Jordan Civil Aviation Regulatory Commission

Acceptable Means of Compliance and Guidance Material to Part-145

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NOTE

The contents of this document (AMC and GM) are colour-coded and can be identified according to the illustration below:

Acceptable Means of Compliance (AMC)

Guidance Material (GM)

GENERAL AVIATION (GA) ALLEVIATIONS

The General Aviation requirements (GA alleviations) are written in violet.

AMC 145.1 (d) General

1. Maintenance organization having their principal place of business in a foreign country may conduct any maintenance activity on any civil aircraft or components of a civil aircraft provided it is accepted by CARC in accordance with CARC Guidance procedure No. AWS 24 as amended.
2. Component maintenance and installation shall be in compliance with Subpart E of Part M.
3. Aircraft components are required to have authorized release certificate before installation.
4. Parts are identified by 3 different product classes. The documentation required to accompany a part is dependent on the product class.
   a. Class I products are complete aircraft, aircraft engines or propellers that are type-certified. Class I products are identified by a manufacturers data plate or identification marks. Type-certified products are regulated under Part 21.
   b. Class II products are major components of a Class I products, the failure of which would jeopardize the safety of the Class I product and are usually serialized .
   c. Class III products are any parts or components that are not Class I or II, and include standard parts. A Class III product is eligible for installation on a Class I or II product if it is listed in the approved design.
5. Owners/Operators and or CAM organizations shall identify products classes as per point(4) above.
6. Organizations performing maintenance on Class I and II located outside the country must be accepted by CARC in accordance with point (1) above.

AMC 145.10 Scope

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:

   - Trouble shooting.
   - Defect rectification.
   - Component replacement with use of external test equipment if required. Component replacement may include components such as engines and propellers.
   - 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 power plant items which are visible through quick opening access panels/doors.

– 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 organization provided all requirements are fulfilled as defined by CARC.

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

(d) Aircraft maintained in accordance with 'progressive' type programs 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.

2. Where the organization uses facilities both inside and outside Jordan such as satellite facilities, sub-contractors, line stations etc., such facilities may be included in the approval without being identified on the approval certificate subject to the maintenance organization exposition identifying the facilities and containing procedures to control such facilities and CARC being satisfied that they form an integral part of the approved maintenance organization.

GM 145.10 Scope

This Guidance Material (GM) provides guidance on how the smallest organizations satisfy the intent of Part-145:

1. By inference, the smallest maintenance organization would only be involved in a limited number of light aircraft, or aircraft components, used for commercial air transport. It is therefore a matter of scale; light aircraft do not demand the same level of resources, facilities or complex maintenance procedures as the large organization.

2. It is recognized that a Part-145 approval may be required by two quite different types of small organizations, the first being the light aircraft maintenance hangar, the second being the component maintenance workshop, e.g. small piston engines, radio equipment, etc.

3. Where only one person is employed (in fact having the certifying function and others), these organizations approved under Part-145 may use the alternatives provided in point 3.1 limited to the following:

   Class A2 Base and Line maintenance of aeroplanes of 5 700 kg and below (piston engines only).

   Class A3 Base and Line maintenance of single-engined helicopters of less than 3 175 kg.

   Class A4 Aircraft other than A1, A2 and A3

   Class B2 Piston engines with maximum output of less than 450 HP.

   Class C Components.

   Class D1 Non-destructive Testing.

   3.1. 145.30(b): The minimum requirement is for one full-time person who meets the Part-66 requirements for certifying staff and holds the position of 'accountable manager, maintenance engineer and is also certifying staff and, if applicable, airworthiness review staff'. No other person may issue a certificate of release to service and therefore if absent, no maintenance may be released during such absence.

      3.1.1. The quality monitoring function of 145.65(c) may be contracted to an appropriate organization approved under Part-145 or to a person with appropriate technical knowledge and extensive experience of quality audits employed on a part-time basis, with the agreement of CARC.

      Note: Full-time for the purpose of Part-145 means not less than 35 hrs per week except during vacation periods.

      3.1.2. 145.35. In the case of an approval based on one person using a subcontracted quality monitoring arrangement, the requirement for a record of certifying staff is satisfied by the submission to and acceptance by CARC of CRAC Form 18-0285. With only one person the requirement for a separate record of authorization is unnecessary because CRAC Form 18-0127 approval schedule defines the authorization. An appropriate statement, to reflect this situation, should be included in the exposition.

3.1.3. 145.65(c). It is the responsibility of the contracted quality monitoring organization or person to make a minimum of 2 visits per 12 months and it is the responsibility of this organization or person to carry out such monitoring on the basis of 1 pre-announced visit and 1 not announced visit to the organization.

It is the responsibility of the organization to comply with the findings of the contracted quality monitoring organization or the person.

CAUTION: it should be understood that if the contracted organization or the above mentioned person loses or gives up its approval, then the organization's approval will be suspended.

4. Recommended operating procedure for a Part-145 approved maintenance organization based upon up to 10 persons involved in maintenance.

4.1. 145.30(b): The normal minimum requirement is for the employment on a full-time basis of two persons who meet the competent authorities' requirements for certifying staff, whereby one holds the position of 'maintenance engineer' and the other holds the position of 'quality audit engineer'.

Either person can assume the responsibilities of the accountable manager providing that they can comply in full with the applicable elements of 145.30(a), but the 'maintenance engineer' should be the certifying person to retain the independence of the 'quality audit engineer' to carry out audits. Nothing prevents either engineer from undertaking maintenance tasks providing that the 'maintenance engineer' issues the certificate of release to service. This 'maintenance engineer' may also be nominated as airworthiness review staff to carry out airworthiness reviews and issue the corresponding airworthiness review certificate for LA1 aircraft not involved in commercial operations in accordance with M.901(l).

The 'quality audit engineer' should have similar qualifications and status to the 'maintenance engineer' for reasons of credibility, unless he/she has a proven track-record in aircraft quality assurance, in which case some reduction in the extent of maintenance qualifications may be permitted.

In cases where CARC agrees that it is not practical for the organization to nominate a post holder for the quality monitoring function, this function may be contracted in accordance to paragraph 3.1.1.

AMC 145.15 Application

In a form and in a manner established by CARC means that the application should be made on a CARC Form 18-0148 (refer to Appendix III to AMC to Part-145).

AMC 145.20 Terms of approval

The following table identifies the ATA Specification 2200 chapter for the category C component rating. If the maintenance manual (or equivalent document) does not follow the ATA Chapters, the corresponding subjects still apply to the applicable C rating.

CLASS	RATING	ATA CHAPTERS
COMPONENTS OTHER THAN COMPLETE ENGINES OR APUs	C1 Air Cond & Press	21
	C2 Auto Flight	22
	C3 Comms and Nav	23 - 34
	C4 Doors - Hatches	52
	C5 Electrical Power & Lights	24 – 33 - 85
	C6 Equipment	25 - 38 - 44 – 45 - 50
	C7 Engine – APU	49 - 71 - 72 - 73 - 74 - 75 - 76 - 77 - 78 - 79 - 80 - 81 - 82 - 83
	C8 Flight Controls	27 - 55 - 57.40 - 57.50 -57.60 - 57.70
	C9 Fuel	28 - 47
	C10 Helicopters - Rotors	62 - 64 - 66 - 67
	C11 Helicopter - Trans	63 - 65
	C12 Hydraulic Power	29
	C13 Indicating/Recording Systems	31 – 42 - 46
	C14 Landing Gear	32
	C15 Oxygen	35
	C16 Propellers	61
	C17 Pneumatic & Vacuum	36 - 37
	C18 Protection ice/rain/fire	26 - 30
	C19 Windows	56
	C20 Structural	53 - 54 - 57.10 - 57.20 - 57.30
	C21 Water Ballast	41
	C22 Propulsion Augmentation	84

AMC 145.25(a) Facility requirements

1. Where the hangar is not owned by the organization, 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 program. The aircraft hangar visit plan should be updated on a regular basis.

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

AMC 145.25(b) Facility requirements

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.

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.

AMC 145.25(d) Facility requirements

1. Storage facilities for serviceable aircraft components should be clean, well-ventilated and maintained at a constant dry temperature to minimize the effects of condensation. Manufacturer's storage recommendations should be followed for those aircraft components identified in such published recommendations.
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.
3. All aircraft components, wherever practicable, should remain packaged in protective material to minimize damage and corrosion during storage.

AMC 145.30(a) Personnel requirements

1. With regard to the accountable manager, it is normally intended to mean the chief executive officer of the approved maintenance organization, who by virtue of position has overall (including in particular financial) responsibility for running the organization. The accountable manager may be the accountable manager for more than one organization and is not required to be necessarily knowledgeable on technical matters as the maintenance organization exposition defines the maintenance standards. When the accountable manager is not the chief executive officer CARC 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.

2. An organization shall appoint an accountable manager acceptable to CARC means a CARC Form 285 is recommended in order for the accountable manager to be acceptable to CARC.

AMC 145.30(b) Personnel requirements

1. Dependent upon the size of the organization, the Part-145 functions may be subdivided under individual managers or combined in any number of ways.
2. For the purpose of combined manager, the accountable manager may appoint a person with the responsibility for the management and supervision of maintenance activities who's ultimately responsible to the accountable manager.
3. The organization 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 Part-145 organization where any one manager may also be the accountable manager, as determined by CARC, he/she may also be the line maintenance manager or the workshop manager.
4. 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 145.65(b). The base maintenance manager is also responsible for any corrective action resulting from the quality compliance monitoring of 145.65(c).
5. 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 145.65(b) and also responsible for any corrective action resulting from the quality compliance monitoring of 145.65(c).
6. The workshop manager is responsible for ensuring that all work on aircraft components is carried out to the standards specified in 145.65(b) and also responsible for any corrective action resulting from the quality compliance monitoring of 145.65(c).
7. The quality manager's responsibility is specified in 145.30(c).
8. Notwithstanding the example sub-paragraphs 2 - 6 titles, the organization may adopt any title for the foregoing managerial positions but should identify to CARC the titles and persons chosen to carry out these functions.
9. Where an organization chooses to appoint managers for all or any combination of the identified 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 organization uses (for example licensed engineers/independent inspection/dual function supervisors etc.) so long as the quality compliance monitoring staff specified in 145.65(c)(1) remain independent.

AMC 145.30(c) Personnel requirements

1. The Organization shall have an SMS manager appointed in accordance with Part 19.
2. The SMS manager position can be integrated with the quality system only in case of stand-alone Part 145 approval.
3. Monitoring the quality system and safety management system includes requesting remedial action as necessary by the accountable manager and the nominated persons referred to in 145.30(b) and safety performance monitoring and measurement and Safety-related investigations and remedial actions.

