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The Civil Aviation Authority of Thailand

ACCEPTABLE MEANS OF COMPLIANCE (AMC) TO TCAR 8 PART 145

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Approved By

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THAILAND CIVIL AVIATION REGULATION (TCAR)

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INTRODUCTION

CAAT develops acceptable means of compliance (AMC) and guidance material (GM) with a view to ensuring uniformity in the application of common requirements,

When the acceptable means of compliance of TCAR 8 Part 145 issued by the CAAT are used, the related requirements of the Regulation TCAR 8 Part 145 shall be considered as met without further demonstration.

Alternative means of compliance (AMoC) to those adopted by the CAAT may be used by an organisation to establish compliance with the requirements of the Regulation TCAR 8 Part 145.

When an organisation subject to certification wishes to use an alternative means of compliance (AMoC) to the acceptable means of compliance (AMC), it shall, prior to implementing it, provide the CAAT with a full description of the alternative means of compliance.

The description shall include any revisions to manuals or procedures that may be relevant, as well as an assessment demonstrating that the requirements of the regulation are met.

In order to demonstrate that Alternative Mean of compliance guarantee that the requirements of the regulation TCAR 8 Part 145 are met, a risk assessment should be completed and documented by the organisation requesting for the AMoC.

The result of this risk assessment should demonstrate that an equivalent level of safety to that established by the Acceptable Means of Compliance (AMC) adopted by the CAAT is reached.

The organisation may implement these alternative means of compliance subject to prior formal approval by the CAAT.

AMCs & GM TO TCAR 8 PART 145

GM1 Definitions

For the purpose of the AMC and GM to TCAR 8 Part 145, the following definitions are used.

Acceptable means of compliance (AMC)	Non-binding standards adopted by the CAAT to illustrate means to establish compliance with requirements of the Regulation.
Alternative means of compliance	Those means that propose an alternative to an existing AMC or those that propose new means to establish compliance with requirements of the Regulation for which no associated AMC have been adopted by the CAAT.
Audit	A systematic, independent, and documented process for obtaining evidence, and evaluating it objectively to determine the extent to which requirements are complied with. Note: audits may include inspections
Assessment	In the context of management system performance monitoring, continuous improvement and oversight, this refers to a planned and documented activity performed by competent personnel to evaluate and analyse the achieved level of performance and maturity in relation to the organisation's policy and objectives. Note: an assessment focuses on desirable outcomes and the overall performance, looking at the organisation as a whole. The main objective of the assessment is to identify the strengths and weaknesses to drive continual improvement. Remark: for 'risk assessment', refer to the definition below.
Base maintenance	Refer to AMC1 145.A.10
Competency	A combination of individual skills, practical and theoretical knowledge, attitude, training, and experience.
Competent Authority	A competent authority may be a ministry, a national aviation authority or any aviation body designated by a State.
Component	any engine, propeller, part or appliance.
Correction	The action to eliminate a detected non-compliance.
Corrective action	The action to eliminate or mitigate the root cause(s) and prevent the recurrence of an existing detected non-compliance, or other undesirable conditions or situations. Proper determination of the root cause(s) is crucial for defining effective corrective actions to prevent reoccurrence.
Critical Component	A part identified as critical by the design approval holder during the product type validation process, or otherwise by the exporting authority. Typically, such components include parts for which a replacement time, inspection interval, or related procedure is specified in the Airworthiness Limitations section or certification maintenance requirements of the manufacturer's maintenance manual or Instructions for Continued Airworthiness.
Error	An action or inaction by a person that may lead to deviations from accepted procedures or regulations. Note: errors are often associated with occasions when a planned sequence of mental or physical activities either fails to achieve its intended outcome, or is not appropriate with regard to the intended outcome, and when results cannot be attributed purely to chance.
Fatigue	A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, the circadian phase, or workload (mental and/or physical activity) that can impair a person's alertness and ability to safely perform safety-related duties.
Hazard	A condition or an object with the potential to cause or contribute to an aircraft

	incident or accident.
Human factors	Anything that affects human performance, which means principles that apply to aeronautical design, certification, training, operations and maintenance, and which seek a safe interface between the human and other system components by proper consideration of human performance.
Human performance	Human capabilities and limitations which have an impact on the safety, and efficiency of aeronautical operations.
Inspection	In the context of compliance monitoring and oversight, refers to an independent documented conformity evaluation by observation and judgement accompanied, as appropriate, by measurement, testing or gauging, in order to verify compliance with applicable requirements. Note: inspection may be part of an audit (e.g. product audit), but may also be conducted outside of the normal audit plan, for example to verify closure of a particular finding.
Just Culture	'just culture' means a culture in which front-line operators or other persons are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but in which gross negligence, wilful violations and destructive acts are not tolerated.
Line maintenance	Refer to AMC1 145.A.10
Near miss	An event in which an occurrence to be mandatorily reported was narrowly averted or avoided. Example: a mechanic on rechecking his or her work at the end of a task realises that one work card step was not properly carried-out.
Organisational factor	A latent condition that affects the effectiveness of safety risk controls, related to the culture, policies, processes, resources, and workplace of an organisation.
Oversight planning cycle	The time frame within which all areas of the approval and all processes should be reviewed by the CAAT by means of audits and inspections.
Oversight programme	The detailed oversight schedule that defines the number of audits and inspections, the scope and duration of each audit and inspection, including details of product audits and locations, as appropriate, to be performed by the CAAT, and the tentative time frame for performing each audit and inspection.
Preventive action	The action to eliminate the cause of a potential non-compliance, or other undesirable potential situations.
Risk assessment	An evaluation based on engineering and operational judgement and/or analysis methods in order to establish whether the achieved or perceived risk is acceptable or tolerable.
Safety culture	An enduring set of values, norms, attitudes, and practices within an organisation concerned with minimising the exposure of the workforce and the general public to dangerous or hazardous conditions. In a positive safety culture, a shared concern for, commitment to, and accountability for safety is promoted.
Safety risk	The predicted probability and severity of the consequences or outcomes of a hazard.
Safety training	Dedicated training to support safety management policies and processes, including human factors training. *Note: the main purpose of the safety training programme is to ensure that personnel at all levels of the organisation maintain their competency to fulfil their safety roles. Safety training should, in particular, consider the safety knowledge derived from hazard identification and risk management processes, and support the fostering of a positive safety culture.* Note: safety management training means specific training for the staff involved in safety management functions in accordance with point 145.A.30(ca) or 145.A.200(a)3

Working days	Days between and including Monday to Friday, not including public holidays.

AMC1 145.A.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:

   - Troubleshooting.
   - Defect rectification.
   - Component replacement with the 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 inspections**.** It may also include the internal structure, systems and powerplant 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 (AD's, SB's) the Compliance Monitoring Manager may accept base maintenance tasks to be performed by a line maintenance organisation subject to a risk assessment and provided all requirements are fulfilled as defined by the CAAT.

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

   (d) Aircraft that are maintained in accordance with 'progressive' type programmes should be individually assessed in relation to this paragraph**.** In principle, the decision to allow some **'**progressive**'** checks to be carried out should be determined by the assessment that all the tasks within the particular check can be carried out safely and to the required standards at the designated line maintenance station.

2. If the organisation uses facilities both inside and outside Thailand, such as satellite facilities, sub-contractors, line stations, etc., such facilities may be included in the approval without being identified on the organisation approval certificate, provided that the maintenance organisation exposition (MOE) identifies the facilities and contains procedures to control such facilities, and the CAAT is satisfied that they form an integral part of the approved maintenance organisation.

GM1 145.A.10 Scope

SMALLEST ORGANISATIONS

This Guidance Material (GM) provides guidance on how the smallest organisations satisfy the intent of TCAR 8 Part 145:

1. By inference, the smallest maintenance organisations would only be involved in the maintenance of a limited number of light aircraft, or aircraft components, used for commercial air transport**.** It is therefore a matter of scale; the maintenance of light aircraft does not require the same level of resources, facilities or complex maintenance procedures as the maintenance of larger aircraft by large organisations.
2. It is recognised that a TCAR 8 Part 145 approval may be required by two quite different types of small organisations. The first is a light aircraft maintenance hangar, and the second is a component maintenance workshop, e.g. for small piston engines, radio equipment, etc.
3. Organisations that employ one person, who carries out the certification function and other functions, and that are approved under TCAR 8 Part 145, may use the alternatives provided in point 3**.**1, limited to the following:

Class A2 Base and Line maintenance of aeroplanes of 5700 kg maximum take-off mass (MTOM) or less (with piston engines only).

Class A3 Base and Line maintenance of single-engine helicopters of 3175 kg MTOM or less

Class A4 Aircraft other than A1, A2 and A3 aircraft.

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

Class C Components.

Class D1 Non-Destructive Testing.

3.1. 145.A.30(b): The minimum requirement is for one full-time person who meets the requirements for certifying staff and holds the position of accountable manager, safety manager, maintenance engineer and is also certifying staff. No other person may issue a certificate of release to service and, therefore, if that person is absent, no maintenance may be released during such his or her absence.

3.1.1. The independent audit element of the compliance monitoring function of point 145.A.200(a)6 may be subcontracted to an appropriate organisation approved under TCAR 8 Part 145, or contracted to a person with appropriate technical knowledge and extensive experience of audits, working under the management system of the organisation, with the agreement of the CAAT.

Note: full-time for the purpose of TCAR 8 Part 145 means not less than 35 hrs per week, except during vacation periods.

3.1.2. 145.A.35. In the case of an approval based on one person using an independent audit arrangement as referred to in 3.1.1, the requirement for a record of certifying staff is satisfied by the submission to, and acceptance by the CAAT of the MOE. With only one person, the requirement for a separate record of authorisation is unnecessary because the AIR/RI-501 or AIR/RI-502 form approval certificate defines the authorisation. An appropriate statement, to reflect this situation, should be included in the exposition.

3.1.3. 145.A.200(a)6. It is the responsibility of the organisation or person referred to in 3.1.1 to make a minimum of 2 on-site audits every year, and it is the responsibility of this organisation or person to carry out these activities on the basis of 1 pre-announced visit and 1 unannounced visit to the maintenance organisation.

It is the responsibility of the TCAR 8 Part 145 organisation to ensure that effective implementation of all corrective actions takes place.

4. Recommended operating procedure for a TCAR 8 Part 145 maintenance organisation based upon up to 10 persons involved in maintenance.

4.1. 145.A.30(b) and 145.A.30(c): The normal minimum requirement is for the employment on a full-time basis of two persons who meet the applicable CAAT requirements for certifying staff, whereby one holds the position of 'maintenance engineer' and the other holds the position of 'compliance monitoring engineer'.

Either person can assume the responsibilities of the accountable manager and safety manager provided that they can comply in full with the applicable elements of 145.A.30(a) and 145.A.30(ca), but the 'maintenance engineer' should be the certifying person to retain the independence of the 'compliance monitoring engineer' to carry out audits. Nothing prevents either engineer from undertaking maintenance tasks, provided that the 'maintenance engineer' issues the certificate of release to service.

The 'compliance monitoring engineer' should have similar qualifications and status to the 'maintenance engineer' for reasons of credibility, unless he or she has a proven track record in aircraft compliance monitoring, in which case some reduction in the extent of his or her

maintenance qualifications may be permitted.

If the CAAT agrees that it is not practical for the organisation to nominate a person as responsible for the independent audit of the compliance monitoring function; this element may be contracted in accordance with paragraph 3.1.1.

AMC1 145.A.15 Application for an organisation certificate

In a form and in a manner established by the CAAT means that the application should be made on the appropriate CAAT application form (CAAT-AIR-RI-201)

AMC2 145.A.15 Application for an organisation certificate

GENERAL

(a) Draft documents should be submitted at the earliest opportunity so that assessment of the application can begin. The initial certification or approval of changes cannot take place until the CAAT has received the completed documents.

(b) This information, including the results of the pre-audit specified in point 145.A.15(b)1, will enable the CAAT to conduct its assessment in order to determine the volume of certification and oversight work that is necessary, and the locations where it will be carried out.

(c) The intent of the internal pre-audit referred to in point 145.A.15(b)1 is to ensure that the organisation has internally verified its compliance with the regulation. This should allow the organisation to demonstrate to the CAAT the extent to which the applicable requirements are complied with, and to provide assurance that the organisation management system is established to a level that is sufficient to perform maintenance activities.

GM1 145.A.15(b) Application for an organisation certificate

PROCEDURE FOR CHANGES NOT REQUIRING PRIOR APPROVAL

The procedure for changes not requiring prior approval should include, as mentioned in point 145.A.70(a)10, both the scope of those changes and how they will be managed and notified. For applicants for an initial certificate, the scope may be limited by the CAAT for the first period of operation. An extension of such a limited scope may be considered later; see GM1 145.A.85(c).

AMC1 145.A.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

CLASS	RATING	ATA CHAPTERS
	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

AMC1 145.A.25(a) Facility requirements

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

2. 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.

5. Subject to a risk assessment and agreement by the CAAT, the organisation may use facilities at the approved location, other than a hangar that encloses the whole aircraft, for certain aircraft base maintenance tasks, provided that those facilities offer levels of weather and environmental protection that are equivalent to those of a hangar, as well as a suitable working environment for the particular work package. This does not exempt an organisation from the requirement to have an aircraft hangar in order to be approved to conduct base maintenance at a given location.

AMC1 145.A.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 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.

AMC1 145.A.25(d) Facility requirements

(a) 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.

(b) 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.

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

AMC1 145.A.30(a) Personnel requirements

ACCOUNTABLE MANAGER

Accountable manager is normally intended to mean the chief executive officer of the approved maintenance organisation, who by virtue of his or her position, has overall (including in particular financial) responsibility for running the organisation. The accountable manager may be the accountable manager for more than one organisation, and is not necessarily required to be knowledgeable on technical matters, as the MOE defines the maintenance standards. When the accountable manager is not the chief executive officer, the CAAT should be assured that the accountable manager has direct access to the chief executive officer and has the necessary maintenance funding allocation.

