers, transmissions and gearboxes.

9.2.2 The procedure should describe which data sources are used to identify critical maintenance tasks. Several data sources may be used, such as:

a) information from the design approval holder;

b) accident reports;

c) investigation and follow-up of incidents;

d) occurrence reporting;

e) flight data analysis;

f) results of audits;

g) normal operations monitoring schemes; and

h) feedback from training.

9.3 CAD 8601 5.8(b) – Error-Capturing Methods

9.3.1 Error-capturing methods are those actions defined by the organisation to detect maintenance errors made when performing maintenance.

9.3.2 The organisation should ensure that the error-capturing methods are adequate for the work and the disturbance of the system. A combination of several actions (visual inspection, operational check, functional test, rigging check) may be necessary in some cases.

9.4 CAD 8601 5.8(b) – Independent Inspection

9.4.1 Independent inspection is one possible error-capturing method.

9.4.2 What is an independent inspection

An independent inspection is an inspection performed by an 'independent qualified person' of a task carried out by an 'authorised person', taking into account that:

a) the 'authorised person' is the person who performs the task or supervises the task and they assume the full responsibility for the completion of the task in accordance with the applicable maintenance data;

b) the 'independent qualified person' is the person who performs the independent inspection and attests the satisfactory completion of the task and that no deficiencies have been found. The 'independent qualified person' does not issue a maintenance release, therefore they are not required to hold certification privileges;

c) the 'authorised person' issues the maintenance or signs off the completion of the task after the independent inspection has been carried out satisfactorily;

d) the work card system used by the organisation should record the identification of both persons and the details of the independent inspection as necessary before the certificate of release to service or sign-off for the completion of the task is issued.

9.4.3 Qualifications of persons performing independent inspections

The organisation should have procedures to demonstrate that the 'independent qualified person' has been trained and has gained experience in the specific inspection to be performed. The organisation could consider making use of, for example:

a) staff holding a certifying staff or equivalent necessary to release or sign off the critical maintenance task;

b) staff holding a certifying staff or equivalent necessary to release or sign off similar task in a product of similar category and having received specific practical training in the task to be inspected; or

c) a commander holding a limited certification authorisation in accordance with paragraph 5.2(j)(4) of CAD 8601 and having received adequate practical training and having enough experience in the specific task to be inspected and on how to perform independent inspection.

9.4.4 How to perform an independent inspection

An independent inspection should ensure correct assembly, locking and sense of operation. When inspecting control systems that have undergone maintenance,

the independent qualified person should consider the following points independently:

a) all those parts of the system that have actually been disconnected or disturbed should be inspected for correct assembly and locking;

b) the system as a whole should be inspected for full and free movement over the complete range;

c) cables should be tensioned correctly with adequate clearance at secondary stops;

d) the operation of the control system as a whole should be observed to ensure that the controls are operating in the correct sense;

e) if different control systems are interconnected so that they affect each other, all the interactions should be checked through the full range of the applicable controls; and

f) software that is part of the critical maintenance task should be checked, for example: version, compatibility with aircraft configuration.

9.4.5 What to do in unforeseen cases when only one person is available

REINSPECTION:

a) Reinspection is an error-capturing method subject to the same conditions as an independent inspection is, except that the 'authorised person' performing the maintenance task is also acting as 'independent qualified person' and performs the inspection.

b) Reinspection, as an error-capturing method, should only be performed in unforeseen circumstances when only one person is available to carry out the task and perform the independent inspection. The circumstances cannot be considered unforeseen if the person or organisation has not assigned a suitable 'independent qualified person' to that particular line station or shift.

c) The certificate of release to service is issued after the task has been performed by the 'authorised person' and the reinspection has been carried out satisfactorily. The work card system used by the organisation should record the identification and the details of the reinspection before the certificate of release to service for the task is issued.

9.5 CAD 8601 5.8(c) – Multiple errors

9.5.1 The procedures should be aimed at:

a) minimising multiple errors and preventing omissions. Therefore, the procedures should specify:

1) that every maintenance task is signed off only after completion;

2) how the grouping of tasks for the purpose of sign-off allows critical steps to be clearly identified; and

3) that work performed by personnel under supervision (i.e. temporary staff, trainees) is checked and signed off by an authorised person;

b) minimising the possibility of an error being repeated in identical tasks and, therefore, compromising more than one system or function. Thus, the procedures should ensure that no person is required to perform a maintenance task involving removal/installation or assembly/disassembly of several components of the same type fitted to more than one system, a failure of which could have an impact on safety, on the same aircraft or component during a particular maintenance check. However, in unforeseen circumstances when only one person is available, the organisation may make use of reinspection as described in paragraph 9.4.5 of this CAGM.

9.6 CAD 8601 5.8(c) – Minimising risk of multiple errors repetition

9.6.1 To minimise the risk of multiple errors or errors being repeated, the organisation may implement:

a) procedures to plan the performance by different persons of the same task in different systems;

b) duplicate inspection or re-inspection procedures.

9.7 CAD 8601 5.8(d) – Critical Design Configuration Control Limitations (CDCCL)

9.7.1 The organisation should ensure that when performing maintenance, the CDCCL are not compromised. The organisation should pay particular attention to possible adverse effects of any change to the wiring of the aircraft, even of a change not specifically associated with the fuel tank system. For example, it should be common practice to identify segregation of fuel gauging system wiring as a CDCCL. The organisation can prevent adverse effects associated with changes to the wiring by standardising maintenance practices through training, and not through periodic inspections. Training should be provided to avoid indiscriminate routing and splicing of wire and to provide comprehensive knowledge of critical design features of fuel tank systems that would be controlled by a CDCCL. Guidance on the training of maintenance organisation personnel is provided in paragraph 17.1 of this CAGM.

10 Certification of Maintenance (CAD 8601 5.9)

10.1 CAD 8601 5.9(a) – Endangers the flight safety

10.1.1 'Endangers the flight safety' means any instances where safe operation could not be assured or which could lead to an unsafe condition. It typically includes, but is not limited to, significant cracking, deformation, corrosion or failure of primary structure, any evidence of burning, electrical arcing, significant hydraulic fluid or fuel leakage and any emergency system or total system failure. An airworthiness directive overdue for compliance is also considered a hazard to flight safety.