AMC 145.30(d) Personnel requirements

1. Has sufficient staff means that the organization 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 organizational stability. For the purpose of meeting a specific operational necessity, a temporary increase of the proportion of contracted staff may be permitted to the organization by CARC, in accordance with an approved procedure which should describe the extent, specific duties, and responsibilities for ensuring adequate organization stability. For the purpose of this subparagraph, employed means the person is directly employed as an individual by the maintenance organization approved under Part-145, whereas contracted means the person is employed by another organization and contracted by that organization to the maintenance organization approved under Part-145.
2. The maintenance man-hour plan should take into account all maintenance activities carried out outside the scope of the Part-145 approval.

   The planned absence (for training, vacations, etc.) should be considered when developing the man-hour plan.
3. The maintenance man-hour plan should relate to the anticipated maintenance work load except that when the organization 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.
4. In the case of aircraft base maintenance, the maintenance man-hour plan should relate to the aircraft hangar visit plan as specified in AMC 145.25(a).
5. In the case of aircraft component maintenance, the maintenance man-hour plan should relate to the aircraft component planned maintenance as specified in 145.25(a)(2).
6. The quality monitoring compliance function man-hours should be sufficient to meet the requirement of 145.65(c) which means taking into account AMC 145.65(c). 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.

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

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 145.30(d).

AMC1 145.30(e) Personnel requirements

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

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

Competence should be assessed by evaluation of:

- on-the-job performance and/or testing of knowledge by appropriately qualified personnel, and
- records for basic, organizational, and/or product type and differences training, and
- experience records.

Validation of the above could include a confirmation check with the organization(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 GM3 145.30(e).

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

- which level of ongoing supervision would be required or whether unsupervised work could be permitted.
- whether there is a need for additional training.

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

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

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

1. 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.

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

3. 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 AMC2 145.30(e).

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

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

   - 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 organization procedures.
   - 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.
   - 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 145.30(c) 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.
   - 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.
   - Specialized services staff are able to carry out specialized maintenance tasks to the standard specified in the maintenance data. They should be able to communicate with supervisors and report accurately when necessary.
   - Support staff are able to determine that relevant tasks or inspections have been carried out to the required standard.
   - 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.
   - Quality audit staff are able to monitor compliance with Part-145 identifying noncompliance in an effective and timely manner so that the organization may remain in compliance with Part-145.

Competence assessment should be based upon the procedure specified in GM2 145.30(e).

AMC2 145.30(e) Personnel requirements

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

- Post-holders, managers, supervisors;
- Certifying staff, support staff and mechanics;
- Technical support personnel such as planners, engineers, technical record staff;
- Quality control/assurance staff;
- Specialized services staff;
- Human factors staff/human factors trainers;
- Store department staff, purchasing department staff;
- Ground equipment operators.

1. Initial human factors training should cover all the topics of the training syllabus specified in GM 145.30(e) either as a dedicated course or else integrated within other training. The syllabus may be adjusted to reflect the particular nature of the organization. The syllabus may also be adjusted to meet the particular nature of work for each function within the organization. For example:

   - small organizations not working in shifts may cover in less depth subjects related to teamwork and communication;
   - 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.

   All personnel, including personnel being recruited from any other organization should receive initial human factors training compliant with the organization'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 organization.

2. 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.

   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 organization.

3. Human factors training may be conducted by the maintenance organization itself, or independent trainers, or any training organizations acceptable to CARC.

4. The human factors training procedures should be specified in the maintenance organization exposition.

AMC3 145.30(e) Personnel requirements

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

CRAC guidance is provided for training to maintenance organization personnel in Appendix IV to AMC 145.30(e) .

AMC4 145.30(e) Personnel requirements

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

EWIS training program to maintenance organization personnel shall be in accordance with Appendix IV to AMC 145.30(e) and CARC instruction.

GM1 145.30(e) Personnel requirements

TRAINING SYLLABUS FOR INITIAL HUMAN FACTORS TRAINING

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

The maintenance organization may combine, divide, 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 organization and its personnel.

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.

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

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).

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/Organizational 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 behavior

9.3. Assertiveness

10. Organization's HF program

10.1. Reporting errors

10.2. Disciplinary policy

10.3. Error investigation

10.4. Action to address problems

10.5. Feedback

GM2 145.30(e) Competence assessment procedure

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

– persons responsible for this process,

- when the assessment should take place,
- credits from previous assessments,
- validation of qualification records,
- means and methods for the initial assessment,
- means and methods for the continuous control of competence including feedback on personnel performance,
- competences to be observed during the assessment in relation with each job function,
- actions to be taken when assessment is not satisfactory,
- recording of assessment results.

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

	Managers	Planners	Supervisor	staff and support	Mechanics	Specialized 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 organization capabilities, privileges and limitations	X	X	X	X		X	X
Knowledge of Part-M, Part-145 and any other relevant regulations	X	X	X	X			X
Knowledge of relevant parts of the maintenance organization 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			

	Managers	Planners	Supervisor	staff and support	Mechanics	Specialized Service staff	Quality audit staff
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							X

	Managers	Planners	Supervisor	staff and support	Mechanics	Specialized Service staff	Quality audit staff
example, objectivity, fairness, open-mindedness, determination, …)							
Maintenance error investigation skills							X
Resources management and production planning skills	X	X	X				
Teamwork, decision-making and leadership skills	X		X				

GM3 145.30(e) Template for recording experience/training

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

Aviation Maintenance personnel experience credential		
Name Address Telephone E-mail		
Independent worker ☐ Trade Group: airframe ☐ engine ☐ electric ☐ avionics ☐ other (specify) ☐		
Employer's details (when applicable) Name Address Telephone		
Maintenance organization 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 ☐ Servicing ☐ Scheduled Maintenance ☐ Trouble-shooting A/C type	☐ Base Maintenance ☐ Removal/installation ☐ Inspection ☐ Trouble-shooting ☐ Repair A/C type	☐ Component Maintenance ☐ Testing/inspection ☐ Repair ☐ Overhaul ☐ Re-treatment ☐ Reassembly 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 ☐					
☐ Specialized 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 organization 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 organization.*

AMC 145.30(f) Personnel requirements

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 145.45 for in service aircraft/aircraft components for the purpose of determining the continued fitness of the product to operate safely.
2. Appropriately qualified means to Level 1, 2 or 3 as defined by the National or International accepted Standard (e.g. EN 4179) dependent upon the non-destructive testing function to be carried out.

3. Notwithstanding the fact that Level 3 personnel may be qualified via EN 4179 to establish and authorize 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.

4. Notwithstanding the general references in EN 4179 to an aerospace non-destructive testing (NDT) board, all examinations should be conducted by personnel or organizations approved or accredited by such a board. In the absence of a national aerospace NDT board, the aerospace NDT board of another contracted States may be used, as accepted by CARC.

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.

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.

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

8. Boroscoping and other techniques such as delamination coin tapping are non-destructive inspections rather than non-destructive testing. Notwithstanding such differentiation, the maintenance organization should establish an exposition procedure accepted by CARC 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 Part-145 are not listed in Appendix II under class rating D1.

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

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 Part-145 should qualify for such non-destructive test in accordance with EN 4179.

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

AMC 145.30(g) Personnel requirements

1. For the purposes of 66.20(a)(1) and 66.20(a)(3)(ii) personnel, minor scheduled line maintenance means any minor scheduled inspection/check up to and including a weekly check specified in the aircraft maintenance program. For aircraft maintenance programs that do not specify a weekly check, CARC will determine the most significant check that is considered equivalent to a weekly check.

2. Typical tasks permitted after appropriate task training to be carried out by the 66.20(a)(1) and the 66.20(a)(3)(ii) personnel for the purpose of these personnel issuing an aircraft certificate of release to service as specified in 145.50 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 CARC 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 CARC as a simple task for a particular aircraft type. This may include defect deferment when all the following conditions are met:

- There is no need for troubleshooting; and
- The task is in the MEL; and
- The maintenance action required by the MEL is agreed by CARC 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 authorized maintenance actions. Release to service after rectification of deferred defects should be permitted as long as the task is listed above.

3. The requirement of having appropriate aircraft rated certifying staff qualified as category B1, B2, B3, as appropriate, in the case of aircraft line maintenance does not imply that the organization must have B1, B2 and B3 personnel at every line station. The MOE should have a procedure on how to deal with defects requiring B1, B2 or B3 certifying staff.

4. CARC may accept that in the case of aircraft line maintenance an organization has only B1, B2 or B3 certifying staff, as appropriate, provided that CARC is satisfied that the scope of work, as defined in the Maintenance Organization Exposition, does not need the availability of all B1, B2 and B3 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 certifying staff category.

AMC 145.30(h) Personnel requirements

In accordance with 145.30(h) and 145.35, the qualification requirements (basic licence, aircraft ratings, recent experience and continuation training) are identical for certifying staff and for support staff. The only difference is that support staff cannot hold certification privileges when performing this role since during base maintenance the release to service will be issued by category C certifying staff.

Nevertheless, the organization may use as support staff (for base maintenance) persons who already hold certification privileges for line maintenance.

AMC 145.30(j)(4) Personnel requirements

1. For the issue of a limited certification authorization:

   (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 CARC on the aircraft type.

2. In addition the limited certification authorization is subject to the maintenance organization exposition containing procedures to address the personnel requirements of 145.30(e) and associated AMC and guidance material. The procedures should be accepted by CARC 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 Part-145.

2.(i) 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 AMC and as agreed by CARC.

2.(ii) Holders of flight engineer license acceptable to CARC on the aircraft type, may only exercise this limited certification authorization privilege when performing the duties of a flight engineer.

In addition to paragraph 2(i)(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 CARC as a simple task.

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

(l) Any other task agreed by CARC as a simple task for a particular aircraft type.

3. The authorization should have a finite life of twelve months subject to satisfactory re-current training on the applicable aircraft type.

GM 145.30(j)(4) Personnel requirements (Flight crew)

For the holder of a flight engineer license acceptable to CARC Technical Training Course (TTC) details the following subjects:

Familiarization with basic maintenance procedures, to give additional technical background knowledge, especially with respect to the implication of systems malfunctions, and to train the applicant in maintenance related to the Minimum equipment list (MEL).

The theoretical knowledge instruction consists of 100 hours and includes the following elements:

1. Airframe and systems
2. Electrics
3. Powerplant and emergency equipment
4. Flight instruments and automatic flight control systems

   Practical skills training provided by an organization approved under Part-145 is given which includes 35 hours practical experience in the following subjects:

   - Fuselage and flight controls,
   - Engines,
   - Instruments,
   - Landing gear and brakes,
   - Cabin/cockpit/emergency equipment,
   - De-icing/anti-icing related maintenance activities;
   - Ground handling and servicing,
   - Certificate of completion.