AMC1 145.A.30(b) Personnel requirements

MANAGEMENT STRUCTURE FOR MAINTENANCE

The person or group of persons nominated under point 145.A.30(b) with the responsibility for ensuring compliance should represent the management structure of the organisation, and be responsible for all maintenance functions.

1. Dependent upon the size of the organisation, the TCAR 8 Part 145 functions may be subdivided under individual managers or combined in any number of ways. However, the compliance monitoring function should be independent from the other functions.
2. The organisation should have, dependent upon the extent of approval, a base maintenance manager, a line maintenance manager, and a workshop manager and, all of whom should report to the accountable manager except in small TCAR 8 Part 145 organisations where anyone manager may also be the accountable manager, as determined by the CAAT, and he or she may also be the line maintenance manager or the workshop manager.
3. The base maintenance manager is responsible for ensuring that all maintenance required to be carried out in the hangar, plus any defect rectification carried out during base maintenance, is carried out to the standards specified in point 145.A.65. The base maintenance manager is also responsible for any corrective action resulting from the compliance monitoring of point 145.A.200(a)6.
4. The line maintenance manager is responsible for ensuring that all maintenance required to be carried out on the line, including line defect rectification, is carried out to the standards specified in point 145.A.65, and is also responsible for any corrective action resulting from the compliance monitoring of point 145.A.200(a)6.
5. The workshop manager is responsible for ensuring that all work on aircraft components is carried out to the standards specified in point 145.A.65, and is also responsible for any corrective action resulting from the compliance monitoring of point 145.A.200(a)6.

6. (Reserved)

7. Notwithstanding the example titles in sub-paragraphs 2 to 5, the organisation may adopt any titles for the foregoing managerial positions, but it should identify to the CAAT the titles and the persons chosen to carry out these functions.

8. If an organisation chooses to appoint managers for all or any combination of the identified TCAR 8 Part 145 functions because of the size of the undertaking, these managers should ultimately report to the accountable manager through either the base maintenance manager, the line maintenance manager, the workshop manager, the compliance monitoring manager or the safety manager, as appropriate.

   NOTE: certifying staff may report to any of the managers specified, depending on which type of control the approved maintenance organisation uses (for example, licenced engineers/independent inspection/dual function supervisors, etc.), as long as the independence of the compliance monitoring function is ensured.

GM1 145.A.30(b) Personnel requirements

RESPONSIBILITY FOR ENSURING COMPLIANCE

For day-to-day functions, the responsibility for ensuring that all maintenance activities are performed in accordance with the applicable requirements and procedures lies with the person(s) nominated in accordance with point 145.A.30(b).

These nominated persons should demonstrate a complete understanding of the applicable requirements, and ensure that the organisation's processes and standards accurately reflect the applicable requirements. It is their role to ensure that compliance is proactively managed, and that any early warning signs of non-compliance are documented and acted upon.

AMC1 145.A.30(c) Personnel requirements

Compliance monitoring may include the need to involve the accountable manager and the nominated persons referred to in point 145.A.30(b) in requesting corrections and corrective actions.

AMC1 145.A.30(c);(ca) Personnel requirements

SAFETY MANAGEMENT AND COMPLIANCE MONITORING FUNCTION

(a) Safety manager

   1. The safety manager should act as the focal point for effective safety management processes, and be responsible for their development, administration and maintenance.

   2. The functions of the safety manager should be to:

      (i) facilitate hazard identification, risk assessment and management;

      (ii) monitor the implementation of actions taken to mitigate risks, as listed in the safety action plan, unless action follow-up is addressed by the compliance monitoring function;

      (iii) provide periodic reports on safety performance to the safety review board;

      (iv) ensure the maintenance of safety management documentation;

      (v) ensure that there is safety training available, and that it meets acceptable standards;

      (vi) provide advice on safety matters; and

      (vii) ensure the initiation and follow-up of internal occurrence investigations.

   3. If more than one person is designated for the safety management function, the accountable manager should identify the person who acts as the unique focal point (i.e. the 'safety manager').

(b) The compliance monitoring function should ensure that:

1. the activities of the organisation are monitored for compliance with the applicable requirements and any additional requirements as established by the organisation, and that these activities are carried out properly under the supervision of the nominated persons referred to in points 145.A.30(b) to (ca).
2. any maintenance contracted to another maintenance organisation is monitored for compliance with the contract;
3. an audit plan is properly implemented, maintained, and continually reviewed and improved; and
4. corrections and corrective actions are requested as necessary.

(c) The compliance monitoring manager should:

1. not be one of the persons referred to in point 145.A.30(b);
2. be able to demonstrate relevant knowledge, background and appropriate experience related to the activities of the organisation, including knowledge and experience in compliance monitoring;
3. have access to all parts of the organisation, and as necessary, any subcontracted organisation.

(d) If more than one person is designated for the compliance monitoring function, the accountable manager should identify the person who acts as the unique focal point (i.e. the 'compliance monitoring manager').

(e) If the functions related to compliance monitoring or safety management are combined with other duties, the organisation should ensure that this does not result in any conflicts of interest.

(f) If the same person is designated to manage both the compliance monitoring function and safety management-related processes and tasks, the accountable manager, with regard to his or her direct accountability for safety, should ensure that sufficient resources are allocated to both functions, taking into account the size of the organisation, and the nature and complexity of its activities.

(g) Subject to a risk assessment and agreement by the CAAT, with due regard to the size of the organisation and the nature and complexity of its activities, the compliance monitoring manager role and/or safety manager role may be exercised by the accountable manager, provided that he or she has demonstrated the related competency as defined in point (c)2.

GM1 145.A.30(ca) Personnel requirements

SAFETY MANAGER

(a) Depending on the size of the organisation and the nature and complexity of its activities, the safety manager may be assisted by additional safety personnel in performing all the safety management tasks defined in AMC1 145.A.200(a)1.

(b) Regardless of the organisational setup, it is important that the safety manager remains the unique focal point for the development, administration, and maintenance of the organisation's management system.

AMC1 145.A.30(cc) Personnel requirements

KNOWLEDGE, BACKGROUND AND EXPERIENCE OF NOMINATED PERSON(S)

(a) Practical experience and expertise in the application of aviation safety standards and safe operating practices;

(b) Knowledge of:

1. human factors principles;
2. safety management systems based on ICAO Annex 19.

(c) 5 years of relevant work experience, of which at least 2 years should be from the aeronautical industry in an appropriate position;

(d) A relevant engineering degree or an aircraft maintenance technician qualification with additional education that is acceptable to the CAAT. 'Relevant engineering degree' means an engineering degree from aeronautical, mechanical, electrical, electronic, avionic or other studies that are relevant to the maintenance and continuing airworthiness of aircraft/aircraft components;

The above recommendation may be replaced by 5 years of experience in addition to those already recommended by the paragraph (c) above. These 5 years should cover an appropriate combination of experience in tasks related to aircraft maintenance and/or continuing airworthiness management and/or the surveillance of such tasks;

(e) Thorough knowledge of the organisation's MOE;

(f) Knowledge of a relevant sample of the type(s) of aircraft or components gained through a formalised training course. These courses could be provided by the manufacturer, by the Part 145 organisation or by any other organisation accepted by the CAAT.

'Relevant sample' means that these courses should cover typical aircraft or components that are within the scope of work.

For all balloons and any other aircraft of 2730 kg MTOM or less, the formalised training courses may be replaced by a demonstration of the required knowledge by providing documented evidence, or by an assessment performed by the CAAT. This assessment should be recorded;

(g) Knowledge of the relevant maintenance methods;

(h) Knowledge of the applicable regulations.

AMC1 145.A.30(d) Personnel requirements

SUFFICIENT NUMBER OF PERSONNEL

1. Has sufficient staff means that the organisation employs or contracts competent staff, as detailed in the man-hour plan, of which at least half the staff that perform maintenance in each workshop, hangar or flight line on any shift should be employed to ensure organisational stability. For the purpose of meeting a specific operational necessity, a temporary increase of the proportion of contracted staff may be permitted to the organisation by the CAAT, in accordance with an approved procedure, which should describe the extent, specific duties, and responsibilities for ensuring adequate organisation stability. For the purpose of this sub-paragraph, 'employed' means that the person is directly employed as an individual by the maintenance organisation approved under TCAR 8 Part 145, whereas 'contracted' means the person is employed by another organisation and contracted by that organisation to the maintenance organisation approved under TCAR 8 Part 145.

2. The maintenance man-hour plan should take into account all maintenance activities carried out outside the scope of the TCAR 8 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 organisation cannot predict such workload, due to the short term nature of its contracts, then such plan should be based upon the minimum maintenance workload needed for commercial viability**.** Maintenance work load includes all necessary work such as, but not limited to, planning, maintenance record checks, production of worksheets/cards in paper or electronic form, accomplishment of maintenance, inspection and the completion of maintenance records.

4. For aircraft base maintenance, the maintenance man-hour plan should relate to the aircraft hangar visit plan as specified in AMC1 145.A.25(a).

5. For aircraft component maintenance, the maintenance man-hour plan should relate to the aircraft component planned maintenance as specified in 145.A.25(a)2.

6. The man-hours allocated to the compliance monitoring function should be sufficient to meet the requirement of 145.A.200(a)6, which means taking into account AMCs to 145.A.200(a)6. If the compliance monitoring staff also perform other functions, the time allocated to those functions needs to be taken into account in determining the number of compliance monitoring staff.

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

8. Significant deviations from the maintenance man-hour plan should be reported through the responsible manager to the compliance monitoring manager and the accountable manager for review, as well as through the internal safety reporting scheme. A significant deviation means more than a 25% shortfall in the available man-hours during a calendar month for any one of the functions specified in 145.A.30(d).

9. In addition, as part of its management system in accordance with point 145.A.200, the organisation should have a procedure to assess and mitigate the risks:

   (a) if the actual number of staff available is less than the planned staffing level for any particular work shift or period;

   (b) if there is a temporary increase in the proportion of subcontracted staff in order to meet specific operational needs.

AMC1 145.A.30(e) Personnel requirements

COMPETENCY ASSESSMENT

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

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

Competency should be assessed by the evaluation of:

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

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

— experience records.

Validation of the above could include a confirmation check with the organisation(s) that issued the 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.A.30(e).

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

— which level of ongoing supervision would be required and whether unsupervised work could be permitted;

— whether there is a need for additional training.

A record should be kept of each individual's qualifications and competency assessment (refer to point 145.A.55(d))

This should include copies of all documents that attest to their qualifications, such as a licence and/or any authorisation held, as applicable.

For a proper competency assessment of its personnel, the organisation should consider that**:**

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

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

3. All staff should be able to demonstrate an understanding of the safety management principles, human factors and human performance issues related to their job function, and be trained as per AMC2 145.A.30(e).

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

5. Criteria should allow the assessment to establish that; among other aspects (titles might be different in each organisation):

   — Managers are able to properly manage the work output, processes, resources and priorities described in their assigned duties, accountabilities and responsibilities in accordance with the safety policy and objectives, and in compliance with the applicable requirements and 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 the required maintenance tasks are carried out and, if they are not completed or it is evident that a particular maintenance task cannot be carried out according to the maintenance data, that these problems will be adequately addressed to eliminate non-compliance, and reported through the internal safety reporting scheme to prevent recurrence. In addition, for those supervisors, who also carry out maintenance tasks, the assessment should ensure that they understand that such tasks should not be undertaken if they are incompatible with their management responsibilities.

   — Mechanics are able to carry out maintenance tasks to any standard specified in the maintenance data, and will notify their supervisors of any defects or mistakes that require rectification to re-establish required maintenance standards.

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

   — Support staff are able to determine that the relevant tasks or inspections have been carried out to the required standard.

   — Certifying staff are able to determine when the aircraft or aircraft component maintenance is ready to be released to service, and when it should not be released to service.

   — Compliance monitoring staff are able to monitor compliance with the regulation, and to identify non-compliances in an effective and timely manner so that the organisation may remain in compliance with this TCAR 8 Part 145.

   — Staff who have been designated safety management responsibilities are familiar with the relevant processes in terms of hazard identification, risk management, and the monitoring of safety performance.

   — All staff are familiar with the safety policy and the procedures and tools that can be used for internal safety reporting.

The competency assessment should be based upon the procedure specified in GM2 145.A.30(e).

AMC2 145.A.30(e) Personnel requirements

SAFETY TRAINING (INCLUDING HUMAN FACTORS)

Refer to the definition of safety training in GM1 to TCAR 8 Part 145.

(a) With respect to the understanding of the application of safety management, human factors and human performance issues, all maintenance organisation personnel should have received initial and recurrent safety training, appropriate for their responsibilities. This should include at least the following staff members:

— Nominated persons, line managers, supervisors;

— Certifying staff, support staff and mechanics;

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

— Persons involved in any compliance monitoring and/or safety management-related processes and tasks, including the application of human factors principles, internal investigations and safety training;

— Specialised services staff;

— Stores department staff, purchasing department staff;

— Ground equipment operators.

The generic term 'line managers' refers to departmental heads or persons responsible for operational departments or functional units that are directly involved in the delivery of the basic maintenance services of the organisation.

(b) Initial safety training should cover all the topics of the training syllabus specified in GM1 145.A.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 organisation**.** The syllabus may also be adjusted to suit the particular nature of work for each function within the organisation. For example:

— small organisations that do not work in shifts may cover subjects related to teamwork and communication in less depth;

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

All personnel, including personnel being recruited from any other organisation, should receive initial safety training that is compliant with the organisation's training standards prior to commencing the actual job function, unless their competency assessment justifies that there is no need for such a training**.** New directly employed personnel who work under direct supervision may receive training within 6 months after joining the maintenance organisation.