10.2 CAD 8601 5.9(b) – Maintenance release statement

10.2.1 The maintenance release should contain the following statement:

'Certifies that the work specified, except as otherwise specified, was carried out in accordance with CAA Malaysia Requirements and in respect to that work the aircraft/aircraft component is considered ready for release to service'.

Reference should also be made to the CAAM Part-145 approval number.

10.2.2 It is acceptable to use an alternate abbreviated maintenance release consisting of the following statement 'Part-145 release to service' instead of the full certification statement specified in paragraph 10.2.1. When the alternate abbreviated maintenance release is used, the introductory section of the technical log should include an example of the full certification statement from paragraph 10.2.1.

10.2.3 The maintenance release should relate to the task specified in the (S)TC holder's or operator's instructions or the aircraft maintenance programme which itself may cross-refer to maintenance data.

10.2.4 The date such maintenance was carried out should include when the maintenance took place relative to any life or overhaul limitation in terms of date/flying hours/cycles/landings etc., as appropriate.

10.2.5 When extensive maintenance has been carried out, it is acceptable for the maintenance release to summarise the maintenance as long as there is a unique cross-reference to the work package containing full details of maintenance carried out. Dimensional information should be retained in the work-pack record.

10.3 CAD 8601 5.9(d) – CAAM Form 1

10.3.1 The purpose of the certificate is to release assemblies/items/components/parts (hereafter referred to as 'item(s)') after maintenance and to release maintenance work carried out on such items under the approval of CAAM and to allow items removed from one aircraft/aircraft component to be fitted to another aircraft/aircraft component.

10.3.2 The certificate is to be used for export/import purposes, as well as for domestic purposes, and serves as an official certificate for items from the manufacturer/maintenance organisation to users.

10.3.3 It can only be issued by organisations approved by CAAM within the scope of the approval.

10.3.4 The certificate may be used as a rotable tag by utilising the available space on the reverse side of the certificate for any additional information and dispatching the item with two copies of the certificate so that one copy may be eventually returned with the item to the maintenance organisation. The alternative solution is to use existing rotable tags and also supply a copy of the certificate.

10.3.5 A certificate should not be issued for any item when it is known that the item is unserviceable except in the case of an item undergoing a series of maintenance processes at several maintenance organisations approved under CAAM Part-145 and the item needs a certificate for the previous maintenance process carried out for the next maintenance organisation approved under CAAM Part-145 to accept the item for subsequent maintenance processes. In such a case, a clear statement of limitation should be endorsed in Block 12.

10.4 CAD 8601 5.9(d) – CAAM Form 1 Block 12

10.4.1 Examples of data to be entered in this block as appropriate:

a) Maintenance documentation used, including the revision status, for all work performed and not limited to the entry made in Block 11.

b) A statement such as ‘in accordance with the CMM’ is not acceptable.

c) NDT methods with appropriate documentation used when relevant.

d) Compliance with airworthiness directives or service bulletins.

e) Repairs carried out.

f) Modifications carried out.

g) Replacement parts installed.

h) Life-limited parts status.

i) Shelf life limitations.

j) Deviations from the customer work order.

k) Release statements to satisfy a foreign Civil Aviation Authority maintenance requirement.

l) Information needed to support shipment with shortages or re-assembly after delivery.

m) References to aid traceability, such as batch numbers.

10.5 CAD 8601 5.9(e) – Maintenance release for incomplete maintenance

10.5.1 Being unable to establish full compliance with sub-paragraph 5.9(a) of CAD 8601 means that the maintenance required by the aircraft operator could not be completed due either to running out of available aircraft maintenance downtime for the scheduled check or by virtue of the condition of the aircraft requiring additional maintenance downtime.

10.5.2 The aircraft operator is responsible for ensuring that all required maintenance has been carried out before flight and therefore paragraph 5.9(e) of CAD 8601 requires such operator to be informed in the case where full compliance with paragraph 5.9(a) of CAD 8601 cannot be achieved within the operator's limitations. If the operator agrees to the deferment of full compliance, then the maintenance release may be issued subject to details of the deferment, including the operator's authority, being endorsed on the certificate.

10.5.3 The procedure should draw attention to the fact that paragraph 5.9(a) of CAD 8601 does not normally permit the issue of a maintenance release in the case of non-compliance and should state what action the mechanic, supervisor and certifying staff should take to bring the matter to the attention of the relevant department or person responsible for technical co-ordination with the aircraft operator so that the issue may be discussed and resolved with the aircraft operator. In addition, the appropriate person(s) as specified in paragraph 5.2(b) of CAD 8601 should be kept informed in writing of such possible non-compliance situations and this should be included in the procedure.

10.6 CAD 8601 5.9(f) – Suitable release certificate

10.6.1 Suitable release certificate means a certificate which clearly states that the aircraft component is serviceable; that clearly specifies the organisation releasing said component together with details of the authority under whose approval the organisation works including the approval or authorisation reference.

10.6.2 Compliance with all other CAAM Part-145 and operator requirements means making an appropriate entry in the aircraft technical log, checking for compliance with type design standards, modifications, repairs, airworthiness directives, life limitations and condition of the aircraft component plus information on where, when and why the aircraft was grounded.

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11 Maintenance Records (CAD 8601 5.10)

11.1 CAD 8601 5.10(a) – General

11.1.1 Properly executed and retained records provide owners, operators and maintenance personnel with information essential in controlling unscheduled and scheduled maintenance, and troubleshooting to eliminate the need for re-inspection and rework to establish airworthiness. The prime objective is to have secure and easily retrievable records with comprehensive and legible contents. The aircraft record should contain basic details of all serialised aircraft components and all other significant aircraft components installed, to ensure traceability to such installed aircraft component documentation and associated maintenance data as specified in paragraph 5.6 of CAD 8601.

11.1.2 Some gas turbine engines are assembled from modules and a true total time in service for a total engine is not kept. When owners and operators wish to take advantage of the modular design, then total time in service and maintenance records for each module is to be maintained. The maintenance records as specified are to be kept with the module and should show compliance with any mandatory requirements pertaining to that module.