Following successful completion of the technical training, the training organization carrying out the theoretical knowledge instruction and/or the practical skill training should provide the applicant with a certificate of satisfactory completion of the course, or part thereof.

AMC 145.30(j)(5) Personnel requirements

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.
2. A one-off authorization should only be considered for issue by the quality department of the contracted organization after it has made a reasoned judgment that such a requirement is appropriate under the circumstances and at the same time maintaining the required

airworthiness standards. The organization's quality department will need to assess each situation individually prior to the issuance of a one-off authorization.

3. A one-off authorization 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.

AMC 145.30(j)(5)(i) Personnel requirements

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

1. Flight crew should communicate full details of the defect to the operator's supporting maintenance organization. If necessary, the supporting maintenance organization will then request the use of a one-off authorization from the quality department.
2. When issuing a one-off authorization, the quality department of the organization should verify that:
   (a) Full technical details relating to the work required to be carried out have been established and passed on to the certifying staff.
   (b) The organization 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 authorization.
   (c) The person to whom a one-off authorization 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 organization, communicated to the one-off authorization holder.
   (d) The person holds authorizations of equivalent level and scope on other aircraft type of similar technology, construction and systems.
3. The one-off authorization 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 Part-145 maintenance facility.

AMC 145.30(j)(5)(ii) Personnel requirements

This paragraph addresses staff not employed by the maintenance organization who meet the requirements of 145.30(j)(5). In addition to the items listed in AMC 145.30(j)(5)(i), paragraph 1, 2(a), (b) and (c) and 3 the quality department of the organization may issue such one-off authorization providing full qualification details relating to the proposed certifying personnel are verified by the quality department and made available at the location.

AMC 145.35(a) Certifying staff and support staff

1. Holding a 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 authorized as certifying staff and/or support staff. The organization is responsible to assess the competence of the holder for the scope of maintenance to be authorized.

2. The sentence 'the organization 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 organization procedures' means that the person has received training and has been successfully assessed on:

   - the type of aircraft or component;
   - the differences on:
   - the particular model/variant;
   - the particular configuration.

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

   - 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.
   - appropriate attitude towards safety and observance of procedures.
   - knowledge of the associated organization and operator procedures (i.e. handling and identification of components, MEL use, Technical Log use, independent checks, etc.).

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

   - in-depth troubleshooting;
   - very specific adjustment or test procedures;
   - rigging;
   - engine run-up, starting and operating the engines, checking engine performance characteristics, normal and emergency engine operation, associated safety precautions and procedures;
   - extensive structural/system inspection and repair;
   - other specialized maintenance required by the maintenance program.

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

4. The satisfactory assessment of the competence should be conducted in accordance with a procedure approved by CARC (item 3.4 of the MOE, as described in AMC 145.70(a)).

5. The organization should hold copies of all documents that attest the competence and recent experience for the period described in 145.35(j).

Additional information is provided in AMC 66.20(b)3.

AMC 145.35(b) Certifying staff and support staff

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

AMC 145.35(c) Certifying staff and support staff

1. For the interpretation of '6 months of actual relevant aircraft maintenance experience in any consecutive 2-year period', the provisions of AMC 66.20(b)2 are applicable.
2. The organization shall ensure that all certifying staff (C/S) and base maintenance support staff (S/S) are involved in at least six months of actual relevant aircraft or component maintenance experience in any consecutive two year period.
3. "involved in actual relevant aircraft or component maintenance" means that the person has worked in an aircraft or component maintenance environment and has either exercised the privileges of the certification authorization and/or has actually carried out maintenance on at least some of the aircraft type or aircraft group systems specified in the particular certification authorization.
4. The Part 145 organization shall detail in the Maintenance organization exposition a procedure describing how the C/S and S/S shall demonstrate the compliance with the requirement and how the control of this requirement is ensured.
5. This procedure shall be established for issuing an initial individual C/S and/or S/S authorization and or renewing an individual C/S and/or S/S authorization.

Note: For more information, please refer to CARC Guidance Procedure No. AWS 31 as amended.

AMC 145.35(d) Certifying staff and support staff

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 organization 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.

2. Continuation training should cover changes in relevant requirements such as Part-145, changes in organization 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.

3. Continuation training should be of sufficient duration in each 2 year period to meet the intent of 145.35(d) and may be split into a number of separate elements. 145.35(d) 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 organization on human errors in maintenance. This means that in the case of an organization that maintains aircraft with few relevant quality audit findings, continuation training could be limited to days rather than weeks, whereas a similar organization with a number of relevant quality audit findings, such training may take several weeks. For an organization 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. The method of training is intended to be a flexible process and could, for example, include a 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 organization exposition unless such training is undertaken by an organization approved under Part-147 when such details may be specified under the approval and cross referenced in the maintenance organization exposition.

AMC 145.35(e) Certifying staff and support staff

The program for continuation training should list all certifying staff and support 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 and support staff record as required by 145.35(j).

AMC 145.35(f) Certifying staff and support staff

As stated in 145.35(f), except where any of the unforeseen cases of 145.30(j)(5) applies, all prospective certifying staff and support staff should be assessed for competence related to their intended duties in accordance with AMCs 1, 2, 3 and 4 to 145.30(e), as applicable.

AMC 145.35(j) Certifying staff and support staff

1. The following minimum information as applicable should be kept on record in respect of each certifying staff and support staff:
   (a) Name
   (b) Date of Birth
   (c) Basic Training
   (d) Type Training
   (e) Continuation Training
   (f) Experience
   (g) Qualifications relevant to the authorization
   (h) Scope of the authorization
   (i) Date of first issue of the authorization
   (j) If appropriate - expiry date of the authorization
   (k) Identification Number of the authorization
2. The record may be kept in any format but should be controlled by the organization's quality department. This does not mean that the quality department should run the record system.
3. Persons authorized to access the system should be maintained at a minimum to ensure that records cannot be altered in an unauthorized manner or that such confidential records become accessible to unauthorized persons.
4. CARC is an authorized person when investigating the records system for initial and continued approval or when CARC has cause to doubt the competence of a particular person.

AMC 145.35(n) Certifying staff and support staff

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

2. 'Appropriately approved in accordance with Part-147' means an organization holding an approval to provide category A task training for the corresponding aircraft type.

3. 'Appropriately approved in accordance with Part-145' means an organization holding a maintenance organization approval for the corresponding aircraft type.

AMC 145.35(o) Certifying staff and support staff

1. The privilege for a B2 licence holder to release minor scheduled line maintenance and simple defect rectification in accordance with 66.20(a)(3)(ii) can only be granted by the Part-145 approved organization where the licence holder is employed/contracted after meeting all the requirements specified in 145.35(o). This privilege cannot be transferred to another Part-145 approved organization.

2. When a B2 licence holder already holds a certifying staff authorization 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.

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

4. For the addition of new types to the certifying staff authorization, another 6 months should be required unless the aircraft is considered similar per AMC 66.20(b)2 to the one already held.

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 authorization.

AMC 145.36 Records of airworthiness review staff

The following minimum information, as applicable, should be kept on record in respect of each airworthiness review staff:

(a) name;

(b) date of birth;

(c) certifying staff authorization;

(d) experience as certifying staff on LA1 aircraft;

(e) qualifications relevant to the approval (knowledge of relevant parts of Part-M and knowledge of the relevant airworthiness review procedures);

(f) scope of the airworthiness review authorization and personal authorization reference;

(g) date of the first issue of the airworthiness review authorization; and

(h) if appropriate, expiry date of the airworthiness review authorization.

AMC 145.40(a) Equipment, tools and material

Once the applicant for approval has determined the intended scope of approval for consideration by CARC, 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 organization agrees can be used.

AMC 145.40(b) Equipment, tools and material

1. The control of these tools and equipment requires that the organization 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.
2. Inspection, service or calibration on a regular basis should be in accordance with the equipment manufacturers' instructions except where the organization can show by results that a different time period is appropriate in a particular case.
3. In this context officially recognized standard means those standards established or published by an official body whether having legal personality or not, which are widely recognized by the air transport sector as constituting good practice.

AMC 145.42(a) Acceptance of components

1. A document equivalent to a CARC Form 18-0227 may be:
   (a) A release document issued by an organization under the terms of a bilateral agreement signed by CARC;
   (b) EASA Form 1 issued by EASA Part-21 or 145 Organizations;
   (c) FAA Form 8130-3 (or 8130-4 for engines) from FAA Approved Part-21 or 145 Organizations;
   (d) TCCA 24-0078 Release Form from Canada CAA approved organizations;
   (e) DAC SEGVÔO 003 Release Form from Brazilian approved organizations;
   (f) Certificate of Conformity for standard parts, raw materials and chemicals;

(g) a JAA Form One issued prior to 28 November 2004 by a JAR 145 organization approved by a JAA Full Member State;

(h) a JAA Form One issued prior to 28 September 2005 by a production organization approved by a competent authority in accordance with its national regulations;organizationorganizationorganizationorganizationorganization

2. For acceptance of standard parts, raw material and consumable material, refer to AMC M.501(c) and AMC M.501(d).

AMC 145.42(b) Acceptance of components

The CARC Form 18-0227 or equivalent identifies the status of an aircraft component. Block 12 'Remarks' on the CARC Form 18-0227 in some cases contains vital airworthiness related information which may need appropriate and necessary actions.

The receiving organization should be satisfied that the component in question is in satisfactory condition and has been appropriately released to service. In addition, the organization should ensure that the component meets the approved data/standard, such as the required design and modification standard. This may be accomplished by reference to the manufacturer's parts catalogue or other approved data (i.e. Service Bulletin). Care should also be taken in ensuring compliance with applicable airworthiness directives, the status of any life-limited parts fitted to the aircraft component as well as Critical Design Configuration Control Limitations.

AMC 145.42(c) Acceptance of components

1. The agreement by CARC for the fabrication of parts by the approved maintenance organization should be formalized through the approval of a detailed procedure in the Maintenance Organization Exposition. This AMC contains principles and conditions to be taken into account for the preparation of an acceptable procedure.
2. Fabrication, inspection assembly and test should be clearly within the technical and procedural capability of the organization.
3. All necessary data to fabricate the part should be approved either by the Agency or the type certificate (TC) holder or Part-21 design organization approval holder, or supplemental type certificate (STC) holder.
4. Items fabricated by an organization approved under Part-145 may only be used by that organization in the course of overhaul, maintenance, modifications, or repair of aircraft or components undergoing work within its own facility. The permission to fabricate does not constitute approval for manufacture, or to supply externally and the parts do not qualify for certification on CARC Form 18-0227. 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.
5. Fabrication of parts, modification kits etc. for onward supply and/or sale may not be conducted by an organization approved under Part-145.