(c) The purpose of recurrent safety training is primarily to ensure that staff remains current in terms of SMS principles and human factors, and also to collect feedback on safety and human factors issues**.** Consideration should be given to involving the compliance monitoring staff and the key safety management personnel in this training. There should be a procedure to ensure that feedback is formally reported by the trainers through the internal reporting scheme to initiate action where necessary.

Recurrent safety training should be delivered either as a dedicated course or integrated within other training. It should be of an appropriate duration in each 2-year period in relation to the relevant compliance monitoring audit findings and other internal/external sources of information available to the organisation on safety and human factors maintenance issues.

(d) Safety training should be delivered by a competent trainer, and may be conducted by the maintenance organisation itself, independent trainers, or any training organisations acceptable to the CAAT.

(e) The safety training procedures should be specified in the MOE.

AMC3 145.A.30(e) Personnel requirements

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

Guidance for the training of maintenance organisation personnel is provided in Appendix I to AMC3 145.A.30(e).

AMC4 145.A.30(e) Personnel requirements

Competency assessments should check whether there is a need for additional EWIS training, if this is relevant.

Guidance on EWIS training programmes for maintenance organisation personnel is published in CAAT advisory circular CAAT-AIR-GM-17-EWIS training programme.

AMC5 145.A.30(e) Personnel requirements

INITIAL AND RECURRENT TRAINING

(a) Adequate initial and recurrent training should be provided and recorded to ensure that staff remain competent.

(b) All prospective maintenance staff should be assessed for their competency related to their intended duties (see the definition of competency in GM1 to TCAR 8 Part 145.

(c) The organisation should develop a procedure that describes the process for conducting competency assessments of personnel. The procedure should specify:

1. the persons who are responsible for this process;
2. when the assessments should take place;
3. how to give credit from previous assessments;
4. how to validate qualification records;
5. the means and methods to be used for the initial assessment;
6. the means and methods to be used for the continuous control of competency, including to gather feedback on the performance of personnel;
7. the aspects of competencies to be observed during the assessment in relation to each job function;
8. the actions to be taken if the assessment is not satisfactory; and
9. how to record the assessment results.

(d) Competency may be assessed by having the person work under the supervision of another qualified person for a sufficient time to arrive at a conclusion. Sufficient time could be as little as a few weeks if the person is fully exposed to relevant work. The person need not be assessed against the complete spectrum of their intended duties. If the person has been recruited from another approved maintenance organisation, it is reasonable to accept a written confirmation from the previous organisation.

GM1 145.A.30(e) Personnel requirements

TRAINING SYLLABUS FOR INITIAL SAFETY TRAINING

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

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

Some of the topics may be covered in separate training courses (e.g. health and safety, management, supervisory skills, etc.) in which case duplication of the 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 where possible; too much unrelated theory should be avoided.

1. General/Introduction to safety management and human factors
    1.1. Need to address safety management and human factors
    1.2. Statistics
    1.3. Incidents

1a. Safety risk management
    1a.1. Hazard identification
    1a.2. Safety risk assessment
    1a.3. Risk mitigation and management
    1a.4. Effectiveness of safety risk management

2. Safety Culture/Organisational factors
    2.1. Just culture
    2.2. Reporting culture
    2.3. Informed culture
    2.4. Flexible culture/learning culture

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 and fatigue risk management

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. Other 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. Avoiding error-provoking behaviour

9.3. Assertiveness

10. Organisation safety programme

10.1. Safety policy and objectives, just culture principles

10.2. Reporting errors and hazards, internal safety reporting scheme

10.3. Occurrence investigation process

10.4. Action to address problems

10.5. Feedback and safety promotion

GM2 145.A.30(e) Personnel requirements

COMPETENCY ASSESSMENT

An example of elements that may be considered during a competency assessment according to the job functions and the scope, size and complexity of the organisation, is given in the following table (not exhaustive):

	Managers	Planners	Supervisor	Certifying staff and support staff	Mechanics	Specialised service staff	Compliance monitoring staff	Safety management and key SM
Knowledge of applicable officially recognised standards						X	X	X
Knowledge of auditing techniques: planning, conducting and reporting							X	X
Knowledge of safety management, human factors, human performance and limitations, and just culture	X	X	X	X	X	X	X	X
Knowledge of logistics processes	X	X	X					
Knowledge of organisation capabilities, privileges and limitations	X	X	X	X		X	X	X
Knowledge of TCAR 8 Part 145 and any other relevant regulations	X	X	X	X			X	X
Knowledge of relevant parts of the maintenance organisation exposition and procedures	X	X	X	X	X	X	X	X
Knowledge of occurrence reporting (mandatory and voluntary), internal reporting scheme and understanding of the importance of reporting occurrences, incorrect maintenance data and existing or potential defects		X	X	X	X	X		X
Knowledge of safety risks linked to the working environment	X	X	X	X	X	X	X	X
Knowledge of CDCCL when relevant	X	X	X	X	X	X	X	
Knowledge of 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	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 tasks		X	X	X	X		X	X
Ability to compile and control completed work cards		X	X	X				
Ability to consider human performance and limitations	X	X	X	X			X	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	X
Ability to manage third parties involved in maintenance activity		X	X					

	Managers	Planners	Supervisor	Certifying staff and support staff	Mechanics	Specialised service staff	Compliance monitoring staff	Safety management and key SM
Ability to confirm proper accomplishment of maintenance tasks			X	X	X	X		
Ability to identify and properly plan performance of critical maintenance task		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 policy	X		X				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	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	X
Analytical and proven auditing skills (for example, objectivity, fairness, open-mindedness, determination, …)							X	X
Maintenance error investigation skills							X	X
Resources management and production planning skills	X	X	X					
Teamwork, decision-making and leadership skills	X		X				X	X

GM3 145.A.30(e) Personnel requirements

TEMPLATE FOR RECORDING EXPERIENCE/TRAINING

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

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

Approval Number Period of employment	From:		To:		
Domain of employment					
☐Planning	☐Engineering		☐Technical records		
☐Store department	☐Purchasing				
Mechanics/Technician					
☐Line Maintenance ☐Servicing ☐Scheduled Maintenance	☐Base Maintenance ☐Removal/installation ☐Inspection		☐Component Maintenance ☐Testing/inspection ☐Repair		
Troubleshooting A/C type	☐Troubleshooting ☐ Repair A/C type		☐Overhaul ☐Re-treatment ☐Reassembly Component type		
Certifying Staff and support staff					
☐Cat. A A/C Type	☐Cat. B1 A/C Type	☐Cat. B2 A/C Type	☐Cat. C A/C Type	☐Component type Component Type	☐Other (e.g. NDT) Specify
Certification privileges: Yes ☐/ No ☐					
☐Specialised services ☐Skilled personnel ☐Ground equipment operation			Speciality *(NDT, composites, welding, etc.)*: Speciality *(sheet metal, structures, wireman, upholstery, etc.)*:		
☐Supervision ☐Safety investigation	☐Compliance monitoring ☐Safety management		☐Training		
Total number of check boxes ticked:					
Details of employment					
Training received from the contracting organisation Date			Nature of training		
Certified by: Name: Position: Contact details: *Advisory note: A copy of the present credentials will be kept for at least 3 years from their issuance by the maintenance organisation.*			Date: Signature:		

GM4 145.A.30(e) Personnel requirements

SAFETY TRAINER

The competency of a trainer to conduct safety training should include:

(a) an understanding of safety management and human factors in a maintenance environment at a level

sufficient to teach the elements of the initial safety training syllabus (see GM1 145.A.30(e));

(b) a good understanding of training and facilitation techniques, and communication skills that enable the trainer to influence attitudes and behaviours;

(c) experience within the aviation industry, or a suitable academic background;

(d) knowledge of the organisation's safety programme (Module 10 of GM1 145.A.30(e)).

GM5 145.A.30(e) Personnel requirements

COMPETENCY OF THE SAFETY MANAGER

The competency of a safety manager should include, but not be limited to, the following:

(a) knowledge of ICAO standards on safety management;

(b) an understanding of management systems, including compliance monitoring systems;

(c) an understanding of risk management;

(d) an understanding of safety investigation techniques;

(e) an understanding of human factors;

(f) understanding and promotion of a positive safety culture;

(g) operational experience related to the activities of the organisation;

(h) safety management experience;

(i) interpersonal and leadership skills, and the ability to influence staff;

(j) oral and written communications skills;

(k) data management, analytical and problem-solving skills;

(l) professional integrity.

GM6 145.A.30(e) Personnel requirements

SAFETY TRAINING (INCLUDING HUMAN FACTORS)

(a) The scope of the safety training and the related training programme will vary significantly depending on the size and complexity of the organisation. Safety training should reflect the evolving management system, and the changing roles of the personnel who make it work.

(b) In recognition of this, training should be provided to management and staff at least:

1. during the initial implementation of safety management processes;
2. for all new staff or personnel recently allocated to any safety management related task;
3. on a regular basis to refresh their knowledge and to understand changes to the management system;
4. when changing roles affect their safety management roles, accountabilities, responsibilities, and authorities; and

NOTE: in the context of safety management, the term 'authority' is used in relation to the level of management in the organisation that is necessary to make decisions related to risk tolerability.

5. when performing dedicated safety functions in domains such as safety risk management, compliance monitoring, and internal investigations.

(c) Safety training is subject to the record-keeping requirements in point 145.A.55(d).

AMC1 145.A.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.A.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 European Standard 4179 (EN4179) or National Aerospace Standard 410 (NAS410) or any other equivalent standard acceptable to the CAAT dependent upon the non-destructive testing function to be carried out.
3. Notwithstanding the fact that Level 3 personnel may be qualified under EN 4179 to establish and authorise methods, techniques, etc., this does not permit such personnel to deviate from methods and techniques published by the type certificate holder/manufacturer in the form of continued airworthiness data, such as in non-destructive test manuals or service bulletins, unless the manual or service bulletin expressly permits such deviation.
4. Notwithstanding the general references in EN 4179 or any other equivalent Aerospace NDT standard controlled by a board acceptable to CAAT, all examinations should be conducted by personnel or organisations under the general control of such a board.
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. Until this agreed standard is established, such methods should be carried out in accordance with the particular equipment manufacturers' recommendations, including any training and examination process to ensure the competency of the personnel in the process.
7. Any maintenance organisation approved under TCAR 8 Part 145 that carries out NDT should establish NDT specialist qualification procedures that are detailed in the exposition and accepted by the CAAT.
8. Boroscoping and other techniques such as de-lamination coin tapping are non-destructive inspections rather than non-destructive testing. Notwithstanding such differentiation, the maintenance organisation should establish an exposition procedure that is accepted by the CAAT to ensure that personnel who carry out and interpret such inspections are properly trained and assessed for their competency in the process**.** Non-destructive inspections, which are not considered to be NDT by TCAR 8 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 organisation 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 TCAR 8 Part 145 should qualify for such non-destructive test in accordance with EN 4179 or any other equivalent standard acceptable to the CAAT.
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. EN4179 and NAS410 are considered by CAAT as officially recognized standards and are acceptable to CAAT. CAAT will publish the list of the NDT standards that are acceptable to CAAT.

AMC2 145.A.30(f) Personnel requirements

Those licensed Aircraft Maintenance engineers specified in paragraph 145.A.30 (f) who may by derogation carry out control colour contrast dye test have to hold a valid license issued according to RCAB 77 Article 8 A.1 or A.2 category and have to be specifically trained and authorized to perform control colour contrast dye test.

AMC1 145.A.30(g) Personnel requirements

The applicable regulation for CAAT aircraft maintenance engineer licensing is RCAB N° 77.

The privileges of these license holders are exposed in RCAB N°77 Article 7 and for each category in RCAB N°77 Article 8 A.1, A.2 and A.3. The only category allowed to release the aircraft is category A.1, the other categories are authorized to sign a maintenance release on the systems corresponding to their speciality.

The MOE should have a procedure on how to deal with defects requiring other specialists to assist the ones available in the line station.

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 certifying staff category available onsite.

AMC1 145.A.30(h) Personnel requirements

"Appropriate aircraft type rated certifying staff qualified in accordance with the applicable regulation to CAAT aircraft maintenance engineer licensing for aircraft base maintenance" means the organisation shall have sufficient numbers of certifying staff qualified as RCAB N° 77 Article 8.A.1 and specifically trained to manage base maintenance and related documentation, in particular, maintenance records used for base maintenance. "Sufficient aircraft type rated staff qualified to support the certifying staff" means the organisation shall have sufficient numbers of aircraft type rated staff qualified in accordance with RCAB N° 77 Article 8.A.1, A.2 and/or A.3 and authorized as support staff to support the certifying staff for aircraft base maintenance in accordance with 145.A.35.

The organisation shall maintain a register/list of certifying staff (for line and for base maintenance) and support staff.

In accordance with 145.A.30(h) and 145.A.35, the qualification requirements (basic licence, aircraft type ratings, recent experience and recurrent training) are identical for certifying staff and for support staff.

Certifying staff for base maintenance are, in addition, specifically trained to manage base maintenance and related documentation, in particular, maintenance records used for base maintenance.

The only difference is that support staff does not hold aircraft release to service privileges (on his certification authorization) when acting as support staff in base maintenance, since during base maintenance the release to service will be issued by certifying staff for aircraft base maintenance.

Nevertheless, the organisation may use as support staff (for base maintenance) persons who already hold aircraft release to service privileges (on his certification authorization) for line maintenance."

AMC1 145.A.30(j)(4) Personnel requirements

1. For the issue of a limited certification authorisation, the commander should hold either a valid airline transport pilot licence (ATPL), or a commercial pilot licence (CPL).
2. In addition, the limited certification authorisation is subject to the MOE containing procedures to address the personnel requirements of 145.A.30(e) and the associated AMC and guidance material. The procedures should be accepted by the CAAT and should include as a minimum:
   (a) Completion of adequate continuing airworthiness regulation training as related to maintenance.
   (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 that it will involve training in the use of the associated maintenance data.
   (c) Completion of the procedural training as specified in TCAR 8 Part 145.
3. Typical tasks that may be certified and/or carried out by a commander who holds an ATPL or CPL are the

minor maintenance or simple checks included in the following list:

(a) The replacement of internal lights, filaments and flash tubes.