11.1.3 Reconstruction of lost or destroyed records can be done by reference to other records which reflect the time in service, research of records maintained by repair facilities and reference to records maintained by individual mechanics etc. When these things have been done and the record is still incomplete, the owner/operator may make a statement in the new record describing the loss and establishing the time in service based on the research and the best estimate of time in service. The reconstructed records should be submitted to CAAM for acceptance.

Note: Additional maintenance may be required.

11.1.4 The maintenance record can be either a paper or computer system or any combination of both.

11.1.5 Paper systems should use robust material which can withstand normal handling and filing. The record should remain legible throughout the required retention period.

11.1.6 Computer systems may be used to control maintenance and/or record details of maintenance work carried out. Computer systems used for maintenance should have at least one backup system which should be updated at least within 24 hours of any maintenance. Each terminal is required to contain programme safeguards against the ability of unauthorised personnel to alter the database.

11.2 CAD 8601 5.10(c) – Associated maintenance data

11.2.1 Associated maintenance data is specific information such as repair and modification data. This does not necessarily require the retention of all Aircraft Maintenance Manual, Component Maintenance Manual, Illustrated Parts Catalogue (IPC) etc. issued by the TC holder or STC holder. Maintenance records should refer to the revision status of the data used.

12 Mandatory Occurrence Reporting – Airworthiness Aspect (CAD 8601 5.11)

12.1 CAD 8601 5.11(a) – Organisation responsible for the design

12.1.1 The organisation responsible for the design is normally the TC holder of the aircraft, engine or propeller and/or if known the STC holder.

12.2 CAD 8601 5.11(b) – Occurrence reporting system

12.2.1 The aim of occurrence reporting is to identify the factors contributing to incidents, and to make the system resistant to similar errors.

12.2.2 An occurrence reporting system should enable and encourage free and frank reporting of any (potentially) safety related occurrence. This will be facilitated by the establishment of a just culture. An organisation should ensure that personnel are not inappropriately punished for reporting or co-operating with occurrence investigations.

12.2.3 The internal reporting process should be closed-loop, ensuring that actions are taken internally to address safety hazards.

12.2.4 Feedback to reporters, both on an individual and more general basis, is important to ensure their continued support for the scheme.

12.3 CAD 8601 5.11(c) – Mandatory occurrence report

12.3.1 Each report should contain at least the following information:

a) Organisation name and approval reference.

b) Information necessary to identify the subject aircraft and / or component.

c) Date and time relative to any life or overhaul limitation in terms of flying hours/cycles/landings etc. as appropriate.

d) Details of the condition as required by paragraph 5.11(b) of CAD 8601

e) Any other relevant information found during the evaluation or rectification of the condition.

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13 Safety and Quality Policy, Maintenance Procedures and Quality System (CAD 8601 5.12)

13.1 CAD 8601 5.12(a) – Safety and quality policy

13.1.1 The safety and quality policy should as a minimum include a statement committing the organisation to:

a) Recognise safety as a prime consideration at all times.

b) Apply Human factors principles.

c) Encourage personnel to report maintenance related errors/incidents.

d) Recognise that compliance with procedures, quality standards, safety standards and regulations is the duty of all personnel.

e) Recognise the need for all personnel to cooperate with the quality auditors.

13.2 CAD 8601 5.12(b) – Maintenance procedures

13.2.1 Maintenance procedures should be held current such that they reflect best practice within the organisation. It is the responsibility of all organisation's employees to report any differences via their organisation's internal occurrence reporting mechanisms.

13.2.2 All procedures, and changes to those procedures, should be verified and validated before use where practicable.

13.2.3 All technical procedures should be designed and presented in accordance with good human factors principles.

13.3 CAD 8601 5.12(b)(1) – Maintenance contract

13.3.1 Appendix 14.3 of CAGM 6802 provides guidance on the elements that need to be considered for the maintenance contract between the CAMO and the maintenance organisation. The CAAM Part-145 organisation should take into account these elements to ensure that a clear contract or work order has been concluded before providing maintenance services.

13.4 CAD 8601 5.12(b)(2) – Specialised services

13.4.1 Specialised services include any specialised activity, such as, but not limited to non-destructive testing requiring particular skills and/or qualification. Paragraph 5.2(f) of CAD 8601 covers the qualification of personnel but, in addition, there is a need to establish maintenance procedures that cover the control of any specialised process.

13.5 CAD 8601 5.12(c)(1) – Independent audit

13.5.1 The primary objectives of the quality system are to enable the organisation to ensure that it can deliver a safe product and that organisation remains in compliance with the requirements.

13.5.2 An essential element of the quality system is the independent audit.

13.5.3 The independent audit is an objective process of routine sample checks of all aspects of the organisation's ability to carry out all maintenance to the required standards and includes some product sampling as this is the end result of the maintenance process. It represents an objective overview of the complete maintenance related activities and is intended to complement paragraph 5.9(a) of CAD 8601 requirement for certifying staff to be satisfied that all required maintenance has been properly carried out before issue of the certificate of release to service. Independent audits should include a percentage of random audits carried out on a sample basis when maintenance is being carried out. This means some audits during the night for those organisations that work at night.

13.5.4 Except as specified in sub-paragraphs 13.5.7 and 13.5.9, the independent audit should ensure that all aspects of CAAM Part-145 compliance are checked every 12 months and may be carried out as a complete single exercise or subdivided over the 12-month period in accordance with a scheduled plan. The independent audit does not require each procedure to be checked against each product line when it can be shown that the particular procedure is common to more than one product line and the procedure has been checked every 12 months without resultant findings. Where findings have been identified, the particular procedure should be rechecked against other product lines until the findings have been rectified after which the independent audit procedure may revert back to 12 monthly for the particular procedure.

13.5.5 Except as specified otherwise in subparagraphs 13.5.7, the independent audit should sample check one product on each product line every 12 months as a demonstration of the effectiveness of maintenance procedures compliance. It is recommended that procedures and product audits be combined by selecting a specific product example, such as an aircraft or engine or instrument and sample checking all the procedures and requirements associated with the specific product example to ensure that the end result should be an airworthy product.