6. The data specified in paragraph 3 may include repair procedures involving the fabrication of parts. Where the data on such parts is sufficient to facilitate fabrication, the parts may be fabricated by an organization approved under 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 or/and incoming inspection requirement and that the approved organization has the necessary capability. 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 organization the organization cannot fabricate the part unless the TC/STC-holder gives an approved alternative.

7. Examples of fabrication under the scope of an Part-145 approval can 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 fabricated parts should be in accordance with data provided in overhaul or repair manuals, modification schemes and service bulletins, drawings or otherwise approved by CARC.

   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 processes and which is acceptable to CARC.

8. Where a TC-holder or an approved production organization is prepared to make available complete data which is not referred to in 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 CARC in accordance with a procedure specified in the exposition.

9. Inspection and Identification.

   Any locally fabricated part should be subjected to an inspection stage 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 the final inspections. All parts, except those having not enough space, should carry a part number which clearly relates it to the manufacturing/inspection data. Additional to the part-number the organization's identity should be marked on the part for traceability purposes.

AMC 145.42(d) Acceptance of components

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 that cannot be returned to airworthy condition due to exposure to extreme forces, heat or adverse environment;
   (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.
2. It is common practice for possessors of aircraft components to dispose of unsalvageable components by selling, discarding, or transferring such items. In some instances, these items have reappeared for sale and in the active parts inventories of the aviation community. Misrepresentation of the status of components and the practice of making such items appear serviceable have resulted in the use of unsalvageable nonconforming components. Therefore organizations disposing of unsalvageable aircraft components should consider the possibility of such components later being misrepresented and sold as serviceable components. Caution should be exercised to ensure that unsalvageable components are disposed of in a manner that does not allow them to be returned to service.

AMC 145.45(b) Maintenance data

1. Except as specified in sub-paragraph 5, each maintenance organization approved under Part-145 should hold and use the following minimum maintenance data relevant to the organization's approval class rating. All maintenance related Implementing Rules and associated AMCs, approval specifications and Guidance Material, all applicable national maintenance requirements and notices which have not been superseded by an CARC requirement, procedure or directive and all applicable airworthiness directives issued by type certificate holder competent authority.
2. In addition to sub-paragraph 1, an organization with an approval class rating in category A - Aircraft, should hold and use the following maintenance data where published. The appropriate sections of the operator's aircraft maintenance program, aircraft maintenance manual, repair manual, supplementary structural inspection document, corrosion control document, service bulletins, service letters, service instructions, modification leaflets, NDT manual, parts catalogue, type certificate data sheet and any other specific document issued by the type certificate or supplementary type certificate holder as maintenance data.

3. In addition to subparagraph 1, an organization with an approval class rating in category B — Engines/APUs, should hold and use the following maintenance data where published. The appropriate sections of the engine/APU maintenance and repair manual, service bulletins, service letters, modification leaflets, non-destructive testing (NDT) manual, parts catalogue, type certificate data sheet and any other specific document issued by the type certificate holder as maintenance data.

4. In addition to sub-paragraph 1, an organization with an approval class rating in category C - Components other than complete engines/APUs, should hold and use the following maintenance data where published. The appropriate sections of the vendor maintenance and repair manual, service bulletins and service letters plus any document issued by the type certificate holder as maintenance data on whose product the component may be fitted when applicable.

5. Appropriate sections of the sub-paragraphs 2 to 4 additional maintenance data means in relation to the maintenance work scope at each particular maintenance facility. For example, a base maintenance facility should have almost complete set(s) of the maintenance data whereas a line maintenance facility may need only the maintenance manual and the parts catalogue.

6. An organization only approved in class rating category D – Specialized services, should hold and use all applicable specialized service(s) process specifications.

AMC 145.45(c) Maintenance data

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 Part-145 approved maintenance organization 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 Part-145 approved organization until such time as the type certificate holder has clarified the issue by e.g. amending the maintenance data.

2. The referenced procedure should be specified in the maintenance organization exposition.

AMC 145.45(d) Maintenance data

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 Part-21.

AMC 145.45(e) Maintenance data

1. The maintenance organization should:
   - transcribe accurately the maintenance data onto such work cards or worksheets, or
   - make precise reference to the particular maintenance task(s) contained in such maintenance data, which already identifies the task as a CDCCL where applicable.
2. Relevant parts of the organization 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.
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.
4. "Complex Maintenance Tasks" are listed in Appendix VII of Part M as applicable, however the maintenance organization shall define it in the MOE; The level of complexity depends on several factors:
   a. Tasks which have multiple steps that must be performed in specific sequence, or contain unusual operations, must be spelled out precisely.
   b. What specific data is needed to complete the task with repeatable results? Critical numerical data, such as torque values and clearances, specific type of lubricant, or special tools, should always be spelled out and never left to memory. This information is subject to change, as is your craft person's memory.
   c. The criticality of the procedure's outcome. How important is it that the job is done exactly right? As the tolerance for poor outcome or any variation in the outcome decreases, the need for specific detail required to ensure a consistent outcome increases sharply. Check-off and inspection steps may be necessary. the procedure should be written always in simplicity and clarity form; using simple but precise words and short, unambiguous sentences.

Where complex maintenance tasks are undertaken using a workcard system to record the maintenance activity, it is advisable that the maintenance data should be transcribed onto the workcards or worksheets. This should be subdivided into clear stages to ensure a record of the accomplishment of the maintenance task. Of particular importance is the need to

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 task, it may be necessary to use supplementary work cards or worksheets to indicate what was actually accomplished by each individual person.

AMC 145.45(f) Maintenance data

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.
2. Where computer systems are used, the number of computer terminals should be sufficient in relation to the size of the work program 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.

AMC 145.45(g) Maintenance data

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.

AMC 145.47(a) Production planning

1. Depending on the amount and complexity of work generally performed by the maintenance organization, the planning system may range from a very simple procedure to a complex organizational set-up including a dedicated planning function in support of the production function.
2. For the purpose of Part-145, the production planning function includes two complementary elements:
   - 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.
   - during maintenance work, organizing maintenance teams and shifts and provide all necessary support to ensure the completion of maintenance without undue time pressure.
3. When establishing the production planning procedure, consideration should be given to the following:
   - logistics,
   - inventory control,

- square meters of accommodation,
- man-hours estimation,
- man-hours availability,
- preparation of work,
- hangar availability,
- environmental conditions (access, lighting standards and cleanliness),
- co-ordination with internal and external suppliers, etc.
- scheduling critical maintenance tasks during periods when staff are likely to be most alert.

AMC 145.47(b) Production planning

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.

AMC 145.47(c) Production planning

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:

- The outgoing person's ability to understand and communicate the important elements of the job or task being passed over to the incoming person.
- The incoming person's ability to understand and assimilate the information being provided by the outgoing person.
- A formalized process for exchanging information between outgoing and incoming persons and a planned shift overlap and a place for such exchanges to take place.

GM 145.48 Performance of maintenance

AUTHORIZED PERSON

An 'authorized person' is a person formally authorized by the maintenance organization to perform or supervise a maintenance task. An 'authorized person' is not necessarily 'certifying staff'.

SIGN-OFF

A 'sign-off' is a statement issued by the 'authorized person' which indicates that the task or group of tasks has been correctly performed. A 'sign-off' relates to one step in the maintenance process and is, therefore, different to a certificate of release to service.

AMC1 145.48(b) Performance of maintenance

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 organization ensures that its staff is familiar with critical maintenance tasks and error-capturing methods.

AMC2 145.48(b) Performance of maintenance

CRITICAL MAINTENANCE TASKS

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

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

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

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

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

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

(1) information from the design approval holder;

(2) accident reports;

(3) investigation and follow-up of incidents;

(4) occurrence reporting;

(5) flight data analysis;

(6) results of audits;

(7) normal operations monitoring schemes; and

(8) feedback from training.

AMC3 145.48(b) Performance of maintenance

ERROR-CAPTURING METHODS

(a) Error-capturing methods are those actions defined by the organization to detect maintenance errors made when performing maintenance.

(b) The organization 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.

AMC4 145.48(b) Performance of maintenance

INDEPENDENT INSPECTION

Independent inspection is one possible error-capturing method.

(a) What is an independent inspection

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

(1) the 'authorized 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;

(2) 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 certificate of release to service, therefore they are not required to hold certification privileges;

(3) the 'authorized person' issues the certificate of release to service or signs off the completion of the task after the independent inspection has been carried out satisfactorily;

(4) the work card system used by the organization 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.

(b) Qualifications of persons performing independent inspections

The organization 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 organization could consider making use of, for example:

(1) staff holding a certifying staff or support staff or sign-off authorization or equivalent necessary to release or sign off the critical maintenance task;

(2) staff holding a certifying staff or support staff or sign-off authorization 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

(3) a commander holding a limited certification authorization in accordance with 145.30(j)(4) and having received adequate practical training and having enough experience in the specific task to be inspected and on how to perform independent inspection.

(c) 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:

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

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

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

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

(5) 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

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

(d) What to do in unforeseen cases when only one person is available

RE-INSPECTION:

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

(2) Re-inspection, 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 organization has not assigned a suitable 'independent qualified person' to that particular line station or shift.

(3) The certificate of release to service is issued after the task has been performed by the 'authorized person' and the re-inspection has been carried out satisfactorily. The work card system used by the organization should record the identification and the details of the re-inspection before the certificate of release to service for the task is issued.1. List level 0

AMC 145.48(c) Performance of maintenance

The procedures should be aimed at:

(a) minimizing 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 authorized person;

(b) minimizing 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 organization may make use of re-inspection as described in point (d) of AMC4 145.48(b).

GM 145.48(c) Performance of maintenance

To minimize the risk of multiple errors or errors being repeated, the organization may implement:

- procedures to plan the performance by different persons of the same task in different systems;
- duplicate inspection or re-inspection procedures.

GM 145.48(d) Performance of maintenance — critical design configuration control limitations (CDCCL)

The organization should ensure that when performing maintenance the CDCCL are not compromised. The organization 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 organization can prevent adverse effects associated with changes to the wiring by standardizing 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 organization personnel is provided in Appendix IV to AMC 145.35.

AMC 145.50 Certification of maintenance after embodiment of a Standard Change or Standard Repair (SC/SR)

AMC M.801 of the AMC to Part-M contains acceptable means of compliance for the release to service of a SC/SR by an organization approved in accordance with Part-145.