(b) The closing of cowlings and re-fitment of quick access inspection panels.

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

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

(e) Any check/replacement that involve simple techniques that are consistent with this AMC and that have been agreed by the CAAT.

4. The validity of the authorisation should be limited to 12 months, and may be renewed if there has been satisfactory recurrent training on the applicable aircraft type.

AMC1 145.A.30(j)(5) Personnel requirements

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

2. Issuing a one-off authorisation should only be considered under the responsibility of the compliance monitoring manager of the contracted organisation after a reasoned judgment was made that such an authorisation is appropriate under the circumstances, while at the same time that it maintains the required airworthiness standards. The organisation's compliance monitoring personnel should assess each situation individually prior to issuing a one-off authorisation, and it may request the safety management personnel to perform a safety risk assessment.

3. A one-off authorisation should not be issued if 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 the required tooling and/or test equipment needed to complete the work.

AMC1 145.A.30(j)5(i) Personnel requirements

If a one-off authorisation to issue a CRS for a task on an aircraft type for which certifying staff does not hold a type-rated authorisation is necessary, the following procedure is recommended:

1. The flight crew should communicate full details of the defect to the maintenance organisation. If necessary, the maintenance organisation will then request the use of a one-off authorisation from the compliance monitoring personnel.

2. When issuing a one-off authorisation, the compliance monitoring personnel should verify that:

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

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

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

(d) The person holds authorisations of equivalent levels and scopes on other aircraft types that have similar technology, construction and systems.

3. The holder of the one-off authorisation 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 TCAR 8 Part 145 maintenance facility.

AMC1 145.A.30(j)5(ii) Personnel requirements

This paragraph addresses the requirements for staff who are not employed by the maintenance organisation, but who meet the requirements of 145.A.30(j)5. In addition to the items listed in AMC 145.A.30(j)5(i), paragraph 1, 2(a), (b) and (c) and 3, the compliance monitoring personnel of the organisation may issue such a one-off authorisation provided that full details related to the qualifications of the proposed certifying personnel are verified by the compliance monitoring personnel and made available at the location.

AMC1 145.A.35(a) Certifying staff and support staff

1. Holding a licence qualified in accordance with the regulation applicable to CAAT aircraft maintenance engineer licence in Thailand with the relevant type/group rating, or a national qualification in the case of components, does not mean by itself that the holder is qualified to be authorised as certifying staff and/or support staff. The organisation is responsible for assessing the competency of the holder for the scope of the maintenance to be authorised.
2. The sentence 'the organisation shall ensure that certifying staff and support staff have an adequate understanding of the relevant aircraft and/or components to be maintained together with the associated organisation procedures' means that the person has received training and has been successfully assessed on:
   - the type of aircraft or component;
   - the differences on:
     - the particular model/variant;
     - the particular configuration.

   The organisation 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 organisation 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 specialised maintenance required by the maintenance programme.

   For engine run-up training, simulators and/or real aircraft should be used.
4. The assessment of the competency of the holder should be conducted in accordance with a procedure approved by the CAAT (item 3.4 of the MOE, as described in AMC1 145.A.70(a)).

5. The organisation should hold copies of all the documents that attest the competency and recent experience of the holder for the period described in 145.A.55(d)4.

AMC1 145.A.35(b) Certifying staff and support staff

The organisation issues the certification authorisation when satisfied that compliance has been established with the appropriate paragraphs of TCAR 8 Part 145, RCAB No.77 and the regulation applicable to CAAT aircraft maintenance engineer licence in Thailand. In granting the certification authorisation, the maintenance organisation approved under TCAR 8 Part 145 needs to be satisfied that the person holds a valid aircraft maintenance licence and may need to confirm such fact with the CAAT.

AMC1 145.A.35(c) Certifying staff and support staff

The 6 months maintenance experience in 2 years should be understood as consisting of two elements, duration and nature of the experience. The minimum to meet the requirements for these elements may vary depending on the size and complexity of the aircraft and type of operation and maintenance.

1. Duration:

   — 6 months continuous employment within the same organisation; or

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

   The 6 months period can be replaced by 100 working days of maintenance experience in accordance with the privileges. The working days should be spread over the intended 6 months period to avoid a too long interval without activity.

2. Nature of the experience:

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

   — Servicing;

   — Inspection;

   — Operational and functional testing;

   — Trouble-shooting;

   — Repairing;

   — Modifying;

   — Removal/Installation of components;

   — Supervising these activities;

   — Releasing aircraft to service.

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

   — Propulsion systems (piston, turboprop, turbofan, turbo-shaft, jet-engine or push propellers); and

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

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

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

   A maximum of 20% of the experience duration required may be replaced by the following relevant

activities on an aircraft type of similar technology, construction and with comparable systems:

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

— Maintenance technical support/engineering;

— Maintenance management/planning.

The experience should be documented in an individual log book or in any other recording system (which may be an automated one) containing the following data:

— Date;

— Aircraft type;

— Aircraft identification i.e. registration;

— ATA chapter (optional);

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

— Type of maintenance i.e. base, line;

— Type of activity i.e. perform, supervise, release;

— Licence Category

— Duration in days or partial-days.

AMC1 145.A.35(d) Certifying staff and support staff

1. Recurrent training is a two-way process to ensure that certifying staff remain current in terms of the necessary procedures, safety management, human factors and technical knowledge, and that the organisation receives feedback on the adequacy of its procedures and maintenance instructions. Due to the interactive nature of this training, consideration should be given to involving the compliance monitoring staff and the key management personnel in this training. There should be a procedure to ensure that feedback is formally reported by the trainers through the internal safety reporting scheme to initiate action.

2. Recurrent training should cover any changes made to the relevant requirements such as TCAR 8 Part 145, to the organisation procedures, safety policy and objectives, or to the modification standard of the products being maintained, as well as any human factors and safety issues identified from any internal or external analysis of incidents. It should also address any instances in which staff failed to follow the procedures, and the reasons why particular procedures were not always followed. In many cases, the recurrent training will reinforce the need to follow the procedures and will ensure that any incomplete or incorrect procedures are identified to the company so that they can be corrected**.** It may be necessary to carry out an audit of these procedures.

3. Recurrent training should be of sufficient duration in each 2-year period to meet the intent of 145.A.35(d) and may be split into a number of separate elements. Point 145.A.35(d) requires such a training to keep certifying staff up-to-date in terms of relevant technology, procedures, safety management and human factors issues, which means it is one part of ensuring compliance. Therefore, sufficient duration should be related to relevant audit findings and other internal/external sources of information available to the organisation on human errors and safety issues in maintenance. This means that in the case of an organisation that maintains aircraft with few relevant audit findings, recurrent training could be limited to days rather than weeks, whereas in the case of a similar organisation with a number of relevant audit findings, such a training may take several weeks. For an organisation that maintains aircraft components, the duration of recurrent 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 recurrent training, whereas those who

release turbine engines may only require a few days of such a training. The content of recurrent training should be related to relevant audit findings, hazards and related safety risks identified. It is recommended that such a training is reviewed at least once in every 24-month period.

4. The method of training is intended to be a flexible process, and this training, for example, be provided by an aeronautical college, by the TCAR 8 Part 145 organisation, or by another training or maintenance organisation. The elements, general content and length of such a training should be specified in the maintenance organisation exposition.

AMC1 145.A.35(e) Certifying staff and support staff

The programme for recurrent training should include a procedure to ensure compliance with the regulation applicable to CAAT aircraft maintenance engineer licence in Thailand.

The programme for recurrent training should list all certifying staff and support staff and when the training will take place, the elements of such a training, and an indication that it was carried out on time as planned. Such information should subsequently be transferred to the certifying staff and to the support staff records as required by 145.A.55(d)3.

AMC1 145.A.35(f) Certifying staff and support staff

As stated in 145.A.35(f), except where any of the unforeseen cases of 145.A.30(j)5 applies, all prospective certifying staff and support staff should be assessed for their competency related to their intended duties in accordance with AMCs 1, 2, 3, 4 and 5 to 145.A.30(e), as applicable.

AMC1 145.A.40(a) Equipment and tools

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

AMC1 145.A.40(b) Equipment and tools

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

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

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

AMC1 145.A.42(a)1 Components

1. An equivalent to CAAT Form 1 may be**:**

   (a) An authorised release certificate issued by an organisation under the terms of a bilateral agreement signed by the CAAT;

(b) For used parts, an authorised release certificate issued by an organisation approved by a competent authority acceptable to the CAAT according to standards that are not lower than TCAR 8 Part-145. The list of competent authorities that are acceptable to CAAT as well as the list of standards that are not lower than TCAR 8 Part 145 is published by CAAT.

(c) For new parts, one of the following authorised release certificate EASA Form 1, FAA Form 8130-3, TCCA Form 1, TCCA 24-0078, ANAC Form F-100-01 or ANAC form SEGVÔO 003 issued in accordance with applicable production standards and certifying that the parts have been manufactured in conformity to approved design data and are in a condition for safe operation.

(d) For new PMA Parts (Parts designed and manufactured in the United States of America under the Parts Manufacturer Approval), a FAA Form 8130-3 will be considered as equivalent only if it is a non-critical component. The mention that the part is a non-critical component shall be contained in "Remarks" block of the authorised release certificate

2. For a foreign maintenance organisation:

For a foreign maintenance organisation certified using simplified procedure as per 145.A.5 (a) the CAAT Form 1 issued will be acceptable only when accompanied by the "original" authorised release certificate issued according to the Repair station certificate that enabled to use the simplified certification procedure. Such CAAT Form 1 shall contain in block "Remarks" the date and reference of the "original" authorised release certificate.

GM1 145.A.42(a)2 Components

UNSERVICEABLE COMPONENTS

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

(b) Unserviceable components should typically undergo maintenance due to:

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

(ii) non-compliance with the applicable airworthiness directives and other continuing airworthiness requirements mandated by the CAAT;

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

(iv) evidence of defects or malfunctions; or

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

AMC1 145.A.42(a)3 Components

UNSALVAGEABLE COMPONENTS

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

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

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

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

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

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

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

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

AMC1 145.A.42(a)4 Components

STANDARD PARTS

(a) Standard parts are parts manufactured in complete compliance with an established industry, competent authority or other government specification which includes design, manufacturing, test and acceptance criteria, and uniform identification requirements. The specification should include all information necessary to produce and verify conformity of the part. It should be published so that any party may manufacture the part. Examples of specifications are National Aerospace Standards (NAS), Army-Navy Aeronautical Standard (AN), Society of Automotive Engineers (SAE), SAE Sematec, Joint Electron Device Engineering Council, Joint Electron Tube Engineering Council, and American National Standards Institute (ANSI), EN Specifications etc…

(b) To designate a part as a standard part, the TC holder may issue a standard parts manual accepted by the competent authority of the original TC holder or may make reference in the parts catalogue to the specification to be met by the standard part.

(c) Documentation that accompanies standard parts should clearly relate to the particular parts and contain a conformity statement plus both the manufacturing and supplier source**.** Some materials are subject to special conditions, such as storage conditions or life limitation etc**.,** and this should be included on the documentation and/or the material packaging**.**

(d) A CAAT Form 1 or equivalent is not normally issued, and, therefore, none should be expected.

AMC2 145.A.42(a)4

STANDARD PARTS

For sailplanes and powered sailplanes, non-required instruments and/or equipment means those instruments or equipment, when installed, functioning, functioning improperly or not functioning at all, do not in themselves, or by their effect upon the sailplane and its operation, constitute a safety hazard.

'Required' in the term 'non-required', as used above, means required by the applicable airworthiness standard or required by the relevant regulations for air operations and the applicable Rules of the Air or as required by air traffic management (e.g. a transponder in certain controlled airspace). Examples of non-required equipment which can be considered to be standard parts may be electrical variometers, bank/slip indicators ball-type, total energy probes, capacity bottles for variometers, final glide calculators, navigation computers, data logger/barograph/turnpoint camera, bug-wipers and anti-collision systems. Equipment which must be approved in accordance with the airworthiness code shall comply with the applicable TSO or equivalent and it is not considered to be a standard part (e.g. oxygen equipment).

AMC1 145.A.42(a)5 Components

MATERIAL

(a) Consumable material is any material which is only used once, such as lubricants, cements, compounds, paints, chemicals dyes and sealants, etc.

(b) Raw material is any material that requires further work to make it into a component part of the aircraft

such as metals, plastics, wood, fabric, etc.

(c) Materials, both raw and consumable, should only be accepted when satisfied that it is to the required specification. To be satisfied, the material and or its packaging should be marked with the specification and, where appropriate, the batch number.

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

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

AMC1 145.A.42(b)1 Components

ACCEPTANCE OF COMPONENTS FOR INSTALLATION

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

1. physical inspection of the components, standard parts and materials;
2. review of the accompanying documentation and data, which should be acceptable in accordance with 145.A.42(a).

(b) For the acceptance of components, standard parts and materials from suppliers, the above procedures should include supplier evaluation procedures.

GM1 145.A.42(b)1 Components

INCOMING PHYSICAL INSPECTION

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

(b) The incoming physical inspection should be performed before the component is installed on the aircraft.

(c) The following list, although not exhaustive, contains typical checks to be performed:

1. verify the general condition of the components and their packaging in relation to damages that could affect their integrity;
2. verify that the shelf life of the component has not expired;
3. verify that items are received in the appropriate package in respect of the type of the component: e.g. correct ATA 300 or electrostatic sensitive devices packaging, when necessary;
4. verify that the component has all plugs and caps appropriately installed to prevent damage or internal contamination. Care should be taken when tape is used to cover electrical connections or fluid fittings/openings because adhesive residues can insulate electrical connections and contaminate hydraulic or fuel units.