For the purpose of the independent audit, a product line includes any product under an approval class rating as specified in the approval schedule issued to the particular organisation.

It therefore follows for example that a maintenance organisation approved under CAAM Part-145 with a capability to maintain aircraft, repair engines, brakes and autopilots would need to carry out four complete audit sample checks each year except as specified otherwise in subparagraphs 13.5.5, 13.5.7 or 13.5.9.

13.5.6 The sample check of a product means to witness any relevant testing and visually inspect the product and associated documentation. The sample check should not involve repeat disassembly or testing unless the sample check identifies findings requiring such action.

13.5.7 Except as specified otherwise in sub-paragraph 13.5.9, where the smallest organisation, that is an organisation with a maximum of 10 personnel actively engaged in maintenance, chooses to contract the independent audit element of the quality system in accordance with paragraph 5.12(c)(1) of CAD 8601 it is conditional on the audit being carried out twice in every 12-month period.

13.5.8 Except as specified otherwise in sub-paragraph 13.5.9, where the organisation has line stations listed as per paragraph 6.1(d) of CAD 8601 the quality system should describe how these are integrated into the system and include a plan to audit each listed line station at a frequency consistent with the extent of flight activity at the particular line station. Except as specified otherwise in sub-paragraph 13.5.9 the maximum period between audits of a particular line station should not exceed 24 months.

13.5.9 Except as specified otherwise in sub-paragraph 13.5.5, the CAAM may agree to increase any of the audit time periods specified in this paragraph by up to 100% provided that there are no safety related findings and subject to being satisfied that the organisation has a good record of rectifying findings in a timely manner.

13.5.10 A report should be raised each time an audit is carried out describing what was checked and the resulting findings against applicable requirements, procedures and products.

13.5.11 The independence of the audit should be established by always ensuring that audits are carried out by personnel not responsible for the function, procedure or products being checked. It therefore follows that a large maintenance organisation approved under CAAM Part-145, being an organisation with more than about 500 maintenance staff should have a dedicated quality audit group whose sole function is to conduct audits, raise finding reports and follow up to check that findings are being rectified. For the medium sized maintenance organisation approved under CAAM Part-145, being an organisation with less than about 500 maintenance staff, it is acceptable to use competent personnel from one section/department not responsible for the production function, procedure or product to audit the section/department that is responsible subject to the overall planning and implementation being under the control of the quality manager. Organisations with a maximum of 10 maintenance staff actively engaged in carrying out maintenance may contract the independent audit element of the quality system to another organisation or a qualified and competent person approved by the CAAM.

13.6 CAD 8601 5.12(c)(1) – Audit plan

13.6.1 The purpose of this CAGM is to give guidance on just one acceptable working audit plan to meet part of the needs of paragraph 5.12(c)(1) of CAD 8601. There is any number of other acceptable working audit plans.

13.6.2 The proposed plan lists the subject matter that should be covered by the audit and attempts to indicate applicability in the various types of workshops and aircraft facilities. The list should therefore be tailored for the particular situation and more than one list may be necessary. Each list should be shown against a timetable to indicate when the particular item is scheduled for audit and when the audit was completed.

Paragraph	Comment	Hangar	Engine Workshop	Mech Workshop	Avionic Workshop
5.1		Yes	Yes	Yes	Yes
5.2		Yes	Yes	Yes	Yes
5.3		Yes	Yes	Yes	Yes
5.4		Yes	Yes	Yes	Yes
5.5		Yes	Yes	Yes	Yes
5.6		Yes	Yes	Yes	Yes
5.7		Yes	Yes	Yes	Yes
5.8		Yes	Yes	If appl.	If appl.
5.9		Yes	Yes	Yes	Yes
5.10		Yes	Yes	Yes	Yes
5.11		Yes	Yes	Yes	Yes
5.12		Yes	Yes	Yes	Yes
2.1	MOE	Yes	Yes	Yes	Yes
2.2	MOE	Yes	Yes	Yes	Yes
2.3	MOE	Yes	Yes	Yes	Yes
2.4	MOE	Yes	Yes	Yes	Yes
2.5	MOE	Yes	Yes	Yes	Yes
2.6	MOE	Yes	Yes	Yes	Yes
2.7	MOE	Yes	Yes	Yes	Yes
2.8	MOE	Yes	Yes	Yes	Yes
2.9	MOE	Yes	Yes	Yes	Yes
2.10	MOE	Yes	No	No	No
2.11	MOE	Yes	Yes	Yes	Yes
2.12	MOE	Yes	Yes	Yes	Yes
2.13	MOE	Yes	Yes	Yes	Yes
2.14	MOE	Yes	Yes	Yes	Yes
2.15	MOE	Yes	No	No	No
2.16	MOE	Yes	Yes	Yes	Yes
2.17	MOE	If appl.	If appl.	If appl.	If appl.
2.18	MOE	Yes	Yes	Yes	Yes
2.19	MOE	Yes	Yes	Yes	Yes
2.20	MOE	Yes	Yes	Yes	Yes
2.21	MOE	If appl.	If appl.	If appl.	If appl.
2.22	MOE	Yes	Yes	Yes	Yes
2.23	MOE	Yes	Yes	Yes	Yes
2.24	MOE	Yes	Yes	Yes	Yes

2.25	MOE	Yes	Yes	Yes	Yes
2.26	MOE	Yes	Yes	Yes	Yes
2.28	MOE	Yes	Yes	Yes	Yes
2.29	MOE	Yes	No	No	No
2.30	MOE	Yes	No	No	No
L2.1	MOE	If appl.	No	No	No
L2.2	MOE	If appl.	No	No	No
L2.3	MOE	If appl.	No	No	No
L2.4	MOE	If appl.	No	No	No
L2.5	MOE	If appl.	No	No	No
L2.6	MOE	If appl.	No	No	No
L2.7	MOE	If appl.	No	No	No
3.9	MOE	If appl.	If appl.	If appl.	If appl.
3.10	MOE	If appl.	If appl.	If appl.	If appl.
3.11	MOE	If appl.	If appl.	If appl.	No
3.12	MOE	Yes	Yes	No	No
3.13	MOE	Yes	Yes	Yes	Yes
3.14	MOE	Yes	Yes	Yes	Yes
5.13		Yes	Yes	Yes	Yes
6.1		Yes	Yes	Yes	Yes
6.2		Yes	Yes	Yes	Yes
7.1		Yes	Yes	Yes	Yes
7.2		Yes	Yes	Yes	Yes
7.3		If appl.	If appl.	If appl.	If appl.