AMC 145.50(a) Certification of maintenance

'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.

AMC 145.50(b) Certification of maintenance

1. The certificate of release to service should contain the following statement:

   'Certifies that the work specified, except as otherwise specified, was carried out in accordance with Part-145 and in respect to that work the aircraft/aircraft component is considered ready for release to service'.

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

2. It is acceptable to use an alternate abbreviated certificate of release to service consisting of the following statement 'Part-145 release to service' instead of the full certification statement specified in paragraph 1. When the alternate abbreviated certificate of release to service is used, the introductory section of the technical log should include an example of the full certification statement from paragraph 1.

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

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.

5. When extensive maintenance has been carried out, it is acceptable for the certificate of release to service to summarize 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.

AMC1 145.50(d) Certification of maintenance

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 a competent authority and to allow items removed from one aircraft/aircraft component to be fitted to another aircraft/aircraft component.

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 organization to users.

It can only be issued by organizations approved by the particular competent authority within the scope of the approval.

The certificate may be used as a rotable tag by utilizing 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 organization. The alternative solution is to use existing rotable tags and also supply a copy of the certificate.

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 organizations approved under Part-145 and the item needs a certificate for the previous maintenance process carried out for the next maintenance organization approved under 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.

AMC2 145.50(d) Certification of maintenance

1. A component which has been maintained off the aircraft needs the issuance of a certificate of release to service for such maintenance and another certificate of release to service in regard to being installed properly on the aircraft when such action occurs.

   When an organization maintains a component for use by the same organization, a CARC Form 18-0227 may not be necessary depending upon the organization's internal release procedures defined in the maintenance organization exposition.

2. In the case of the issue of CARC Form 18-0227 for components in storage before Part-145 and Part-21 became effective and not released on a CARC Form 18-0227 or equivalent in accordance with 145.42(a) or removed serviceable from a serviceable aircraft or an aircraft which has been withdrawn from service the following applies:

   2.1. A CARC Form 18-0227 may be issued for an aircraft component which has been:

   - Maintained before Part-145 became effective or manufactured before Part-21 became effective.
   - Used on an aircraft and removed in a serviceable condition. Examples include leased and loaned aircraft components.
   - Removed from aircraft which have been withdrawn from service, or from aircraft which have been involved in abnormal occurrences such as accidents, incidents, heavy landings or lightning strikes.
   - Maintained by an unapproved organization.

   2.2. An appropriately rated maintenance organization approved under Part-145 may issue a CARC Form 18-0227 as detailed in this AMC subparagraph 2.5 to 2.9, as appropriate, in accordance with procedures detailed in the exposition as approved by CARC. The appropriately rated organization is responsible for ensuring that all reasonable measures have been taken to ensure that only approved and serviceable aircraft components are issued a CARC Form 18-0227 under this paragraph.

2.3. For the purposes of this AMC No 2 only, appropriately rated means an organization with an approval class rating for the type of component or for the product in which it may be installed.

2.4. A CARC Form 18-0227 issued in accordance with this paragraph 2 should be issued by signing in block 14b and stating 'Inspected/Tested' in block 11. In addition, block 12 should specify:

2.4.1. When the last maintenance was carried out and by whom.

2.4.2. If the component is unused, when the component was manufactured and by whom with a cross-reference to any original documentation which should be included with the Form.

2.4.3. A list of all airworthiness directives, repairs and modifications known to have been incorporated. If no airworthiness directives or repairs or modifications are known to be incorporated, then this should be so stated.

2.4.4. Detail of life used for service life-limited parts being any combination of fatigue, overhaul or storage life.

2.4.5. For any aircraft component having its own maintenance history record, reference to the particular maintenance history record as long as the record contains the details that would otherwise be required in block 12. The maintenance history record and acceptance test report or statement, if applicable, should be attached to the EASA Form 1.

2.5. New/unused aircraft components

2.5.1. Any unused aircraft component in storage without a CARC Form 18-0227 up to the effective date(s) for Part-21 that was manufactured by an organization acceptable to CARC at that time may be issued with a CARC Form 18-0227 by an appropriately rated maintenance organization approved under Part-145. The CARC Form 18-0227 should be issued in accordance with the following subparagraphs which should be included in a procedure within the maintenance organization manual.

Note 1: It should be understood that the release of a stored but unused aircraft component in accordance with this paragraph represents a maintenance release under Part-145 and not a production release under Part-21. It is not intended to bypass the production release procedure agreed by the Member State for parts and subassemblies intended for fitment on the manufacturers' own production line.

(a) An acceptance test report or statement should be available for all used and unused aircraft components that are subjected to acceptance testing after manufacturing or maintenance as appropriate.

(b) The aircraft component should be inspected for compliance with the manufacturer's instructions and limitations for storage and condition including any requirement for limited storage life, inhibitors, controlled climate and special storage containers. In addition or in the absence of

specific storage instructions the aircraft component should be inspected for damage, corrosion and leakage to ensure good condition.

(c) The storage life used of any storage life-limited parts should be established.

2.5.2. If it is not possible to establish satisfactory compliance with all applicable conditions specified in subparagraph 2.5.1(a) to (c) inclusive, the aircraft component should be disassembled by an appropriately rated organization and subjected to a check for incorporated airworthiness directives, repairs and modifications and inspected/tested in accordance with the maintenance data to establish satisfactory condition and, if relevant, all seals, lubricants and life-limited parts should be replaced. Upon satisfactory completion after reassembly, a CARC Form 18-0227 may be issued stating what was carried out and the reference of the maintenance data included.

2.6. Used aircraft components removed from a serviceable aircraft

2.6.1. Serviceable aircraft components removed from a Member State registered aircraft may be issued with a CARC Form 18-0227 by an appropriately rated organization subject to compliance with this subparagraph.

(a) The organization should ensure that the component was removed from the aircraft by an appropriately qualified person.

(b) The aircraft component may only be deemed serviceable if the last flight operation with the component fitted revealed no faults on that component/related system.

(c) The aircraft component should be inspected for satisfactory condition including in particular damage, corrosion or leakage and compliance with any additional maintenance data.

(d) The aircraft record should be researched for any unusual events that could affect the serviceability of the aircraft component such as involvement in accidents, incidents, heavy landings or lightning strikes. Under no circumstances may a CARC Form 18-0227 be issued in accordance with this paragraph 2.6 if it is suspected that the aircraft component has been subjected to extremes of stress, temperatures or immersion which could affect its operation.

(e) A maintenance history record should be available for all used serialised aircraft components.

(f) Compliance with known modifications and repairs should be established.

(g) The flight hours/cycles/landings as applicable of any service life-limited parts including time since overhaul should be established.

(h) Compliance with known applicable airworthiness directives should be established.

(i) Subject to satisfactory compliance with this subparagraph 2.6.1, a CARC Form 18-0227 may be issued and should contain the information as

specified in paragraph 2.4 including the aircraft from which the aircraft component was removed.

2.6.2. Serviceable aircraft components removed from a non-Member State registered aircraft may only be issued with a CARC Form 18-0227 if the components are leased or loaned from the maintenance organization approved under Part-145 who retains control of the airworthiness status of the components. A CARC Form 18-0227 may be issued and should contain the information as specified in paragraph 2.4 including the aircraft from which the aircraft component was removed.

2.7. Used aircraft components removed from an aircraft withdrawn from service. Serviceable aircraft components removed from a Member State registered aircraft withdrawn from service may be issued with a CARC Form 18-0227 by a maintenance organization approved under Part-145 subject to compliance with this subparagraph.

(a) Aircraft withdrawn from service are sometimes dismantled for spares. This is considered to be a maintenance activity and should be accomplished under the control of an organization approved under Part-145, employing procedures approved by CARC.

(b) To be eligible for installation, components removed from such aircraft may be issued with a CARC Form 18-0227 by an appropriately rated organization following a satisfactory assessment.

(c) As a minimum, the assessment will need to satisfy the standards set out in paragraphs 2.5 and 2.6 as appropriate. This should, where known, include the possible need for the alignment of scheduled maintenance that may be necessary to comply with the maintenance program applicable to the aircraft on which the component is to be installed.

(d) Irrespective of whether the aircraft holds a certificate of airworthiness or not, the organization responsible for certifying any removed component should ensure that the manner in which the components were removed and stored are compatible with the standards required by Part-145.

(e) A structured plan should be formulated to control the aircraft disassembly process. The disassembly is to be carried out by an appropriately rated organization under the supervision of certifying staff who will ensure that the aircraft components are removed and documented in a structured manner in accordance with the appropriate maintenance data and disassembly plan.

(f) All recorded aircraft defects should be reviewed and the possible effects these may have on both normal and standby functions of removed components are to be considered.

(g) Dedicated control documentation is to be used as detailed by the disassembly plan, to facilitate the recording of all maintenance actions and component removals performed during the disassembly process. Components found to be unserviceable are to be identified as such and quarantined pending a decision

on the actions to be taken. Records of the maintenance accomplished to establish serviceability are to form part of the component maintenance history.

(h) Suitable Part-145 facilities for the removal and storage of removed components are to be used which include suitable environmental conditions, lighting, access equipment, aircraft tooling and storage facilities for the work to be undertaken. While it may be acceptable for components to be removed, given local environmental conditions, without the benefit of an enclosed facility, subsequent disassembly (if required) and storage of the components should be in accordance with the manufacturer's recommendations.

2.8. Used aircraft components maintained by organizations not approved in accordance with Part-145. For used components maintained by a maintenance organization not approved under Part-145, due care should be taken before acceptance of such components. In such cases an appropriately rated maintenance organization approved under Part-145 should establish satisfactory conditions by:

(a) dismantling the component for sufficient inspection in accordance with the appropriate maintenance data;

(b) replacing all service life-limit components when no satisfactory evidence of life used is available and/or the components are in an unsatisfactory condition;

(c) reassembling and testing as necessary the component;

(d) completing all certification requirements as specified in 145.50.

2.9. Used aircraft components removed from an aircraft involved in an accident or incident. Such components should only be issued with a CARC Form 18-0227 when processed in accordance with paragraph 2.7 and a specific work order including all additional necessary tests and inspections deemed necessary by the accident or incident. Such a work order may require input from the TC holder or original manufacturer as appropriate. This work order should be referenced in block 12.

GM 145.50(d) CARC Form 18-0227 Block 12 'Remarks'

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

- Maintenance documentation used, including the revision status, for all work performed and not limited to the entry made in block 11.
- A statement such as 'in accordance with the CMM' is not acceptable.
- NDT methods with appropriate documentation used when relevant.
- Compliance with airworthiness directives or service bulletins.
- Repairs carried out.
- Modifications carried out.
- Replacement parts installed.
- Life-limited parts status.