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

GM2 145.A.42(b)1 Components

EXAMPLES OF SUPPLIERS

A supplier could be any source that provides components, standard parts or materials to be used for maintenance. Possible sources could be: maintenance organisations, production organisations, operators, stockist, distributors, brokers, aircraft owners/lessees, etc.

GM3 145.A.42(b)1 Components

SUPPLIER EVALUATION

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

1. availability of appropriate up-to-date regulations, specifications (such as component handling/storage data) and standards;
2. standards and procedures for the training of personnel and competency assessment;
3. procedures for shelf-life control;
4. procedures for handling of electrostatic sensitive devices;
5. procedures for identifying the source from which components and materials were received;
6. purchasing procedures that identify documentation to accompany components and materials for subsequent use by approved TCAR 8 Part 145 maintenance organisations;
7. procedures for incoming inspection of components and materials;
8. procedures for control of measuring equipment that provide for appropriate storage, usage, and for calibration when such equipment is required;
9. procedures to ensure appropriate storage conditions for components and materials that are adequate to protect the components and materials from damage and/or deterioration. Such procedures should comply with the manufacturers' recommendations and relevant standards;
10. procedures for adequate packing and shipping of components and materials to protect them from damage and deterioration, including procedures for proper shipping of dangerous goods (e.g. ICAO and ATA specifications);
11. procedures for detecting and reporting of suspected unapproved components;
12. procedures for handling unsalvageable components in accordance with applicable regulations and standards;
13. procedures for batch splitting or redistribution of lots and handling of the related documents;
14. procedures for notifying purchasers of any components that have been shipped and have later been identified as not conforming to the applicable technical data or standard;
15. procedures for recall control to ensure that components and materials shipped can be traced and recalled if necessary;
16. procedures for monitoring the effectiveness of the quality system.

(b) Suppliers which are certified to officially recognised standards that have a quality system that includes the elements specified in (a) may be acceptable; such standards include:

1. EN/AS9120 and listed in the OASIS database;
2. ASA-100;
3. EASO 2012;

4. FAA AC 00-56.

(c) The use of such suppliers does not exempt the organisation from its obligations under 145.A.42 to ensure that supplied components and materials are in satisfactory condition and meet the applicable criteria of 145.A.42.

(d) Supplier evaluation may depend on different factors, such as the type of component, whether or not the supplier is the manufacturer of the component, the TC holder or a maintenance organisation, or even specific circumstances such as aircraft on ground. This evaluation may be limited to a questionnaire from the TCAR 8 Part 145 organisation to its suppliers, a desktop evaluation of the supplier's procedures or an on-site audit, if deemed necessary.

GM1 145.A.42(b)2 Components

INSTALLATION OF COMPONENTS

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

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

AMC1 145.A.42(b)3 Components

FABRICATION OF PARTS FOR INSTALLATION

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

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

(c) All necessary data to fabricate the part should be approved either by the CAAT or the type certificate (TC) holder, or acceptable design organisation approval holder, or supplemental type certificate (STC) holder.

(d) Items that are fabricated by an organisation approved under TCAR 8 Part 145 may only be used by that organisation in the course of overhaul, maintenance, modifications, or repair of aircraft or components undergoing work within its own facilities. The permission to fabricate does not constitute approval for manufacture, or to supply externally, and the parts do not qualify for CAAT Form 1 certification. This prohibition also applies to the bulk transfer of surplus inventory, in that locally fabricated parts are physically segregated and excluded from any delivery certification.

(e) Fabrication of parts, modification kits etc., for onward supply and/or sale may not be conducted by an organisation that is approved under TCAR 8 Part 145.

(f) The data specified in paragraph (c) may include repair procedures that involve the fabrication of parts. Where the data on such parts is sufficient to facilitate fabrication, the parts may be fabricated by an organisation that is approved under TCAR 8 Part 145. Care should be taken to ensure that the data include details of part numbering, dimensions, materials, processes, and any special manufacturing techniques, special raw material specification and/or incoming inspection requirement, and that the approved organisation has the necessary capability to fabricate those parts. That capability should be

defined by way of exposition content**.** Where special processes or inspection procedures are defined in the approved data which are not available at the organisation, the organisation cannot fabricate the part unless the TC/STC holder gives an approved alternative.

(g) Examples of fabrication under the scope of a TCAR 8 Part 145 approval may include but are not limited to the following:

1. Fabrication of bushes, sleeves and shims;
2. Fabrication of secondary structural elements and skin panels;
3. Fabrication of control cables;
4. Fabrication of flexible and rigid pipes;
5. Fabrication of electrical cable looms and assemblies;
6. Formed or machined sheet metal panels for repairs.

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

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 the CAAT.

(h) Where a TC holder or an approved production organisation is prepared to make available complete data which is not referred to in the aircraft manuals or service bulletins but provides manufacturing drawings for items specified in parts lists, the fabrication of these items is not considered to be within the scope of an approval unless agreed otherwise by the CAAT in accordance with a procedure specified in the exposition.

(i) Inspection and Identification.

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

AMC1 145.A.42(c) Components

SEGREGATION OF COMPONENTS

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

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

(c) In the case of unsalvageable components, the organisation should:

1. retain such component in the secure location referred to in paragraph (b);

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

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

GM1 145.A.42(c)1 Components

MUTILATION OF COMPONENTS

(a) Mutilation should be accomplished in such a manner that the components become permanently unusable for their originally intended use. Mutilated components should not be able to be reworked or camouflaged to provide the appearance of being serviceable, such as by replating, shortening and rethreading long bolts, welding, straightening, machining, cleaning, polishing, or repainting.

(b) Mutilation may be accomplished by one or a combination of the following procedures:

1. grinding;
2. burning;
3. removal of a major lug or other integral feature;
4. permanent distortion of parts;
5. cutting a hole with cutting torch or saw;
6. melting;
7. sawing into many small pieces; and
8. any other method accepted by the CAAT.

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

1. stamping or vibro-etching;
2. spraying with paint;
3. small distortions, incisions, or hammer marks;
4. identification by tags or markings;
5. drilling small holes; and
6. sawing in two pieces only.

AMC1 145.A.45(b) Maintenance data

1. Except as specified in sub-paragraph 5, each maintenance organisation approved under TCAR 8 Part 145 should hold and use the following minimum maintenance data relevant to the organisation‘s approval class rating. All maintenance related rules and associated AMCs, approval specifications and Guidance Material, all applicable national maintenance requirements and notices which have not been superseded by any requirement, procedure or directive and all applicable airworthiness directives plus any non-national airworthiness directive supplied by a contracted non-Thai operator or customer as well as Critical Design Configuration Control Limitations.

2. In addition to sub-paragraph 1, an organisation 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 programme, 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 datasheet and any other specific document issued by the type certificate or supplementary type certificate holder as maintenance data.

3. In addition to sub-paragraph 1, an organisation 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 organisation 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 organisation only approved in class rating category D – Specialised services, should hold and use all applicable specialised service(s) process specifications.

AMC1 145.A.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 as part of the internal safety reporting scheme specified in point 145.A.202. The procedure should then ensure that the TCAR 8 Part 145 approved maintenance organisation notifies the problem to the author of the maintenance data in a timely manner. A record of such communications to the author of the maintenance data should be retained by the TCAR 8 Part 145 approved organisation until such time as the type certificate holder has clarified the issue by, for instance, amending the maintenance data.

2. The referenced procedure should be specified in the maintenance organisation exposition (MOE).

AMC1 145.A.45(d) Maintenance data

The referenced procedure should address the need for a practical demonstration by the mechanic to the compliance monitoring personnel of the proposed modified maintenance instruction. Depending on the nature of the maintenance instruction modification, the safety management personnel may be required to perform a safety risk assessment. When satisfied, the compliance monitoring 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 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 holder's original intent can be carried out in a more practical or more efficient manner.

(b) Where the type certificate/supplementary type certificate holder's 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 by the CAAT.

AMC1 145.A.45(e) Maintenance data

1. The maintenance organisation should:
   - Accurately transcribe the maintenance data onto work cards or worksheets, or
   - make precise reference to the particular maintenance task**(**s**)** contained in the maintenance data, which already identifies the task as a CDCCL where applicable.
2. Relevant parts of the organisation means, with regard to aircraft base maintenance, aircraft line maintenance, engine workshops, mechanical workshops and avionic workshops. Therefore, engine workshops, for example, should have a common system throughout the engine workshops that may be different from that in the aircraft base maintenance.
3. The work cards should differentiate and specify, when relevant, disassembly, the accomplishment of tasks, 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. Where required by the operator to use their work card or worksheet system, the maintenance organisation should assess the system for compliance with the maintenance organisation procedures, for example, the subdivision of complex maintenance tasks into clear stages.

AMC1 145.A.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 programme to enable easy access, unless the computer system can produce paper copies. Where microfilm or microfiche readers/printers are used, a similar requirement is applicable.

AMC1 145.A.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 limitation and Airworthiness Limitation Items (ALI), etc.

AMC1 145.A.47(a) Production planning

1. Depending on the amount and complexity of work generally performed by the maintenance organisation, the planning system may range from a very simple procedure to a complex organisational set-up including a dedicated planning function in support of the production function.
2. For the purpose of TCAR 8 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, organising 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.

AMC1 145.A.47(b) Production planning

FATIGUE RISK MANAGEMENT

(a) Human performance can be affected by excessive hours of duty and shift working, particularly with multiple shift periods, additional overtime or night work. Induced fatigue is one of the factors that contributes towards maintenance errors. In accordance with point 145.A.200(a)(3), these risks should be assessed and managed by the organisation, taking into account the size, nature, and complexity of the organisation and its operational working hours.

(b) In order to manage the risk related to the fatigue of personnel, the organisation should:

1. as part of its management system, develop, define and maintain a policy for the management of fatigue-related risks, and the related procedures;
2. define and use work schedules with maximum work and minimum rest hours that comply with the national legislation on working time and taking into account the recommendations of Appendix H to Chapter 3 of ICAO Doc 9824;
3. ensure that existing internal reporting systems enable the identification of fatigue-related hazards;
4. assess and manage the risks raised by these reports in accordance with the organisation's safety risk management procedures (see AMC1 145.A.200(a)3), and monitor the effectiveness of the related risk mitigation actions that are implemented;
5. provide training and safety promotion information/briefings on the management of fatigue.

(b) The work hour limits defined under (b)2 should not be exceeded merely for management convenience even when staff is willing to work extended hours. Without prejudice to the national legislation on working time, in exceptional circumstances where the maximum work hours are to be exceeded (such as for urgent operational reasons), the organisation should carry out a risk assessment, and with the agreement of the individual staff member, it should be recorded how the increased fatigue risk will be mitigated. This may include:

1. additional supervision and independent inspection;
2. limitation of maintenance tasks to non-critical tasks;
3. use of additional rest breaks;
4. permission to nap in accordance with guidelines approved by the organisation.

GM1 145.A.47(b) Production planning

HUMAN PERFORMANCE AND FATIGUE (see definitions in GM1 to TCAR 8 Part 145)

(a) 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.

(b) With regard to fatigue, there are three primary factors that are relevant:

1. the amount of proper sleep;
2. the amount of time awake;
3. the time of day where work is performed.

(c) Fatigue is also impacted by high workloads (mental and/or physical activity) and by the physical and mental health of the staff concerned.

AMC1 145.A.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 formalised process for exchanging information between outgoing and incoming persons and a planned shift overlap and a place for such exchanges to take place

GM1 145.A.47(d) Production planning

‘External working team’ refers to an organisation that does not belong to the Part-145 organisation in whose facility the maintenance is being carrying out, and which is, for example (this list is not exhaustive):

— contracted by the TCAR 8 Part 145 maintenance organisation; or

— subcontracted by the TCAR 8 Part 145 maintenance organisation; or

— contracted by the aircraft owner.

The objective of this requirement is to manage the risk involved in the actual execution of maintenance by the various organisations at the same location.

Example: the need for one organisation to be informed that they should not put the aircraft in a certain configuration (regarding electrical power, hydraulic power, the flight control configuration, the aeroplane on jacks, etc.) if this is could adversely affect the work performed by another organisation.

Note: refer to the difference between contracting and subcontracting maintenance activities in GM2 145.A.205.

GM1 145.A.48 Performance of maintenance

AUTHORISED PERSON

An ‘authorised person’ is a person formally authorised by the maintenance organisation to perform or supervise a maintenance task. An ‘authorised person’ is not necessarily ‘certifying staff’.

SIGN-OFF

A ‘sign-off’ is a statement issued by the ‘authorised 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.A.48(a) Performance of maintenance

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

AMC1 145.A.48(c)2 Performance of maintenance

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

AMC2 145.A.48(c)2 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 the installation, rigging and adjustments of flight controls;
2. tasks that may affect the aircraft stability control systems (autopilots, fuel transfer);
3. tasks that may affect the propulsive force of the aircraft, including the installation of aircraft engines, propellers and rotors; and
4. the 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. the investigation and follow-up of incidents;
4. occurrence reporting;
5. flight data analysis, where this is available from the operator;
6. the results of audits;
7. monitoring schemes for normal operations, where these are available from the operator;
8. feedback from training.

AMC3 145.A.48(c)2 Performance of maintenance

ERROR-CAPTURING METHODS

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

(b) The organisation should ensure that the error-capturing methods are adequate for the work and the disturbance of the aircraft system. A combination of several actions (e.g. visual inspections, operational checks, functional tests, rigging checks) may be necessary in some cases.

AMC4 145.A.48(c)2 Performance of maintenance

INDEPENDENT INSPECTION

Independent inspection is one possible error-capturing method.