Table 4: Audit plan list

Note 1: 'if appl.' means 'if applicable or relevant'.

Note 2: In the case of line stations, all line stations should be audited at the frequency agreed with the CAAM within the limits of paragraph 13.5 of this CAGM

13.7 CAD 8601 5.12(c)(2) – Quality feedback system

13.7.1 An essential element of the quality system is the quality feedback system.

13.7.2 The quality feedback system may not be contracted to outside persons. The principal function of the quality feedback system is to ensure that all findings resulting from the independent quality audits of the organisation are properly investigated and corrected in a timely manner and to enable the accountable manager to be kept informed of any safety issues and the extent of compliance with CAAM Part-145.

13.7.3 The independent quality audit reports referenced in sub-paragraph 13.5.10 should be sent to the relevant department(s) for rectification action giving target rectification dates. Rectification dates should be discussed with such department(s) before the quality department or nominated quality auditor confirms such dates in the report. The relevant department(s) are required by 5.12(c)(2) of CAD 8601 to rectify findings and inform the quality department or nominated quality auditor of such rectification.

13.7.4 The accountable manager should hold regular meetings with staff to check progress on rectification except that in the large organisations such meetings may be delegated on a day to day basis to the quality manager subject to the accountable manager meeting at least twice per year with the senior staff involved to review the overall performance and receiving at least a half yearly summary report on findings of non-compliance.

13.7.5 All records pertaining to the independent quality audit and the quality feedback system should be retained for at least 2 years after the date of clearance of the finding to which they refer or for such periods as to support changes to the sub-paragraph 13.5.9 audit time periods, whichever is the longer.

14 Maintenance Organisation Exposition (CAD 8601 5.13)

14.1 CAD 8601 5.13(a) – Information to be included

14.1.1 The following information should be included in the maintenance organisation exposition.

14.1.2 The information specified in paragraph 5.13(a) of CAD 8601 subparagraphs (6) and (12) to (16) inclusive, whilst a part of the maintenance organisation exposition, may be kept as separate documents or on separate electronic data files subject to the management part of said exposition containing a clear cross-reference to such documents or electronic data files.

14.1.3 The exposition should contain the information, as applicable, specified in this guidance. The information may be presented in any subject order as long as all applicable subjects are covered. Where an organisation uses a different format, for example, to allow the exposition to serve for more than one approval, then the exposition should contain a cross-reference CAD using this list as an index with an explanation as to where the subject matter can be found in the exposition.

14.1.4 The exposition should contain information, as applicable, on how the maintenance organisation complies with Critical Design Configuration Control Limitations' (CDCCL) instructions.

14.1.5 Small maintenance organisations may combine the various items to form a simple exposition more relevant to their needs.

14.1.6 The operator may use electronic data processing (EDP) for publication of the maintenance organisation exposition. The maintenance organisation exposition should be made available to the CAAM in a form acceptable to the CAAM. Attention should be paid to the compatibility of EDP publication systems with the necessary dissemination of the maintenance organisation exposition, both internally and externally.

PART 1 MANAGEMENT

1.1 Corporate commitment by the accountable manager

1.2 Safety and quality policy

1.3 Management personnel

1.4 Duties and responsibilities of the management personnel

1.5 Management organisation chart

1.6 List of certifying staff

1.7 Manpower resources

1.8 General description of the facilities at each address intended to be approved

1.9 Organisations intended scope of work

1.10 Notification procedure to the CAAM regarding changes to the organisation's activities/approval/location/personnel

1.11 Exposition amendment procedures including, if applicable, delegated procedures

PART 2 MAINTENANCE PROCEDURES

2.1 Supplier evaluation and subcontract control procedure

2.2 Acceptance/inspection of aircraft components and material from outside contractors

2.3 Storage, tagging and release of aircraft components and material to aircraft maintenance

2.4 Acceptance of tools and equipment

2.5 Calibration of tools and equipment

2.6 Use of tooling and equipment by staff (including alternate tools)

2.7 Cleanliness standards of maintenance facilities

2.8 Maintenance instructions and relationship to aircraft/aircraft component manufacturers'
instructions including updating and availability to staff

2.9 Repair procedure

2.10 Aircraft maintenance programme compliance

2.11 Airworthiness directives procedure

2.12 Optional modification procedure

2.13 Maintenance documentation in use and its completion

2.14 Technical record control

2.15 Rectification of defects arising during base maintenance

2.16 Release to service procedure

2.17 Records for the operator

2.18 Reporting of defects to the CAAM/operator/manufacturer

2.19 Return of defective aircraft components to store

2.20 Defective components to outside contractors

2.21 Control of computer maintenance record systems

2.22 Control of manhour planning versus scheduled maintenance work

2.23 Critical maintenance tasks and error-capturing methods

2.24 Reference to specific maintenance procedures such as -
— Engine running procedures
— Aircraft pressure run procedures
— Aircraft towing procedures
— Aircraft taxiing procedures

2.25 Procedures to detect and rectify maintenance errors.

2.26 Shift/task handover procedures

2.27 Procedures for notification of maintenance data inaccuracies and ambiguities, to the type certificate holder

2.28 Production planning procedures

PART L2 ADDITIONAL LINE MAINTENANCE PROCEDURES

L2.1 Line maintenance control of aircraft components, tools, equipment, etc.

L2.2 Line maintenance procedures related to servicing/fuelling/de-icing, including inspection for/removal of de-icing/anti-icing fluid residues, etc.