- Shelf life limitations.
- Deviations from the customer work order.
- Release statements to satisfy a foreign Civil Aviation Authority maintenance requirement.
- Information needed to support shipment with shortages or re-assembly after delivery.
- References to aid traceability, such as batch numbers.

AMC 145.50(e) Certification of maintenance

1. Being unable to establish full compliance with sub-paragraph Part-145.50(a) 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.

2. The aircraft operator is responsible for ensuring that all required maintenance has been carried out before flight and therefore 145.50(e) requires such operator to be informed in the case where full compliance with 145.50(a) cannot be achieved within the operator's limitations. If the operator agrees to the deferment of full compliance, then the certificate of release to service may be issued subject to details of the deferment, including the operator's authority, being endorsed on the certificate.

   Note: Whether or not the aircraft operator does have the authority to defer maintenance is an issue between the aircraft operator and the competent authority of the State of Registry or State of operator, as appropriate. In case of doubt concerning such a decision of the operator, the approved maintenance organization should inform CARC on such doubt, before issuing the certificate of release to service. This will allow CARC to investigate the matter with the competent authority of the State of Registry or the State of the operator as appropriate.

3. The procedure should draw attention to the fact that 145.50(a) does not normally permit the issue of a certificate of release to service 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 145.30(b) should be kept informed in writing of such possible non-compliance situations and this should be included in the procedure.

AMC 145.50(f) Certification of maintenance

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

2. Compliance with all other 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.

GM 145.55(a) Maintenance and airworthiness review records

1. Properly executed and retained records provide owners, operators and maintenance personnel with information essential in controlling unscheduled and scheduled maintenance, and trouble-shooting 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 serialized 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 145.45.

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.

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 CARC for acceptance.

   Note: Additional maintenance may be required.

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

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

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 program safeguards against the ability of unauthorized personnel to alter the database.

AMC 145.55(c) Maintenance and airworthiness review records

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, IPC etc issued by the TC holder or STC holder. Maintenance records should refer to the revision status of the data used.

AMC 145.55(c) Maintenance and airworthiness review records

This AMC contains principles and conditions to be taken into account for the implementation of an electronic maintenance release and electronic signature and electronic exchange of the CARC Form 227.

a) Submission to CARC

Any organization intending to implement an electronic signature procedure to issue CARC Form 227 and/or to exchange electronically such data contained on the CARC Form 227, should document it and submit it to CARC as part of the documents attached to its exposition.

b) Characteristics of the electronic system generating the CARC Form 227

The electronic system should:

- guarantee secure access for each certifying staff;
- ensure integrity and accuracy of the data certified by the signature on the form and be able to show evidence of the authenticity of the CARC Form 227 (recording and record keeping) with suitable security, safeguards and backups;
- be active only at the location where the part is being released with CARC Form 227;
- not permit to sign a blank form;
- provide a high degree of assurance that the data has not been modified after signature (if modification is necessary after issuance, i.e., re-certification of a part, a new form with a new number and reference to the initial issuance should be made).
- provide for a 'personal' electronic signature, identifying the signatory. The signature should be generated only in presence of the signatory.

An electronic signature means data in electronic form which is attached to or logically associated with other electronic data and which serves as a method of authentication and should meet the following criteria:

- it is uniquely linked to the signatory;
- it is capable of identifying the signatory;
- it is created using means that the signatory can maintain under his sole control.

This electronic signature should be an electronically generated value based on a cryptographic algorithm and appended to data in a way to enable the verification of the data's source and integrity.

Organization(s) are reminded that additional national requirements may need to be satisfied when operating electronic systems" Act 15 for the year 2015 on a framework for electronic signatures', as last amended, may constitute a reference.
The electronic system should be based on a policy and management structure (confidentiality, integrity and availability), such as:

- Administrators, signatories;
- Scope of authorization, rights;
- Password and secure access, authentication, protections, confidentiality;
- Track changes;
- Minimum blocks to be completed, completeness of information;
- Archives;

GM 145.55(e) Acceptance of electronic aircraft maintenance records(EAMR)

a. Identification, authentication and authorization

1. The basis of any electronic record and its related electronic signature identity management system is trust. Whether it is about identifying an aircraft, a crew member, a mechanic, a component, or a ground station entity, the organization will have to be able to trust that, when the entity presents a digital credential, the respective credential was issued to that entity. To facilitate the establishment of this trust, requirements and procedures should be specified enabling and ensuring verification of the identity of the various parties that are involved in the issuance of a credential. The credential should be the basis of establishing the identity of an electronic record system use.
2. The electronic record system should perform the user's identity authentication. This should consist in means by which the system validates an authorized user's identity. These means may include, but are not limited to, a password, a personal identification number (PIN), a cryptographic key, or a badge swipe, all in correlation with the implemented solution and processes.
3. The level of identity assurance and authentication should be commensurate to the class of activity for which the electronic record system is authorizing the user's access.
4. The user's identity assurance should comprise both initial and continuing (i.e. periodic) procedures the user has to comply with.
5. The organization to which the user belongs at the time of interacting with the EAMR should be responsible for the correlation between the management of the user's identity and the user's scope of authorization

b. Electronic signature

The criteria of referenced in AMC to appendix II to Part M shall be considered and AMC 145.55(e) Maintenance and airworthiness review records is apply

c. Security and integrity

1. A corresponding policy and management structure should support the computer hardware and computer software that delivers the information. Appropriate physical security and EAMR back-up procedures should be established for current, operational, stored and archived records.
2. The electronic system should protect confidential information
3. The electronic system should ensure that the information is not altered by operating any unauthorized changes to the EAMR.
4. Procedures should be established allowing the organization to correct documents that were electronically signed in error. The original entry should be superseded anytime a correction related to that entry is made. (The original entry should be voided but remain in place. Reference to a new entry should be made and electronically signed and dated). It should be clearly identified that the original entry has been superseded by another entry.
5. Procedures should be established to describe how the organization will ensure that the computerized records are transmitted in accordance with the appropriate regulatory requirements to customers or to another operator, or to the CARC.
6. Procedures should be established for reviewing the computerized personal identification codes system to ensure that the system will not permit password duplication.

7. Procedures should be established for auditing the computer system periodically to ensure the integrity of the system. A record of the audit should be completed and retained on file as part of the organization's record retention requirements. This audit may be supported by system automatic self- testing.

8. Procedures should be established for non-recurring audits of the computer system if the integrity of the system is suspect.
9. Audit procedures should be established to ensure the integrity of each computerized workstation. If the workstations are server-based and contain no inherent attributes that enable or disable access, there is no need for each workstation to be audited. The procedures should be applicable to both fixed (e.g. desktop computers) and mobile equipment (e.g. laptops, tablets, PMATs etc.).
10. An information security assessment process should be established for the electronic record system to determine how effectively each entity being assessed (e.g., host, network, procedure, person) meets specific security objectives. The effective implementation of such established process should employ password cracking and security penetration testing procedures.

d. Archiving and transferability

1. In addition to physical safety of the archives, specific procedures for archiving electronically signed documents should be established. A means of safely archiving electronically signed documents should be part of any electronic signature computer software for providing for and adequately support the retention, access and future authentication of EAMR.

2. Procedures should be established to ensure that all EAMR representing aircraft maintenance records would be made available at aircraft transfer and should support the Export Certificate of Airworthiness. These procedures should also detail any electronic transfer specifics if applicable in order to visualise and process the data.

AMC 145.60(a) Occurrence reporting

Technical Occurrence Reporting Guidance Procedure AWS 30 provides further guidance on occurrence reporting.

GM 145.60(a) Occurrence reporting

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

AMC 145.60(b) Occurrence reporting

1. The aim of occurrence reporting is to identify the factors contributing to incidents, and to make the system resistant to similar errors.
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 organization should ensure that personnel are not inappropriately punished for reporting or co-operating with occurrence investigations.
3. The internal reporting process should be closed-loop, ensuring that actions are taken internally to address safety hazards.
4. Feedback to reportees, both on an individual and more general basis, is important to ensure their continued support for the scheme.

GM 145.60(c) Occurrence reporting

Each report should contain at least the following information:

(i) Organization name and approval reference.

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

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

(iv) Details of the condition as required by 145.60(b).

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

GM 145.65 Safety management system

An SMS manual shall be submitted to CARC by a maintenance organization for approval in accordance with Part 19 of JCAR.
The SMS manual for a maintenance organization may be integrated in one manual if the organization holds other approvals by CARC.

The SMS manual shall be in compliance with the following requirements:

a. Administration and control of the safety management system (SMS) manual:
   1. A statement that the manual complies with all applicable regulations.
   2. A statement that the manual contains safety instructions that are to be complied with by the relevant personnel.
   3. Explanations and definitions of terms and words used in the manual.
b. System of amendment and revision of the SMS manual.
c. Organization and responsibilities:
   1. A description of the organizational structure including the general company organigram.
   2. The name of the nominated post holders.
d. SMS regulatory requirements: Address current SMS regulations and guidance material for necessary reference and awareness by all concerned.
e. Scope and integration of the safety management system:
   1. Description of the scope and extent of the organization's aviation-related operation and facilities within which the SMS will apply. The scope of the processes, equipment and operations deemed eligible for the organization's hazard identification and risk management (HIRM) program should also be addressed.
   2. Identification of the major areas, departments, workshops and facilities of the organization within which the SMS will apply.
   3. Identification of the major processes, operations and equipment which are deemed eligible for the organization processes, operations and equipment
f. Safety policy: Description of the organization's intension , management principles and commitment to improving aviation safety in terms of the product or service provider.
g. Safety objectives: Description of the safety objectives of the organization.
h. Safety accountabilities and key personnel: Description of the safety authorities, responsibilities and accountabilities for personnel involved in the SMS.
i. Safety reporting and remedial actions: A reporting system should include both reactive (accident/incident reports, etc.) and proactive / predictive (hazard reports).
j. Hazard identification and risk assessment: Description of the hazard identification system and how such data are collated.

k. Safety performance monitoring and measurement: Description of the safety performance monitoring and measurement component of the SMS. This includes the organization's SMS safety performance indicators (SPIs).
l. Safety-related investigations and remedial actions: Description of how accidents/incidents/occurrences are investigated and processed within the organization, including their correlation with the organization's SMS hazard identification and risk management system.
m. Safety training and communication: Description of the type of SMS and other safety-related training that staff receives and the process for assuring the effectiveness of the training.
n. Continuous improvement and SMS audit: Description of the process for the continuous review and improvement of the SMS.
o. SMS records management: Description of the method of storing all SMS-related records and documents.
p. Management of change: Description of the organization's process for managing changes that may have an impact on safety risks and how such processes are integrated with the SMS.
q. Emergency/contingency response plan: Description of the organization's intentions regarding, and commitment to dealing with, emergency situations and their corresponding recovery controls. Outline the roles and responsibilities of key personnel. The emergency response plan can be a separate document or it can be part of the SMS manual.