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

1. the 'authorised person' is the person who performs the task or supervises the task and they assume the full responsibility for the completion of the task in accordance with the applicable maintenance data;
2. the 'independent qualified person' is the person who performs the independent inspection and attests to 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 'authorised 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 organisation should record the identification of both persons and the details of the independent inspection as necessary before the certificate of release to service or the sign-off for the completion of the task is issued.

(b) Qualifications of persons performing independent inspections

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

1. staff who hold a certifying staff, support staff, sign-off authorisation or equivalent that is necessary to release or sign off the critical maintenance task;
2. staff who hold a certifying staff, support staff, sign-off authorisation or equivalent that is necessary to release or sign off similar tasks in a product of a similar category, and who have received specific practical training in the task to be inspected; or
3. a commander who holds a limited certification authorisation in accordance with 145.A.30(j)4, and has received adequate practical training, and has enough experience in the specific task to be inspected, and on how to perform independent inspections.

(c) How to perform an independent inspection.

An independent inspection should ensure the correct assembly, locking and sense of operation of the parts involved. 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 their 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 operate 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, its version, and its compatibility with the aircraft configuration.

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

REINSPECTION

1. Reinspection is an error-capturing method that is subject to the same conditions as an independent inspection, except that the 'authorised person' who performs the maintenance task also acts as 'independent qualified person', and performs the inspection.
2. Reinspection, as an error-capturing method, should only be performed in unforeseen circumstances when only one person is available to carry out the task and perform the independent inspection. The circumstances cannot be considered to be unforeseen if the person or organisation 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 'authorised person' and the reinspection has been carried out satisfactorily. The work card system used by the organisation should record the identification and the details of the reinspection before the certificate of release to service for the task is issued.

AMC1 145.A.48(c)3 Performance of Maintenance

The procedures should be aimed at**:**

(a) minimising multiple errors and preventing omissions. Therefore, the procedures should specify:
   1. that every maintenance task is signed off only after completion;
   2. how the grouping of tasks for the purpose of sign-off allows critical steps to be clearly identified; and
   3. that work performed by personnel under supervision (i.e. temporary staff, trainees) is checked and signed off by an authorised person;

(b) minimising the possibility of an error being repeated in identical tasks and, therefore, compromising more than one system or function. Thus, the procedures should ensure that no person is required to perform a maintenance task involving removal/installation or assembly/disassembly of several components of the same type fitted to more than one system, a failure of which could have an impact on safety, on the same aircraft or component during a particular maintenance check. However, in unforeseen circumstances when only one person is available, the organisation may make use of reinspection as described in point (d) of AMC4 145.A.48(c)2.

GM1 145.A.48(c)3 Performance of maintenance

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

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

— independent inspection or re-inspection procedures.

GM1 145.A.48(c)4 Performance of maintenance - critical design configuration control limitations (CDCCL)

The organisation should ensure that when performing maintenance, the CDCCL are not compromised. The organisation should pay particular attention to possible adverse effects of any change to the wiring of the aircraft, even of a change not specifically associated with the fuel tank system. For example, it should be common practice to identify the segregation of fuel gauging system wiring as a CDCCL. The organisation can prevent adverse effects associated with changes to the wiring by standardising maintenance practices through training, and not through periodic inspections. Training should be provided to avoid indiscriminate routing and splicing of wires and to provide comprehensive knowledge of critical design features of fuel tank systems that would be controlled by a CDCCL. Guidance on the training of maintenance organisation personnel is provided in Appendix I to AMC3 145.A.30(e).

GM1 145.A.50(a) Certification of maintenance

'Endangers 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 that is overdue for compliance is also considered to be a hazard to flight safety.

However, the intent is not to require the maintenance organisation to find or become responsible for hidden non-compliances which are not expected to be discovered during the ordered maintenance.

A certificate of release to service issued by a maintenance organisation certifies that the performed maintenance work has been completed in accordance with the applicable regulations and the maintenance organisation's approved procedures. In the case of aircraft maintenance, it does not necessarily mean that the aircraft is in airworthy condition. Ensuring that the aircraft is airworthy before each flight always remains the responsibility of the owner/operator.

AMC1 145.A.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 TCAR 8 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 the TCAR 8 Part 145 approval number and the identity of the person who issued the release.

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 summarise the maintenance as long as there is a unique cross reference to the work package containing full details of maintenance carried out. Dimensional information should be retained in the work-pack record.

AMC1 145.A.50(d) Certification of maintenance

The purpose of the certificate CAAT Form 1 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 the CAAT, 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 organisation to users.

It can only be issued by organisations approved by the CAAT and within the scope of the approval.

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

A certificate should not be issued for any item when it is known that the item is unserviceable, except in the case of an item undergoing a series of maintenance processes at several maintenance organisations, approved under TCAR 8 Part 145, and the item needs a certificate for the previous maintenance process

carried out for the next maintenance organisation, approved under TCAR 8 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.A.50(d) Certification of maintenance

1. A component which has been maintained off the aircraft needs the issue 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. This requirement also applies to engine completely restored and engine modules.

   When an organisation maintains a component for use by the same organisation, a CAAT Form 1 may not be necessary depending upon the organisation's internal release procedures defined in the maintenance organisation exposition.

2. In the case of the issue of CAAT Form 1 for components in storage before TCAR 8 Part 145 became effective, and not released on a CAAT Form 1 or equivalent in accordance with 145.A.42(a), or removed serviceable from a serviceable aircraft, or an aircraft which has been withdrawn from service, the following applies:

   2.1. A CAAT Form 1 may be issued for an aircraft component which has been:

   — Maintained before TCAR 8 Part 145 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 organisation.

   2.2. An appropriately rated maintenance organisation approved under TCAR 8 Part 145 may issue a CAAT Form 1 as detailed in this AMC subparagraph 2.5 to 2.9, as appropriate, in accordance with procedures detailed in the exposition as approved by the CAAT. The appropriately rated organisation is responsible for ensuring that all reasonable measures have been taken to ensure that only approved and serviceable aircraft components are issued a CAAT Form 1 under this paragraph.

   2.3. For the purposes of this AMC2 only, 'appropriately rated' means an organisation with an approval class rating for the type of component or for the product in which it may be installed.

   2.4. A CAAT Form 1 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: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 CAAT Form 1.

2.5 New/unused aircraft components

2.5.1 Any unused aircraft component in storage without a CAAT Form 1 up to the effective date(s) for TCAR 8 Part 145 that was manufactured by an organisation acceptable to the CAAT at that time may be issued with a CAAT Form 1 by an appropriately rated maintenance organisation approved under TCAR 8 Part 145. The CAAT Form 1 should be issued in accordance with the following subparagraphs which should be included in a procedure within the maintenance organisation exposition.

NOTE: It should be understood that the release of a stored but unused aircraft component in accordance with this paragraph represents a maintenance release under TCAR 8 Part 145.

(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 in subparagraph 2.5.1(a) to (c) inclusive, the aircraft specified component should be disassembled by an appropriately rated organisation, 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, lubricant and life-limited parts should be replaced. Upon satisfactory completion after reassembly, a CAAT Form 1 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 Thailand registered aircraft may be issued with a CAAT Form 1 by an appropriately rated organisation subject to compliance with this subparagraph.

(a) The organisation 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 CAAT Form 1 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 CAAT Form 1 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 foreign registered aircraft may only be issued with a CAAT Form 1 if the components are leased or loaned from the maintenance organisation approved under TCAR 8 Part 145 who retains control of the airworthiness status of the components. A CAAT Form 1 may be issued and should contain the information as specified in paragraph 2.4 including the aircraft from which the aircraft components were removed.

2.7 Used aircraft components removed from an aircraft withdrawn from service.

Serviceable aircraft components removed from a Thailand registered aircraft withdrawn from service may be issued with a CAAT Form 1 by a maintenance organisation approved under TCAR 8 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 organisation approved under TCAR 8 Part 145, employing procedures approved by the CAAT.

(b) To be eligible for installation, components removed from such aircraft may be issued with a CAAT Form 1 by an appropriately rated organisation 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 programme 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 organisation 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 TCAR 8 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 organisation 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 TCAR 8 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 organisations not approved in accordance with TCAR 8 Part 145.

For used components maintained by a maintenance organisation not approved under TCAR 8 Part 145, due care should be taken before acceptance of such components. In such cases an appropriately rated maintenance organisation approved under TCAR 8 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.A.50.

2.9 Used aircraft components removed from an aircraft involved in an accident or incident.

Such components should only be issued with a CAAT Form 1 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.

GM1 145.A.50(d) CAAT Form 1 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.

AMC1 145.A.50(e) Certification of maintenance

1. Being unable to establish full compliance with point 145.A.50(a) means that the maintenance required by the aircraft operator could not be completed due to either 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.A.50(e) requires such operator to be informed in the case where full compliance with 145.A.50(a) cannot be achieved within the operators 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 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

organisation should inform the CAAT of such doubt, before issue of the certificate of release to service. This will allow the CAAT to investigate the matter with the authority of the State of Registry or the State of Operator, as appropriate.

3. The procedure should draw attention to the fact that 145.A.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.A.30(b) should be kept informed in writing of such possible non-compliance situations and this should be included in the procedure.

AMC1 145.A.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 organisation releasing said component together with details of the authority under whose approval the organisation works including the approval or authorisation number.

2. Compliance with all other TCAR 8 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.

AMC1 145.A.55 Recordkeeping

GENERAL

(a) The recordkeeping system should ensure that all records are accessible within a reasonable time whenever they are needed. These records should be organised in a manner that ensures their traceability and retrievability throughout the required retention period.

(b) Records should be kept in paper form, or in electronic format, or a combination of the two. Records that are stored on microfilm or in optical disc formats are also acceptable. The records should remain legible throughout the required retention period. The retention period starts when the record is created or was last amended.

(c) Paper systems should use robust materials which can withstand normal handling and filing. Computer record systems should have at least one backup system, which should be updated within 24 hours of any new entry. Computer record systems should include safeguards to prevent unauthorised personnel from altering the data.

(d) All computer hardware that is used to ensure the backup of data should be stored in a different location from the one that contains the working data, and in an environment that ensures that the data remains in good condition. When hardware or software changes take place, special care should be taken to ensure that all the necessary data continues to be accessible through at least the full period specified in the relevant provision. In the absence of any such indications, all records should be kept for a minimum period of 3 years.

GM1 145.A.55 Recordkeeping

RECORDS

Microfilming or optical storage of records may be carried out at any time. The records should be as legible as the original record, and remain so for the required retention period.

GM1 145.A.55(a)1 Recordkeeping

MAINTENANCE RECORDS

1. Properly executed and retained maintenance records provide owners, operators and maintenance personnel with information essential in controlling unscheduled and scheduled maintenance, and troubleshooting to eliminate the need for re-inspection and rework to establish airworthiness.

   The prime objective is to have secure and easily retrievable records with comprehensive and legible contents. The aircraft record should contain basic details of all serialised aircraft components and all other significant aircraft components installed, to ensure traceability to such installed aircraft component documentation and the associated maintenance data as specified in 145.A.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 the total time in service and the maintenance records for each module are 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 maintenance 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 the CAAT for acceptance.

   NOTE: Additional maintenance may be required.

AMC1 145.A.55(a)3 Recordkeeping

MAINTENANCE RECORDS

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

AMC1 145.A.55(d) Recordkeeping

RECORDS OF CERTIFYING STAFF AND SUPPORT STAFF

1. The following minimum information, as applicable, should be kept on record in respect of certifying staff or support staff:

   (a) Name

   (b) Date of birth

   (c) Basic training

   (d) Type training

   (e) Recurrent training

   (f) Experience

   (g) Qualifications relevant to the authorisation

   (h) Scope of the authorisation

   (i) Date of first issue of the authorization

   (j) If appropriate - expiry date of the authorisation

   (k) Identification number of the authorisation

2. The record may be kept in any format but should be controlled by the organisation's compliance monitoring function. This does not mean that the compliance monitoring manager should run the record

system.

3. The number of persons authorised to access the system should be kept to a minimum to ensure that records cannot be altered in an unauthorised manner, and that such confidential records do not become accessible to any unauthorised persons.

4. The CAAT is an authorised person when investigating the records system for initial certification and oversight, or when the CAAT has cause to doubt the competency of a particular person.

GM1 145.A.60(b) Occurrence reporting

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

GM1 145.A.60(c) Occurrence reporting

Each report should contain at least the following information**:**

— Organisation name and approval reference.

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

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

— Details of the condition as required by 145.A.60(a) and (b).

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

AMC1 145.A.65 Maintenance procedures

GENERAL

1. Maintenance procedures should be held current kept up to date such that they reflect the best practices within the organisation. It is the responsibility of all the organisation's employees to report any differences via their organisation's internal safety occurrence reporting scheme mechanisms.

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

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

GM1 145.A.65 Maintenance procedures

HUMAN FACTORS PRINCIPLES

The following key points should be considered when designing and presenting technical procedures in accordance with good human factors principles:

(a) The design of procedures and changes should involve maintenance personnel who have a good working knowledge of the tasks.

(b) Ensure that the procedures are accurate, appropriate and usable, and reflect best practices.

(c) Take account of the level of expertise and experience of the user; where appropriate, provide an abbreviated version of the procedure for use by experienced technicians.

(d) Take account of the environment in which the procedures are to be used.

(e) Ensure that all the key information is included without the procedure being unnecessarily complex.

(f) Where appropriate, explain the reasons for the procedure.

(g) The order of the tasks and the steps should reflect best practices, with the procedure clearly stating where the order of steps is critical, and where the order is optional.

(h) Ensure consistency in the design of procedures and the use of terminology, abbreviations, references, etc.

(i) For documents produced in the English language, use 'simplified English'.

AMC1 145.A.65(2) Maintenance procedures

Specialised services include any specialised activity, such as, but not limited to non-destructive testing, that require particular skills and/or qualification. Point 145.A.30(f) covers the qualifications of personnel but, in addition, there is a need to establish maintenance procedures that cover the control of any specialised process.