L2.3 Line maintenance control of defects and repetitive defects

L2.4 Line procedure for completion of technical log

L2.5 Line procedure for pooled parts and loan parts

L2.6 Line procedure for return of defective parts removed from aircraft

L2.7 Line procedure for critical maintenance tasks and error-capturing methods

PART 3 QUALITY SYSTEM PROCEDURES

3.1 Quality audit of organisation procedures

3.2 Quality audit of aircraft

3.3 Quality audit remedial action procedure

3.4 Certifying staff and support staff qualification and training procedures

3.5 Certifying staff and support staff records

3.6 Quality audit personnel

3.7 Qualifying inspectors
3.8 Qualifying mechanics
3.9 Aircraft or aircraft component maintenance tasks exemption process control
3.10 Concession control for deviation from organisations' procedures
3.11 Qualification procedure for specialised activities such as NDT welding, etc.
3.12 Control of manufacturers' and other maintenance working teams
3.13 Human factors training procedure
3.14 Competence assessment of personnel
3.15 Training procedure for on-job training
3.16 Procedure for the issue of recommendation to CAAM for the issue of CAAM Part-66 licence
PART 4
4.1 Contracting operators
4.2 Operator procedures and paperwork
4.3 Operator record completion
PART 5
5.1 Sample of documents
5.2 List of Subcontractors as per paragraph 6.1(b) of CAD 8601
5.3 List of Line maintenance locations as per paragraph 6.1(d) of CAD 8601
5.4 List of contracted organisations as per 5.13(a)(16) of CAD 8601

Table 5: Content of maintenance organisation exposition

14.2 CAD 8601 5.13(a) – Purpose of MOE

14.2.1 The purpose of the maintenance organisation exposition (MOE) is to set forth the procedures, means and methods of the organisation.

14.2.2 Compliance with its contents will assure compliance with the requirements of CAAM Part-145, which is a prerequisite to obtaining and retaining a maintenance organisation approval certificate.

14.2.3 Paragraph 5.13(a)(1) to (a)(11) of CAD 8601 constitutes the 'management' part of the MOE and therefore could be produced as one document and made available to the person(s) specified in paragraph 5.2(b) of CAD 8601 who should be

reasonably familiar with its contents. List of certifying staff may be produced as a separate document.

14.2.4 Paragraph 5.13(a)(12) of CAD 8601 constitutes the working procedures of the organisation and therefore as stated in the requirement may be produced as any number of separate procedures manuals. It should be remembered that these documents should be cross-referenced from the management MOE.

14.2.5 Personnel are expected to be familiar with those parts of the manuals that are relevant to the maintenance work they carry out.

14.2.6 The organisation should specify in the MOE who should amend the manual particularly in the case where there are several parts.

14.2.7 The quality manager should be responsible for monitoring the amendment of the MOE, unless otherwise agreed by the CAAM, including associated procedures manuals and submission of the proposed amendments to the CAAM. However, the CAAM may agree via a procedure stated in the amendment section of the MOE that some defined class of amendments may be incorporated without prior approval by CAAM.

14.2.8 The MOE should cover four main parts:

a) The management MOE covering the parts specified earlier.

b) The maintenance procedures covering all aspects of how aircraft components may be accepted from outside sources and how aircraft will be maintained to the required standard.

c) The quality system procedures including the methods of qualifying mechanics, inspection, certifying staff and quality audit personnel.

d) Contracting operator procedures and paperwork.

14.2.9 The accountable manager's exposition statement as specified in paragraph 5.13(a)(1) of CAD 8601 should embrace the intent of the following paragraph and in fact this statement may be used without amendment. Any modification to the statement should not alter the intent.

> This exposition and any associated referenced manuals define the organisation and procedures upon which the CAAM Part-145 approval is based as required by paragraph 5.13 of CAD 8601. These procedures are approved by the undersigned and should be complied with, as applicable, when work orders are being progressed under the terms of the CAAM Part-145 approval.
>
> It is accepted that these procedures do not override the necessity of complying with any new or amended regulation published by the CAAM from time to time where these new or amended regulations are in conflict with these procedures.

It is understood that the CAAM will approve this organisation whilst the CAAM is satisfied that the procedures are being followed and work standards maintained. It is further understood that the CAAM reserves the right to suspend, limit or revoke the approval of the organisation if the CAAM has evidence that procedures are not followed or standards not upheld. Signed ..... Dated ..... Accountable Manager and..... (quote position)..... For and on behalf of..... (quote organisation's name).....

Table 6: Accountable manager's exposition statement

14.2.10 Whenever the accountable manager changes, it is important to ensure that the new accountable manager signs the paragraph 14.2.9 statement at the earliest opportunity.

14.2.11 Failure to carry out this action could invalidate the CAAM Part-145 approval.

14.2.12 When an organisation is approved against any other Part containing a requirement for an exposition, a supplement covering the differences will suffice to meet the requirements except that the supplement should have an index showing where those parts missing from the supplement are covered.

15 Privileges of the Organisation (CAD 8601 6)

15.1 CAD 8601 6.1(b) – Sub-contracting

15.1.1 Working under the quality system of an organisation appropriately approved under CAAM Part-145 (sub-contracting) refers to the case of one organisation, not itself appropriately approved to CAAM Part-145 that carries out aircraft line maintenance or minor engine maintenance or maintenance of other aircraft components or a specialised service as a subcontractor for an organisation appropriately approved under CAAM Part-145. To be appropriately approved to subcontract the organisation should have a procedure for the control of such subcontractors as described below. Any approved maintenance organisation that carries out maintenance for another approved maintenance organisation within its own approval scope is not considered to be subcontracting for the purpose of this paragraph.

15.1.2 Maintenance of engines or engine modules other than a complete workshop maintenance check or overhaul is intended to mean any maintenance that can be carried out without disassembly of the core engine or, in the case of modular engines, without disassembly of any core module.