AMC 145.65(a) Safety and quality policy, maintenance procedures and quality system

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

- Recognize safety as a prime consideration at all times.
- Apply Human factors principles.
- Encourage personnel to report maintenance related errors/incidents.
- Recognize that compliance with procedures, quality standards, safety standards and regulations is the duty of all personnel.
- Recognize the need for all personnel to cooperate with the quality and safety auditors.

AMC 145.65(b) Safety and quality policy, maintenance procedures and quality system

1. Maintenance procedures should be held current such that they reflect best practice within the organization. It is the responsibility of all organization's employees to report any differences via their organization's internal occurrence reporting mechanisms.
2. All procedures, and changes to those procedures, should be verified and validated before use where practicable.
3. All technical procedures should be designed and presented in accordance with good human factors principles.

GM 145.65(b)(1) Safety and quality policy, maintenance procedures and quality system

Appendix XI to AMC M.708(c) provides guidance on the elements that need to be considered for the maintenance contract between the CAMO and the maintenance organization. The Part-145 organization should take into account these elements to ensure that a clear contract or work order has been concluded before providing maintenance services.

AMC 145.65(b)(2) Safety and quality policy, maintenance procedures and quality system

Specialized services include any specialized activity, such as, but not limited to non-destructive testing requiring particular skills and/or qualification. 145.30(f) covers the qualification of personnel but, in addition, there is a need to establish maintenance procedures that cover the control of any specialized process.

AMC 145.65(c)(1) Safety and quality policy, maintenance procedures and quality system

1. The primary objectives of the quality system are to enable the organization to ensure that it can deliver a safe product and that organization remains in compliance with the requirements.
2. An essential element of the quality system is the independent audit.
3. The independent audit is an objective process of routine sample checks of all aspects of the organization'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 the 145.50(a) 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 organizations that work at night.
4. Except as specified in sub-paragraphs 7 and 9, the independent audit should ensure that all aspects of 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.
5. Except as specified otherwise in subparagraphs 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 Appendix II approval class rating as specified in the approval schedule issued to the particular organization.

It therefore follows for example that a maintenance organization approved under 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 5, 7 or 9.

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.

7. Except as specified otherwise in sub-paragraph 9, where the smallest organization, that is an organization with a maximum of 10 personnel actively engaged in maintenance, chooses to contract the independent audit element of the quality system in accordance with 145.65(c)(1) it is conditional on the audit being carried out twice in every 12 month period.

8. Except as specified otherwise in sub-paragraph 9, where the organization has line stations listed as per 145.75(d) 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 9 the maximum period between audits of a particular line station should not exceed 24 months.

9. Except as specified otherwise in sub-paragraph 5, CARC may agree to increase any of the audit time periods specified in this AMC 145.65(c)(1) by up to 100% provided that there are no safety related findings and subject to being satisfied that the organization has a good record of rectifying findings in a timely manner.

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.

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 organization approved under Part-145, being an organization 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 organization approved under Part-145, being an organization 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. Organizations 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 organization or a qualified and competent person approved by CARC.

GM 145.65(c)(1) Safety and quality policy, maintenance procedures and quality system

1. The purpose of this GM is to give guidance on just one acceptable working audit plan to meet part of the needs of 145.65(c)1. There is any number of other acceptable working audit plans.

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.

PARA	Comment	HANGAR	ENGINE	MECH	AVIONIC
			Workshop	Workshop	Workshop
145.25		Yes	Yes	Yes	Yes
145.30		Yes	Yes	Yes	Yes
145.35		Yes	Yes	Yes	Yes
145.36		Yes	No	No	No
145.40		Yes	Yes	Yes	Yes
145.42		Yes	Yes	Yes	Yes
145.45		Yes	Yes	Yes	Yes
145.47		Yes	Yes	Yes	Yes
145.48		Yes	Yes	if appl	if appl
145.50		Yes	Yes	Yes	Yes
145.55		Yes	Yes	Yes	Yes
145.60		Yes	Yes	Yes	Yes
145.65		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

PARA	Comment	HANGAR	ENGINE	MECH	AVIONIC
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	No	No
2.23	MOE	Yes	Yes	if appl	if appl
2.24	MOE	Yes	Yes	Yes	Yes
2.25	MOE	Yes	Yes	Yes	Yes
2.26	MOE	Yes	Yes	Yes	Yes
2.27	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
145.70		Yes	Yes	Yes	Yes
145.75		Yes	Yes	Yes	Yes
145.80		Yes	Yes	Yes	Yes
145.85		Yes	Yes	Yes	Yes
145.95		if appl	if appl	if appl	if appl

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 CARC within the limits of AMC 145.65(c)(1).

AMC 145.65(c)(2) Safety and quality policy, maintenance procedures and quality system

1. An essential element of the quality system is the quality feedback system.
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 organization 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 Part-145.
3. The independent quality audit reports referenced in AMC 145.65(c)(1) sub-paragraph 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 145.65(c)(2) to rectify findings and inform the quality department or nominated quality auditor of such rectification.
4. The accountable manager should hold regular meetings with staff to check progress on rectification except that in the large organizations 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.
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 AMC 145.65(c)(1) sub-paragraph 9 audit time periods, whichever is the longer.

AMC 145.70(a) Maintenance organization exposition

The following information should be included in the maintenance organization exposition:

The information specified in 145.70(a) subparagraphs (6) and (12) to (16) inclusive, whilst a part of the maintenance organization 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.

The exposition should contain the information, as applicable, specified in this AMC. The information may be presented in any subject order as long as all applicable subjects are covered. Where an organization 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 Annex using this list as an index with an explanation as to where the subject matter can be found in the exposition.

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

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

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

CARC has issued guidance procedure under reference number AWS 33 to assist Part 145 Maintenance Organizations in the production and/or maintaining of their own MOE.

PART 0 GENERAL ORGANIZATION (Operators within Jordan)

This section is reserved for those maintenance organizations approved under Part-145 who are also operators within Jordan.

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 organization chart

1.6 List of certifying staff, support staff and airworthiness review staff

1.7 Manpower resources

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

1.9 Organizations intended scope of work

1.10 Notification procedure to CARC regarding changes to the organization'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 program 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 CARC/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 man-hour 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

2.29 Airworthiness review procedures and records for LA1 aircraft not involved in commercial operations

2.30 Development and approval processing for maintenance programs for LA2 aircraft not involved in commercial operations

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 organization 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 organizations' procedures

3.11 Qualification procedure for specialized 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 procedures for on-the-job training as per Section 6 of Appendix III to Part-66 (limited to the case where CARC for the Part-145 approval and for the Part-66 licence is the same).

3.16 Procedure for the issue of a recommendation to CARC for the issue of a Part-66 licence (limited to the case where CARC for the Part-145 approval and for the Part-66 licence is the same).

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 145.75(b)

5.3 List of Line maintenance locations as per 145.75(d)

5.4 List of contracted organizations as per 145.70(a)(16)

PART 6 OPERATORS MAINTENANCE PROCEDURES

This section is reserved for those maintenance organizations approved under Part-145 who are also operators.

PART 7 NAA SUPPLEMENTARY PROCEDURES FOR A NAA PART-145 MAINTENANCE ORGANIZATION

This section is reserved for those maintenance organizations approved under Part-145 who are also certificated as a NAA Part-145 maintenance organization

GM 145.70(a) Maintenance organization exposition

1. The purpose of the maintenance organization exposition (MOE) is to set forth the procedures, means and methods of the organization.
2. Compliance with its contents will assure compliance with the requirements of Part-145, which is a prerequisite to obtaining and retaining a maintenance organization approval certificate.
3. 145.70(a)(1) to (a)(11) constitutes the 'management' part of the MOE and therefore could be produced as one document and made available to the person(s) specified under 145.30(b) who should be reasonably familiar with its contents. 145.70(a)(6) list of certifying staff and B1 and B2 support staff may be produced as a separate document.
4. 145.70(a)(12) constitutes the working procedures of the organization 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.
5. Personnel are expected to be familiar with those parts of the manuals that are relevant to the maintenance work they carry out.
6. The organization should specify in the MOE who should amend the manual particularly in the case where there are several parts.
7. The quality manager should be responsible for monitoring the amendment of the MOE, unless otherwise agreed by CARC, including associated procedures manuals and submission of the proposed amendments to CARC. However CARC 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 CARC.
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.

9. The accountable manager's exposition statement as specified under 145.70(a)(1) 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 organization and procedures upon which CARC Part-145 approval is based as required by 145.70. 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 Part-145 approval.

It is accepted that these procedures do not override the necessity of complying with any new or amended regulation published by CARC from time to time where these new or amended regulations are in conflict with these procedures.

It is understood that CARC will approve this organization whilst CARC is satisfied that the procedures are being followed and work standards maintained. It is further understood that CARC reserves the right to suspend, limit or revoke the approval of the organization if CARC has evidence that procedures are not followed or standards not upheld.

Signed .....

Dated .....

Accountable Manager and..... (quote position).....

For and on behalf of..... (quote organization's name).....

Whenever the accountable manager changes, it is important to ensure that the new accountable manager signs the paragraph 9 statement at the earliest opportunity.

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

When an organization 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.

Note: for more information, refer to CARC Part-145 MOE Checklist and Guidance Procedure No. AWS 33 as amended.

AMC 145.75(b) Privileges of the organization

1. Working under the quality system of an organization appropriately approved under Part-145 (sub-contracting) refers to the case of one organization, not itself appropriately approved to Part-145 that carries out aircraft line maintenance or minor engine maintenance or maintenance of other aircraft components or a specialized service as a subcontractor for an organization appropriately approved under Part-145. To be appropriately approved to subcontract the organization should have a procedure for the

control of such subcontractors as described below. Any approved maintenance organization that carries out maintenance for another approved maintenance organization within its own approval scope is not considered to be subcontracting for the purpose of this paragraph.

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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.

3. FUNDAMENTALS OF SUB-CONTRACTING UNDER PART-145

3.1. The fundamental reasons for allowing an organization approved under Part-145 to sub-contract certain maintenance tasks are:

(a) To permit the acceptance of specialized 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 CARC in such cases.