AMC1 145.A.70(a) Maintenance organisation exposition (MOE)

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

The information specified in 145.A.70(a) points 6 and 12 to 16 inclusive, whilst a part of the MOE, 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 MOE should contain the information, as applicable, specified in this AMC. The information may be presented in any subject order so long as all the applicable subjects are covered. Where an organisation uses a different format, for example, to allow the MOE to serve for more than one approval, then the MOE 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 MOE.

The MOE should contain information, as applicable, on how the maintenance organisation complies with the Critical Design Configuration Control Limitation CDCCL instructions.

Small maintenance organisations may combine the various items to form a simple MOE that is more relevant to their needs.

The operator may use electronic data processing (EDP) for the publication of the MOE. The MOE should be made available in a form and manner that is acceptable to the CAAT. Attention should be paid to the compatibility of EDP publication systems with the necessary dissemination of the MOE, both internally and externally.

PART 1 GENERAL

1.1. Statement by the accountable manager

1.2. Safety policy and objectives

1.3. Management personnel.

1.4. Duties and responsibilities of the management personnel.

1.5. Management organisation chart

1.6. List of certifying staff and support staff

1.7. Manpower resources

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

1.9. Organisations intended scope of work

1.10. Procedure for changes requiring prior approval by CAAT

1.11. Procedure for exposition amendments and changes not requiring prior approval by CAAT

PART 2 MAINTENANCE PROCEDURES

2.1. Supplier evaluation and subcontract control procedure

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

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

2.4. Acceptance of tools and equipment

2.5. Calibration of tools and equipment

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

2.7. Cleanliness standards of maintenance facilities

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

2.9. Repair procedure

2.10. Aircraft maintenance programme compliance

2.11. Airworthiness directives procedure

2.12. Optional modification procedure

2.13. Maintenance documentation in use and its completion

2.14. Technical record control

2.15. Rectification of defects arising during base maintenance

2.16. Release to service procedure

2.17. Records for the operator

2.18. Occurrence reporting

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 procedures such as:

— Engine running procedures,

— Aircraft pressure run procedures,

— Aircraft towing procedures,

— Aircraft taxiing procedures

2.25. Procedures to detect and rectify maintenance errors

2.26. Shift/task handover procedures

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

2.28. Production planning procedures

PART L2 ADDITIONAL LINE MAINTENANCE PROCEDURES

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

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

L2.3 Line maintenance control of defects and repetitive defects

L2.4 Line procedure for completion of technical logs

L2.5 Line procedure for pooled parts and loaned 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 MANAGEMENT SYSTEM PROCEDURES

3.1. Hazard identification and safety risk management schemes

3.2. Internal safety reporting and investigations

3.3. Safety action planning

3.4. Safety performance monitoring

3.5. Management of changes (including organisational changes with regard to safety responsibilities)

3.6. Safety training and promotion

3.7. Immediate safety action and coordination with the operator's ERP

3.8. Compliance monitoring

3.8.1. Plan and audit procedures

3.8.2. Product audit of aircraft and inspections

3.8.3. Audit findings and corrective action procedure

3.9. Certifying staff and support staff qualifications and training procedures

3.10. Certifying staff and support staff records

3.11. Compliance monitoring and safety management personnel

3.12. Qualifying inspectors

3.13. Qualifying mechanics

3.14. Control of the process for exemption from aircraft/aircraft component maintenance tasks

3.15. Concession control for deviations from organisations' procedures

3.16. Qualification procedure for specialized activities such as NDT, welding etc.

3.17. Management of external working teams

3.18. Competency assessment of personnel

PART 4 OPERATORS

4.1. Contracting operators

4.2. Operator procedures and paperwork

4.3. Operator record completion.

PART 5 SUPPORTING DOCUMENTS

5.1. Sample documents

5.2. List of subcontractors as per 145.A.75(b)

5.3. List of line maintenance locations as per 145.A.75(d)

5.4. List of contracted organisations as per 145.A.70(a)16

PART 6 OPERATORS MAINTENANCE PROCEDURES

This section is reserved for those maintenance organisations approved under TCAR 8 Part 145 who are also operators.

GM1 145.A.70(a) Maintenance organisation exposition (MOE)

1. The purpose of the MOE is to set forth the procedures, means and methods of the organisation.
2. Compliance with its contents will assure compliance with the requirements of TCAR 8 Part 145, which is a pre-requisite to obtaining and retaining an approved maintenance organisation certificate.
3. 145.A.70(a)1 to 145.A.70(a)11 constitute the 'general' part of the MOE and therefore could be produced as one document and made available to the person(s) specified under 145.A.30(b) who should be reasonably familiar with its contents. 145.A.70(a)6 list of certifying staff and support staff may be produced as a separate document.
4. 145.A.70(a)12 constitutes the working procedures of the organisation, and therefore as stated in the requirement, may be produced as any number of separate procedures or manuals. These documents should be cross-referenced from the MOE.
5. Personnel are expected to be familiar with those parts of the manuals that are relevant to the work they carry out.
6. The organisation should specify in the MOE who should amend the exposition, particularly in the case where there are several parts.
7. The organisation should define the responsibilities for monitoring and amending the MOE, including the associated procedures manuals in accordance with 145.A.70(c).
8. The MOE should cover four main parts**:**
   (a) The general part of the MOE covering the elements specified in point 3;
   (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 management system procedures, including the methods of qualifying mechanics, inspectors, certifying staff, compliance monitoring and safety management personnel;
   (d) Contracting operator procedures and paperwork.

AMC1 145.A.70(a)1 Maintenance organisation exposition (MOE)

ACCOUNTABLE MANAGER STATEMENT

Part 1 of the MOE should include a statement signed by the accountable manager (and countersigned by the chief executive officer, if different), confirming that the MOE and any associated manuals will be complied with at all times.

The accountable manager’s exposition statement as specified under point 145.A.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 organisation and procedures upon which the TCAR 8 Part 145 approval is based.*

These procedures are approved by the undersigned and must be complied with, as applicable, when work orders are being progressed under the terms of the Part 145 approval.

These procedures do not override the necessity of complying with any new or amended regulation published from time to time where these new or amended regulations are in conflict with these procedures.

It is understood that the approval of the organisation is based on the continuous compliance of the organisation with Part 145, and with the organisation's procedures described in this exposition. The CAAT is entitled to limit, suspend, or revoke the approval if the organisation fails to fulfil the obligations imposed by Part 145 or any conditions according to which the approval was issued.

Signed .....

Dated .....

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

Chief Executive Officer …

For and on behalf of..... (quote organisation'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.

If the organisation holds one or more additional organisation certificates containing a requirement for an exposition or manual, it may choose to combine the MOE with that exposition or manual in order to avoid duplication. An index that shows where each requirement is addressed should be kept up to date and made available to the CAAT upon request.

GM1 145.A.70(d) Maintenance Organisation Exposition (MOE)

The content of an acceptable MOE Supplement is defined in the Advisory Circular on approval of foreign repair station AW-08-FAMO.

AMC1 145.A.75(b) Privileges of the organisation

1. Working under the management system of an organisation appropriately approved under TCAR 8 Part 145 (subcontracting) refers to the case of one organisation, whether or not it is approved under TCAR 8 Part 145, that carries out aircraft line maintenance or minor engine maintenance or maintenance of other aircraft components or a specialised service as a subcontractor for an organisation appropriately approved under TCAR 8 Part 145. To be properly approved to subcontract, the organisation should have a procedure for the control of such subcontractors as described below. Any approved maintenance organisation that carries out maintenance for another approved maintenance organisation within its own approval scope is not considered to be subcontracting for the purpose of this paragraph.
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 SUBCONTRACTING UNDER TCAR 8 PART 145

   3.1. The fundamental reasons for allowing an organisation approved under Part 145 to subcontract certain maintenance tasks are**:**

      (a) To permit the acceptance of specialised maintenance services, such as, but not limited to, plating, heat treatment, plasma spray, fabrication of specified parts for minor

repairs/modifications, etc., by organisations without the need for direct approval of those organisations by the CAAT.

(b) To permit the acceptance of aircraft maintenance up to but not including a base maintenance check as specified in 145.A.75(b) by organisations not appropriately approved under Part 145 when it is unrealistic to expect direct approval of those organisations by the CAAT. The CAAT will determine when it is unrealistic but in general, it is considered unrealistic if only one or two organisations intend to use the subcontracted organisation.

(c) To permit the acceptance of component maintenance.

(d) To permit the acceptance of engine maintenance up to but not including a workshop maintenance check or overhaul of an engine or engine module as specified in 145.A.75(b) by organisations not appropriately approved under Part 145 when it is unrealistic to expect direct approval of those organisations by the CAAT. The determination of unrealistic is as per sub-paragraph (b).

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

3.3. For the criteria specified in sub-paragraph 3.1, the organisation is not required to have complete facilities for the maintenance that it needs to subcontract, but it should have its own expertise to determine whether the subcontractor meets the necessary standards. However, an organisation cannot be approved unless it has the in-house facilities, procedures and expertise to carry out the majority of maintenance for which it wishes to be approved in terms of the number of class ratings.

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

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

3.6. Authorisation to subcontract is indicated by the CAAT approving the MOE containing a specific procedure on the control of subcontractors.

4. PRINCIPAL PART 145 PROCEDURES FOR THE CONTROL OF SUBCONTRACTORS

4.1. A pre-audit procedure should be established whereby the maintenance organisations should audit a prospective subcontractor to determine whether those services of the subcontractor that it wishes to use meet the intent of Part 145. This audit should be performed under the responsibility of the compliance monitoring function.

4.2. The organisation approved under Part 145 needs to assess to what extent it will use the subcontractor‘s facilities. As a general rule, the organisation should require its own paperwork, approved data and material/spare parts to be used, but it could permit the use of tools, equipment and personnel from the subcontractor, as long as such tools, equipment and personnel meet the requirement of Part 145. In the case of subcontractors who provide specialised services, it may, for practical reasons, be necessary to use their specialised services personnel, approved data and materials, subject to acceptance by the organisation approved under Part 145.

4.3. Unless the subcontracted maintenance work can be fully inspected on receipt by the organisation

approved under Part 145, it will be necessary for such organisation to supervise the inspection and release from the subcontractor. Such control activities should be fully described in the organisation procedures. The organisation will need to consider whether to use its own staff or to authorise the subcontractor's staff.

4.4. The certificate of release to service may be issued either at the subcontractor or at the organisation facility by staff issued a certification authorisation in accordance with 145.A.30 as appropriate, by the organisation approved under Part 145. Such staff would normally come from the organisation approved under Part 145, but may otherwise be a person from the subcontractor who meets the approved maintenance organisation certifying staff standard, which itself is approved by the CAAT via the MOE. The certificate of release to service and the CAAT Form 1 will always be issued under the maintenance organisation approval reference.

4.5. The subcontract control procedure will need to address the relevant management system key processes such as hazard identification, safety risk assessment and management, internal safety reporting, and compliance monitoring (see point 145.A.205). The procedure should ensure that records of all subcontractor audits and inspections, and the corresponding actions are kept, and provide information on when subcontractors are used. The procedure should include a clear revocation process for subcontractors who do not meet the Part 145 approved maintenance organisation's requirements.

4.6. The Part 145 compliance monitoring staff will need to audit the subcontract control function and sample audit subcontractors, unless this task is already carried out by the compliance monitoring staff as stated in sub-paragraph 4.1.

4.7. The contract between the Part 145 approved maintenance organisation and the subcontractor should contain a provision to grant access to the subcontractor to the CAAT.

GM1 145.A.75(b) Privileges of the organisation

SUBCONTRACTING TO A PART-145 APPROVED ORGANISATION

It is not the intent of the rule to prevent a Part 145 organisation from subcontracting certain maintenance activities to another Part 145 approved organisation. In this case, although it is approved under Part 145, such a subcontracted organisation would work under the management system of the contracting Part 145 organisation.

The rule does also not foresee a Part 145 approved organisation working solely as a subcontractor of other Part 145 organisations, such that it would refrain from exercising its privileges.

AMC1 145.A.75(f) Privileges of the organisation

PRIVILEGES OF FOREIGN MAINTENANCE ORGANISATIONS

The foreign maintenance organisation approved by the CAAT according to the simplified certification process of 145.A.5(a)1 and 145.A.5(a)3 can issue a CAAT form 1 after maintenance of aircraft components in accordance with 145.A.50(d) only if an "original" authorised release certificate issued according to the Repair station certificate that enabled to use the simplified certification procedure has been already issued.

The CAAT Form 1 will be acceptable only when accompanied by the "original" authorised release certificate issued according to the Repair station certificate that enabled to use the simplified certification procedure. Such CAAT Form 1 shall contain in block "Remarks" the date and reference of the "original" authorised release certificate.

Both airworthiness release certificate under the foreign CAA approval and the CAAT form 1 release to service certificate should be copied together to the aircraft owner/operator in accordance with 145.A.55(a)2. provisions.

AMC1 145.A.85 Changes to the organisation

APPLICATION TIME FRAMES

(a) The application for the amendment of an organisation certificate should be submitted at least 30 working days before the date of the intended changes.

(b) In the case of a planned change of a nominated person, the organisation should inform the CAAT at least 20 working days before the date of the proposed change.

(c) Unforeseen changes should be notified at the earliest opportunity, in order to enable the CAAT to determine whether there is continued compliance with the applicable requirements, and to amend, if necessary, the organisation certificate and the related terms of approval.

AMC2 145.A.85 Changes to the organisation

MANAGEMENT OF CHANGES

The organisation should manage the safety risks related to any changes to the organisation in accordance with AMC1 145.A.200(a)3 point (e). For changes requiring prior approval, it should conduct a safety risk assessment and provide it to the CAAT upon request.

GM1 145.A.85 Changes to the organisation

CHANGES TO THE MOE

Point 145.A.85 also covers changes to the MOE, as explained in point 145.A.70(c).