15.1.3 FUNDAMENTALS OF SUB-CONTRACTING UNDER CAAM PART-145

15.1.3.1 The fundamental reasons for allowing an organisation approved under CAAM Part-145 to subcontract certain maintenance tasks are:

a) To permit the acceptance of specialised maintenance services, such as, but not limited to, plating, heat treatment, plasma spray, fabrication of specified parts for minor repairs / modifications, etc., without the need for direct approval by the CAAM in such cases.

b) To permit the acceptance of aircraft maintenance up to but not including a base maintenance check as specified in paragraph 6.1(b) of CAD 8601 by organisations not appropriately approved under CAAM Part-145 when it is unrealistic to expect direct approval by the CAAM. The CAAM will determine when it is unrealistic but in general it is considered unrealistic if only one or two organisations intend to use the sub-contract organisation.

c) To permit the acceptance of component maintenance.

d) To permit the acceptance of engine maintenance up to but not including a workshop maintenance check or overhaul of an engine or engine module as specified in paragraph 6.1(b) of CAD 8601 by organisations not appropriately approved under CAAM Part-145 when it is unrealistic to expect direct approval by the CAAM. The determination of unrealistic is as per sub-paragraph 15.1.3.1(b).

15.1.3.2 When maintenance is carried out under the sub-contract control system it means that for the duration of such maintenance, the CAAM Part-145 approval has been temporarily extended to include the sub-contractor. It therefore follows that those parts of the subcontractor's facilities personnel and procedures involved with the maintenance organisation's products undergoing maintenance should meet CAAM Part-145 requirements for the duration of that maintenance and it remains the organisation's responsibility to ensure such requirements are satisfied.

15.1.3.3 For the criteria specified in sub-paragraph 15.1.3.1 the organisation is not required to have complete facilities for maintenance that it needs to sub-contract but it should have its own expertise to determine that the sub-contractor meets the necessary standards. However, an organisation cannot be approved unless it has the in-house facilities, procedures and expertise to carry out the majority of maintenance for which it wishes to be approved in terms of the number of class ratings.

15.1.3.4 The organisation may find it necessary to include several specialist sub-contractors to enable it to be approved to completely certify the maintenance release of a particular product. Examples could be specialist welding, electro-plating, painting etc. To authorise the use of such subcontractors, the CAAM will need to be satisfied that the organisation has the necessary expertise and procedures to control such sub-contractors.

15.1.3.5 An organisation working outside the scope of its approval schedule is deemed to be not approved. Such an organisation may in this circumstance operate only under the subcontract control of another organisation approved under CAAM Part-145.

15.1.3.6 Authorisation to sub-contract is indicated by the CAAM through acceptance of the maintenance organisation exposition containing a specific procedure on the control of sub-contractors.

15.1.4 PRINCIPAL CAAM PART-145 PROCEDURES FOR THE CONTROL OF SUB-CONTRACTORS NOT APPROVED UNDER CAAM PART-145

15.1.4.1 A pre-audit procedure should be established whereby the maintenance organisations' subcontract control section, which may also be the paragraph 5.12(c) of CAD 8601 quality system independent audit section, should audit a prospective subcontractor to determine whether those services of the subcontractor that it wishes to use meets the intent of CAAM Part-145.

15.1.4.2 The organisation approved under CAAM Part-145 needs to assess to what extent it will use the sub-contractor`s facilities. As a general rule the organisation should require its own paperwork, approved data and material/spare parts to be used, but it could permit the use of tools, equipment and personnel from the sub-contractor as long as such tools, equipment and

personnel meet the requirement of CAAM Part-145. In the case of subcontractors who provide specialised services it may for practical reasons be necessary to use their specialised services personnel, approved data and material subject to acceptance by the organisation approved under CAAM Part-145.

15.1.4.3 Unless the sub-contracted maintenance work can be fully inspected on receipt by the organisation approved under CAAM Part-145 it will be necessary for such organisation to supervise the inspection and release from the sub-contractor. Such activities should be fully described in the organisation procedure. The organisation will need to consider whether to use its own staff or authorise the sub-contractor's staff.

15.1.4.4 The maintenance release may be issued either at the sub-contractor or at the organisation facility by staff issued a certification authorisation in accordance with paragraph 5.2 of CAD 8601 as appropriate, by the organisation approved under CAAM Part-145. Such staff would normally come from the organisation approved under CAAM Part-145 but may otherwise be a person from the sub-contractor who meets the approved maintenance organisation certifying staff standard which itself is approved by the CAAM via the maintenance organisation exposition. The maintenance release will always be issued under the maintenance organisation approval reference.

15.1.4.5 The sub-contract control procedure will need to record audits of the sub-contractor, to have a corrective action follow up plan and to know when sub-contractors are being used. The procedure should include a clear revocation process for sub-contractors who do not meet the CAAM Part-145 approved maintenance organisation’s requirements.

15.1.4.6 The CAAM Part-145 quality audit staff will need to audit the sub-contract control section and sample audit sub-contractors unless this task is already carried out by the quality audit staff as stated in sub-paragraph 15.1.4.1.

15.1.4.7 The contract between the CAAM Part-145 approved maintenance organisation and the subcontractor should contain a provision for the CAAM to have right of access to the sub-contractor.

15.2 CAD 8601 6.1(d) – Line maintenance

15.2.1 Line Maintenance should be understood as any maintenance that is carried out before flight to ensure that the aircraft is fit for the intended flight.

a) Line Maintenance may include:

1) Trouble shooting.

2) Defect rectification.

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

4) 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.

5) Minor repairs and modifications which do not require extensive disassembly and can be accomplished by simple means.

b) For temporary or occasional cases (ADs, SBs) the Quality Manager may accept base maintenance tasks to be performed by a line maintenance organisation provided all requirements are fulfilled as defined by CAAM.

c) Maintenance tasks falling outside these criteria are considered to be Base Maintenance.

d) Aircraft maintained in accordance with ‘progressive’ type programmes should be individually assessed in relation to this paragraph. In principle, the decision to allow some ‘progressive’ checks to be carried out should be 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.

16 Limitations on the Organisation (CAD 8601 6.2)

16.1 CAD 8601 6.2.1 – Temporary situations

16.1.1 This paragraph is intended to cover the situation where the larger organisation may temporarily not hold all the necessary tools, equipment etc., for an aircraft type or variant specified in the organisation's approval. This paragraph means that CAAM need not amend the approval to delete the aircraft type or variants on the basis that it is a temporary situation and there is a commitment from the organisation to re-acquire tools, equipment etc. before maintenance on the type may recommence.

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17 Appendices

17.1 Appendix 1 – Fuel Tank Safety (FTS) Training

This appendix includes general instructions for providing training on Fuel Tank Safety issues.