(b) To permit the acceptance of aircraft maintenance up to but not including a base maintenance check as specified in 145.75(b) by organizations not appropriately approved under Part-145 when it is unrealistic to expect direct approval by CARC. CARC will determine when it is unrealistic but in general it is considered unrealistic if only one or two organizations intend to use the sub-contract organization.

(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 145.75(b) by organizations not appropriately approved under Part-145 when it is unrealistic to expect direct approval by CARC. The determination of unrealistic is as per sub-paragraph (b).

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

3.3. For the criteria specified in sub-paragraph 3.1 the organization 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 organization 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.

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

3.5. An organization working outside the scope of its approval schedule is deemed to be not approved. Such an organization may in this circumstance operate only under the sub-contract control of another organization approved under Part-145.

3.6. Authorization to sub-contract is indicated by CARC accepting the maintenance organization exposition containing a specific procedure on the control of sub-contractors.

4. PRINCIPAL PART-145 PROCEDURES FOR THE CONTROL OF SUB-CONTRACTORS NOT APPROVED UNDER PART-145

4.1. A pre-audit procedure should be established whereby the maintenance organizations' subcontract control section, which may also be the 145.65(c) 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 Part-145.

4.2. The organization approved under Part-145 needs to assess to what extent it will use the sub-contractor`s facilities. As a general rule the organization 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 Part-145. In the case of sub-contractors who provide specialized services it may for practical reasons be necessary to use their specialized services personnel, approved data and material subject to acceptance by the organization approved under Part-145.

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

4.4. The certificate of release to service may be issued either at the sub-contractor or at the organization facility by staff issued a certification authorization in accordance with 145.30 as appropriate, by the organization approved under Part-145. Such staff would normally come from the organization approved under Part-145 but may otherwise be a person from the sub-contractor who meets the approved maintenance organization certifying staff standard which itself is approved by CARC via the maintenance organization exposition. The certificate of release to service and the CARC Form 18-0227 will always be issued under the maintenance organization approval reference.

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 Part-145 approved maintenance organization's requirements.

4.6. The 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 4.1.

4.7. The contract between the Part-145 approved maintenance organization and the sub-contractor should contain a provision for CARC team staff to have right of access to the sub-contractor.

AMC 145.75(c) Privileges of the organization

1. 145.75 (c) allows a maintenance organization to "maintain any aircraft or any component for which it is approved at any location subject to the need for such maintenance arising either from the un- serviceability of the aircraft or from the necessity of supporting occasional line maintenance, subject to the conditions specified in the exposition". The privilege to perform maintenance in a non-approved location is limited to the following cases:
   a. To support an unserviceable aircraft**:** It shall be understood that this privilege is intended to be used only for the need of aircraft maintenance in the case of an unscheduled/unexpected event, such as an AOG requiring defect rectification and for which the operator issues a work order.
   b. Occasional line maintenance due to the need of supporting the A/C operation in a non-approved location for maintenance (i.e. one-time flight, short term or seasonal contract, flight schedule change, etc.).
2. When the maintenance organization wishes to use the privileges of point 145.75 (c), the MOE 1.9 (scope of work) shall make reference to the fact that the maintenance organization may perform works away from the approved locations, subject to the condition specified in MOE 2.24 (specific maintenance procedure).The MOE 2.24 shall detail the applicability and conditions, based on the criteria identified in CARC/AWSD guidance procedure No. AWS 33 as amended.

   It must be noted that the fact that a maintenance organization has been granted this privilege shall not be understood as if any maintenance task could be performed at any location, or that such locations become "approved locations".

3.The MOE procedures shall specify which maintenance tasks are going to be performed under such privilege; and how the maintenance organization is going to ensure that Part-145 requirements are met in each case (in particular with regards to adequate facilities, sufficient staff, appropriate certifying staff, availability of tooling and equipment, availability of current maintenance data, adequate planning, release to service procedures, etc.);and how the maintenance organization's quality system is going to monitor compliance with the above requirements.

4.The procedure ***to*** Support an unserviceable aircraft shall be based on the following criteria:

a) The Scope of work shall be limited to:

- aircraft type or components or engines or NDT methods listed in the MOE 1.9 scope of work and;
- maintenance activities strictly necessary to recover the aircraft un-serviceability condition as limited by the MOE 1.9 maintenance level;

- A process shall be in place, under the responsibility of the Quality Manager, to show how the Maintenance Manager ensures that the necessary facilities, certifying staff, tools, equipment, material, maintenance data will be made available as necessary and how the maintenance records will be managed; and the involvement of the Quality System and its approval for any work away from the approved location, based on a desktop review; and that CARC is notified of any such approval within 7 days (activity report). In addition, that a list of all the CRS issued under this procedure will be made available to CARC upon request;

b) The notification shall be formalized using a Form, to be enclosed in the MOE Part 5, including the following minimum information:

- Aircraft type and registration number;
- Location;
- Description of the un-serviceability of the aircraft and expected scope of maintenance;
- Composition of the working Team (number and category of licenses);
- Specify the rating under which the activity is carried out (Ax Line/Base, Bx, Cx, D1);
- Quality Manager signature

5. The procedure(s) related to the "Occasional Maintenance" are approved by CARC based upon the ability of the Quality System to deal adequately with Part-145 requirements. Therefore this privilege cannot be therefore demonstrated at the time of the initial approval. In any case this procedure cannot be detailed in the MOE and therefore approved by CARC before the first 2 year surveillance cycle has been completed.

Note: For more information, refer to CARC guidance procedure No. AWS 33 as amended.

AMC 145.80 Limitations on the organization

This paragraph is intended to cover the situation where the larger organization may temporarily not hold all the necessary tools, equipment etc., for an aircraft type or variant specified in the organization's approval. This paragraph means that CARC 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 organization to re-acquire tools, equipment etc. before maintenance on the type may recommence.

AMC TO APPENDICES TO PART-145

AMC to Appendix III of Part 145— Maintenance Organization Approval

The following fields on page 2 'Maintenance Organization Approval Schedule' of the maintenance organization approval certificate should be completed as follows:

- Date of original issue: It refers to the date of the original issue of the maintenance organization exposition
- Date of last revision approved: It refers to the date of the last revision of the maintenance organization exposition affecting the content of the certificate. Changes to the maintenance organization exposition which do not affect the content of the certificate do not require the reissuance of the certificate.
- Revision No: It refers to the revision No of the last revision of the maintenance organization exposition affecting the content of the certificate. Changes to the maintenance organization exposition which do not affect the content of the certificate do not require the reissuance of the certificate.

APPENDICES TO AMCs TO PART-145

Appendix III to AMC 145.15 — CARC Form 18-0148

The provisions of Appendix IX to AMC M.602 and AMC M.702 CARC Form 18-0148 apply.

Appendix IV to AMC 145.30(e) — Fuel Tank Safety Training

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

A. Effectivity:

- Large aeroplanes as defined in the CARC Part CS, (CS-25) and certified after 1 January 1958 with a maximum type certified passenger capacity of 30 or more or a maximum certified payload capacity of 7500 lbs (3402 kg) cargo or more, and
- Large aeroplanes as defined in (CS-25) which contains CS-25 amendment 1 or later in their certification basis.

B. Affected organizations:

- Part-145 approved maintenance organizations 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.
- Competent authorities responsible for the oversight of the Part-145 approved organizations

C. Persons from affected organizations who should receive training:

Phase 1 only:

- The group of persons representing the maintenance management structure of the organization, the quality manager and the staff required to quality monitor the organization.
- Personnel of the competent authorities responsible for the oversight of Part-145 approved maintenance organizations.

Phase 1 + Phase 2 + Continuation training:

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

D. General requirements of the training courses

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 organization.

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.

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

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

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

2. 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.

3. Be able to use typical terms.

Content: The course should include:

- a short background showing examples of FTS accidents or incidents,
- the description of concept of fuel tank safety and CDCCL,
- some examples of manufacturers documents showing CDCCL items,
- typical examples of FTS defects,
- some examples of TC holders repair data
- some examples of maintenance instructions for inspection.

Phase 2 - Detailed training

A flexible period may be allowed by the competent authorities to allow organizations to set the necessary courses and impart the training to the personnel, taking into account the organization's training schemes/means/practices. This flexible period should not extend beyond 31 December 2010.

The persons who have already attended the Level 2 Detailed training course either from a Part-145 maintenance organization or from a Part-147 training organization are already in compliance with Phase 2 with the exception of continuation training.

Staff should have received Phase 2 training by 31 December 2010 or within 12 months of joining the organization, whichever comes later.

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%.

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

The training may be made either:

- 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
- 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: A continuous evaluation process should ensure the effectiveness of the training and its relevance; Some questions at intermediate steps of the training should be proposed to ensure that the trainee is authorized to move to the next step; The content and results of examinations should be

recorded; 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.

Objectives:

The attendant should, after the completion of the training:

- have knowledge of the history of events related to fuel tank safety issues and the theoretical and practical elements of the subject, have an overview of the FAA regulations known as SFAR (Special FAR) 88 of the FAA and of JAA Temporary Guidance Leaflet TGL 47, 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;
- have the capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner;
- have knowledge on how the above items affect the aircraft;
- be able to identify the components or parts or the aircraft subject to FTS from the manufacturer's documentation,
- be able to plan the action or apply a Service Bulletin and an Airworthiness Directive.

Content: Following the guidelines described in paragraph E).

Continuation training:

The organization should ensure that the continuation training is required in each two years period. The syllabus of the training program referred to in 3.4 of the Maintenance Organization 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 competent authority's directives.

E. Guidelines for preparing the content of Phase 2 courses.

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

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

(b) how the mechanics can recognize, interpret and handle the improvements in the instruction for continuing airworthiness that have been made or are being made regarding the fuel tank system maintenance,

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

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

(i) The theoretical background behind the risk of fuel tank safety: the explosions of mixtures of fuel and air, the behavior 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,

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

(iii) SFAR 88 of the FAA and JAA Interim Policy INT POL 25/12: ignition prevention program initiatives and goals, to identify unsafe conditions and to correct them, to systematically improve fuel tank maintenance),

(iv) Explain the briefly concepts that are being used: the results of SFAR 88 of the FAA and JAA INT/POL 25/12: modifications, airworthiness limitations items and CDCCL,

(v) Where relevant information can be found and how to use and interpret this information in the instructions for continuing airworthiness (aircraft maintenance manuals, component maintenance manuals, Service Bulletins…),

(vi) 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,

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

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

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

F. Approval of training

For Part-145 approved organizations, the approval of the initial and continuation training program 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 appendix should be made and implemented.