1 Effectivity:

Large aircraft as defined in CAD 8601

2 Affected organisations:

CAAM Part-145 approved maintenance organisations involved in the maintenance of aeroplanes specified in paragraph A) and fuel system components installed on such aeroplanes when the maintenance data are affected by CDCCL.

3 Persons from affected organisation who should receive training:

3.1 Phase 1 only:

The quality manager and the staff required to quality monitor the organisation.

3.2 Phase 1 + Phase 2 + Continuation training:

Personnel of the CAAM Part-145 approved maintenance organisation required to plan, perform, supervise, inspect and certify the maintenance of aircraft and fuel system components specified in paragraph A).

4 General requirements of the training courses

4.1 Phase 1 – Awareness

The training should be carried out before the person starts to work without supervision but not later than 6 months after joining the organisation.

4.1.1 Type: Should be an awareness course with the principal elements of the subject. It may take the form of a training bulletin, or other self-study or informative session. Signature of the reader is required to ensure that the person has passed the training.

4.1.2 Level: It should be a course at the level of familiarisation with the principal elements of the subject.

4.1.3 Objectives: The trainee should, after the completion of the training:

a) Be familiar with the basic elements of the fuel tank safety issues.

b) Be able to give a simple description of the historical background and the elements requiring a safety consideration, using common words and showing examples of non-conformities.

c) Be able to use typical terms.

4.1.4 Content: The course should include:

a) a short background showing examples of FTS accidents or incidents,

b) the description of concept of fuel tank safety and CDCCL,

c) some examples of manufacturers documents showing CDCCL items,

d) typical examples of FTS defects,

e) some examples of TC holders repair data

f) some examples of maintenance instructions for inspection.

4.2 Phase 2 - Detailed training

A flexible period may be allowed by CAAM to allow organisations to set the necessary courses and impart the training to the personnel, taking into account the organisation's training schemes/means/practices.

Staff should have received Phase 2 training within 12 months of joining the organisation, whichever comes later.

4.2.1 Type: Should be a more in-depth internal or external course. It should not take the form of a training bulletin, or other self-study. An examination should be required at the end, which should be in the form of a multi choice question, and the pass mark of the examination should be 75%.

4.2.2 Level: It should be a detailed course on the theoretical and practical elements of the subject.

The training may be made either:

a) in appropriate facilities containing examples of components, systems and parts affected by Fuel Tank Safety (FTS) issues. The use of films, pictures and practical examples on FTS is recommended; or

b) by attending a distance course (e-learning or computer based training) including a film when such film meets the intent of the objectives and content here below. An e-learning or computer based training should meet the following criteria:

1) A continuous evaluation process should ensure the effectiveness of the training and its relevance;
2) Some questions at intermediate steps of the training should be proposed to ensure that the trainee is authorized to move to the next step;
3) The content and results of examinations should be recorded;
4) Access to an instructor in person or at distance should be possible in case support is needed.

A duration of 8 hours for phase 2 is an acceptable compliance.

When the course is provided in a classroom, the instructor should be very familiar with the data in Objectives and Guidelines. To be familiar, an instructor should have attended himself a similar course in a classroom and made additionally some lecture of related subjects.

4.2.3 Objectives:

The attendant should, after the completion of the training:

a) have knowledge of the history of events related to fuel tank safety issues and the theoretical and practical elements of the subject, be able to give a detailed description of the concept of fuel tank system ALI (including Critical Design Configuration Control Limitations CDCCL, and using theoretical fundamentals and specific examples;

b) have the capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner;

c) have knowledge on how the above items affect the aircraft;

d) be able to identify the components or parts or the aircraft subject to FTS from the manufacturer's documentation,

e) be able to plan the action or apply a Service Bulletin and an Airworthiness Directive.

4.2.4 Content: Following the guidelines described in paragraph 5 below.

4.2.5 Continuation training:

The organisation should ensure that the continuation training is required in each two years period. The syllabus of the training programme referred to in Part 3.4 of the Maintenance Organisation Exposition (MOE) should include the additional syllabus for this continuation training.

The continuation training may be combined with the phase 2 training in a classroom or at distance.

The continuing training should be updated when new instruction are issued which are related to the material, tools, documentation and manufacturer's or CAAM's directives.

5 Guidelines for preparing the content of Phase 2 courses.

5.1 The following guidelines should be taken into consideration when the phase 2 training programme are being established:

a) understanding of the background and the concept of fuel tank safety,

b) how the mechanics can recognise, interpret and handle the improvements in the instructions for continuing airworthiness that have been made or are being made regarding fuel tank systems,

c) awareness of any hazards especially when working on the fuel system, and when the Flammability Reduction System using nitrogen is installed.

5.2 Paragraphs a), b) and c) above should be introduced in the training programme addressing the following issues:

a) The theoretical background behind the risk of fuel tank safety: the explosions of mixtures of fuel and air, the behaviour of those mixtures in an aviation environment, the effects of temperature and pressure, energy needed for ignition, etc., the 'fire triangle', - Explain 2 concepts to prevent explosions:

1) ignition source prevention; and

2) flammability reduction,

b) The major accidents related to fuel tank systems, the accident investigations and their conclusions,

c) Where relevant information can be found and how to use and interpret this information in the various instructions for continuing airworthiness (aircraft maintenance manuals, component maintenance manual, etc.),

d) Fuel Tank Safety during maintenance: fuel tank entry and exit procedures, clean working environment, what is meant by configuration control, wire separation, bonding of components etc.

e) Flammability reduction systems when installed: reason for their presence, their effects, the hazards of a Flammability Reduction System (FRS) using nitrogen for maintenance, safety precautions in maintenance/working with an FRS,

f) Recording maintenance actions, recording measures and results of inspections.

5.3 The training should include a representative number of examples of defects and the associated repairs as required by the TC/STC holders' maintenance data.

6 Approval of training

6.1 For CAAM Part-145 approved organisations, the approval of the initial and continuation training programme and the content of the examination can be achieved by the change to the MOE. The necessary changes to the MOE to meet the content of this decision should be made and implemented at the time requested by CAAM.