GM1 145.A.85(a)1 Changes to the organisation

CHANGES THAT MAY AFFECT THE SCOPE OF THE CERTIFICATE OR THE TERMS OF APPROVAL

Typical examples of such changes are listed below:

(1) the name of the organisation;

(2) the organisation's principal place of business;

(3) the organisation's scope of work;

(4) the accountable manager referred to in point 145.A.30(a);

(5) the safety policy;

(6) the facilities.

GM2 145.A.85(a)1 Changes to the organisation

CHANGE OF THE NAME OF THE ORGANISATION

A change of the name requires the organisation to submit a new application as a matter of urgency.

If this is the only change to report, the new application can be accompanied by a copy of the documentation that was previously submitted to the CAAT under the previous name, as a means of demonstrating that the organisation complies with the applicable requirements.

GM1 145.A.85(b) Changes to the organisation

CHANGES REQUIRING PRIOR APPROVAL

This GM is a non-exhaustive list of items that require prior approval from the CAAT (other than covered by point 145.A.85(a)) as specified in the TCAR 8 Part 145:

(a) The MOE procedure for the use of alternative tooling or equipment [145.A.40(a)(i)];

(b) The use of component maintenance data by an A-rated organisation for the maintenance of components

fitted to the aircraft [Appendix II point (d)];

(c) The MOE procedure to allow an A-rated organisation to temporarily remove a component for maintenance, in order to improve access to that component [Appendix II point (d)];

(d) The use of component maintenance data by a B-rated organisation for the maintenance of components fitted to the engine and/or APU [Appendix II point (f)];

(e) The MOE procedure to allow a B-rated organisation to carry out maintenance on an installed engine during 'base' and 'line' maintenance [Appendix II point (f)];

(f) The MOE procedure to allow a C-rated organisation to carry out maintenance on an installed component (other than a complete engine/APU) during 'base' and 'line' maintenance or at an engine/APU maintenance facility [Appendix II point (g)];

(g) The procedures and standards to establish and control the competency of personnel (145.A.30(e));

(h) An effective and continuous system for reporting to the CAAT on the safety performance and regulatory compliance of the organisation.

GM1 145.A.85(c) Changes to the organisation

CHANGES NOT REQUIRING PRIOR APPROVAL

The intention of point 145.A.85(c) is to allow the CAAT to accept certain changes to the organisation (other than where the TCAR 8 Part 145 explicitly requires an approval) to be implemented without prior approval, depending on the compliance and safety performance of the organisation, and in particular, on its capability to manage the safety risks related to changes.

AMC1 145.A.95 Findings

GENERAL

A level 1 finding shall be issued by the competent authority when any significant non-compliance is detected with the applicable requirements, with the organisation's procedures and manuals or with the terms of an approval, or certificate which lowers safety or seriously endangers flight safety.

A level 2 finding shall be issued by the competent authority when any non-compliance is detected with the applicable requirement, with the organisation's procedures and manuals or with the terms of an approval, or certificate which could lower safety or seriously hazards flight safety

An observation is opportunity for improvement which is minor gap, mostly documented and implemented. The management system that may be weak, cumbersome, redundant, overly complex, or in some other manner, may, in the opinion of the auditor, offer an opportunity for an organization to improve its current status. An observation is not subject to any corrective actions unless its accepted by auditee for improvement.

The action plan defined by the organisation should address the effects of the non-compliance, as well as its root cause(s) and contributing factor(s).

Depending on the issues, the action plan should address the correction/containment of the issue, corrective action and preventive action.

GM1 145.A.95 Findings

CAUSAL ANALYSIS

(a) It is important that the analysis does not primarily focus on establishing who or what caused the non-compliance, but on why it was caused. Establishing the root cause or causes of a non-compliance often requires an overarching view of the events and circumstances that led to it, to identify all the possible systemic and contributing factors (regulatory, human factors, organisational factors, technical, etc.) in addition to the direct factors.

(b) A narrow focus on single events or failures, or the use of a simple, linear model, such as a fault tree, to identify the chain of events that led to the non-compliance, may not properly reflect the complexity of the issue, and therefore there is a risk that important factors that must be addressed in order to prevent a reoccurrence will be ignored.

Such an inappropriate or partial causal analysis often leads to defining 'quick fixes' that only address the symptoms of the non-conformity. A peer review of the results of the causal analysis may increase its reliability and objectivity.

(c) A system description of the organisation that considers the organisational structures, processes and their interfaces, procedures, staff, equipment, facilities and the environment in which the organisation operates, will support both effective causal (reactive) and hazard (proactive) analyses.

GM1 145.A.200 Management system

GENERAL

Safety management seeks to proactively identify hazards and to mitigate the related safety risks before they result in aviation accidents and incidents. Safety management enables an organisation to manage its activities in a more systematic and focused manner. When an organisation has a clear understanding of its role and contribution to aviation safety, it can prioritise safety risks and more effectively manage their resources and obtain optimal results.

The principles of the requirements in points 145.A.200, 145.A.202, 145.A.205 and the related AMC constitute the management system framework for aviation safety management. This framework addresses the core elements of the ICAO safety management system (SMS) framework defined in Appendix 2 to Annex 19, and it promotes an integrated approach to the management of an organisation. It facilitates the introduction of the additional safety management components, building upon the existing management system, rather than adding them as a separate framework.

This approach is intended to encourage organisations to embed safety management and risk-based decision-making into all their activities, instead of superimposing another system onto their existing management system and governance structure. In addition, if the organisation holds multiple organisation certificates, it may choose to implement a single management system to cover all of its activities. An integrated management system may not only be used to capture multiple certification requirements, but also to cover other business management systems such as quality, security, occupational health and environmental management systems. Integration will remove any duplication and exploit synergies by managing safety risks across multiple activities. Organisations may determine the best means to structure their management systems to suit their business and organisational needs.

The core part of the management system framework (145.A.200) focuses on what is essential for safety management, by mandating the organisation to:

(a) clearly define responsibilities and accountabilities;

(b) establish a safety policy and the related safety objectives,

(c) implement safety reporting procedures in line with just culture principles;

(d) ensure the identification of aviation safety hazards entailed by its activities, ensure their evaluation, and the management of the associated risks, including:

1. taking actions to mitigate the risks;

2. verifying the effectiveness of the actions taken to mitigate the risks;

(e) monitor compliance, while considering any additional requirements that are applicable to the organisation;

(f) keep their personnel trained, competent, and informed about significant safety issues; and

(g) document all the key management system processes.

Compared with the previous Part 145 quality system 'framework', the new elements that are introduced are, in particular, those addressed under points (b) to (d). Points (c) and (d)(1) address component 2 'Safety Risk Management' of the ICAO SMS framework. Points (d)(2) and (e) address component 3 'Safety Assurance' thereof.

Point 145.A.200 defines the following as key safety management processes; these are further specified in the related AMC and GM:

— Hazard identification;

— Safety risk management;

— Internal investigation;

— Safety performance monitoring and measurement;

— Management of change;

— Continuous improvement;

— Immediate safety action and coordination with the aircraft operator's Emergency Response Plan (ERP).

It is important to recognise that safety management will be a continuous activity, as hazards, risks and the effectiveness of safety risk mitigations will change over time.

These key safety management processes are supported by a compliance monitoring function as an integral part of the management system for safety. Most aviation safety regulations constitute generic safety risk controls established by the 'regulator'. Therefore, ensuring effective compliance with the regulations during daily operations and independent monitoring of compliance are fundamental to any management system for safety. The compliance monitoring function may, in addition, support the follow-up of safety risk mitigation actions. Moreover, where non-compliances are identified through internal audits, the causes will be thoroughly assessed and analysed. Such an analysis in return supports the risk management process by providing insights into causal and contributing factors, including human factors, organisational factors and the environment in which the organisation operates. In this way, the outputs of compliance monitoring become some of the various inputs to the safety risk management functions. On the other hand, the safety risk management processes may be used to determine focus areas for compliance monitoring. In this way, internal audits will inform the organisation's management of the level of compliance within the organisation, whether safety risk mitigation actions have been implemented, and where corrective or preventive action is required. The combination of safety risk management and compliance monitoring should lead to an enhanced understanding of the end-to-end process and the process interfaces, exposing opportunities for increased efficiencies, which are not limited to safety aspects.

As aviation is a complex system with many organisations and individuals interacting together, the primary focus of the key safety management processes is on the organisational processes and procedures, but it also relies on the humans in the system. The organisation and the way in which it operates can have a significant impact on human performance. Therefore, safety management necessarily addresses how humans can contribute both positively and negatively to an organisation's safety outcomes, recognising that human behaviour is influenced by the organisational environment.

The effectiveness of safety management largely depends on the degree of commitment of the senior management to create a working environment that optimises human performance and encourages personnel to actively engage in and contribute to the organisation's management processes. Similarly, a positive safety culture relies on a high degree of trust and respect between the personnel and the management, and it must therefore be created and supported at the senior management level. If the management does not treat individuals who identify hazards and report adverse events in a consistently fair and just way, those individuals are unlikely to be willing to communicate safety issues or to work with the management to effectively address the safety risks. As with trust, a positive safety culture takes time and effort to establish, and it can be easily lost.

It is further recognised that the introduction of processes for hazard identification and risk assessment, mitigation and verification of the effectiveness of such mitigation actions will create immediate and direct costs, while related benefits are sometimes intangible, and may take time to materialise. Over time, an effective management system will not only address the risks of major occurrences, but also identify and address production inefficiencies, improve communication, foster a better organisational culture, and lead to a more effective control of contractors and suppliers. In addition, through an improved relationship with the authority, an effective management system may result in a reduced oversight burden.

Thus, by viewing safety management and the related organisational policies and key processes as items that are implemented not only to prevent incidents and accidents, but also to meet the organisation's strategic objectives, any investment in safety should be seen as an investment in productivity and organisational success.

AMC1 145.A.200(a)1 Management system

ORGANISATION AND ACCOUNTABILITIES

(a) The management system should encompass safety by including a safety manager and a safety review board in the organisational structure. The functions of the safety manager are those defined in AMC1 145.A.30(c);(ca).

(b) Safety review board

1. The safety review board should be a high-level committee that considers matters of strategic safety in support of the accountable manager's safety accountability.
2. The board should be chaired by the accountable manager and composed of the heads of the functional areas.
3. The safety review board should monitor:
   (i) safety performance against the safety policy and objectives;
   (ii) that any safety action is taken in a timely manner; and
   (iii) the effectiveness of the organisation's management system processes.
4. The safety review board may also be tasked with:
   (i) reviewing the results of compliance monitoring;
   (ii) monitoring the implementation of related corrective and preventive actions.

(c) The safety review board should ensure that appropriate resources are allocated to achieve the established safety objectives.

(d) The safety manager or any other relevant person may attend, as appropriate, safety review board meetings. He or she may communicate to the accountable manager all information, as necessary, to allow decision-making to be based on safety data.

(e) Notwithstanding point (a), where justified by the size of the organisation and the nature and complexity of its activities and subject to a risk assessment and agreement by the CAAT, the organisation may not need to establish a formal safety review board. In this case, the tasks normally allocated to the safety review board should be allocated to the safety manager.

GM1 145.A.200(a)1 Management system

SAFETY ACTION GROUP

(a) A safety action group may be established as a standing group or as an ad hoc group to assist, or act on behalf of the safety manager or the safety review board.

(b) More than one safety action group may be established, depending on the scope of the task and the

specific expertise required.

(c) The safety action group usually reports to, and takes strategic direction from, the safety review board, and may be composed of managers, supervisors and personnel from operational areas.

(d) The safety action group may be tasked or assist with:

1. monitoring safety performance;
2. defining actions to control risks to an acceptable level;
3. assessing the impact on safety of organisational changes;
4. ensuring that safety actions are implemented within agreed timescales;
5. reviewing the effectiveness of previous safety actions and safety promotion.

GM2 145.A.200(a)1 Management system

MEANING OF THE TERMS 'ACCOUNTABILITY' AND 'RESPONSIBILITY'

In the English language, the notion of accountability is different from the notion of responsibility. Whereas 'accountability' refers to an obligation which cannot be delegated, 'responsibility' refers to an obligation that can be delegated.

AMC1 145.A.200(a)2 Management system

SAFETY POLICY & OBJECTIVES

(a) The safety policy should:

1. reflect organisational commitments regarding safety, and its proactive and systematic management, including the promotion of a positive safety culture;
2. include internal reporting principles, and encourage personnel to report maintenance-related errors, incidents and hazards;
3. recognise the need for all personnel to cooperate with the compliance monitoring and internal investigations referred to under point (c) of AMC1 145.A.200(a)3;
4. be endorsed by the accountable manager;
5. be communicated, with visible endorsement, throughout the organisation; and
6. be periodically reviewed to ensure it remains relevant and appropriate for the organisation.

(b) The safety policy should include a commitment to:

1. comply with all the applicable legislation, to meet all the applicable requirements, and adopt practices to improve safety standards;
2. provide the necessary resources for the implementation of the safety policy;
3. apply human factors principles;
4. enforce safety as a primary responsibility of all managers; and
5. apply 'just culture' principles to internal safety reporting and the investigation of occurrences and, in particular, not to make available or use the information on occurrences:
   (i) to attribute blame or liability to front-line personnel or other persons for actions, omissions or decisions taken by them that are commensurate with their experience and training; or
   (ii) for any purpose other than the maintenance or improvement of aviation safety.

(c) Senior management should continually promote the safety policy to all personnel, demonstrate its commitment to it, and provide necessary human and financial resources for its implementation.

(d) Taking due account of its safety policy, the organisation should define safety objectives. The safety objectives should:

1. form the basis for safety performance monitoring and measurement;
2. reflect the organisation's commitment to maintain or continuously improve the overall effectiveness of the management system;
3. be communicated throughout the organisation; and
4. be periodically reviewed to ensure they remain relevant and appropriate for the organisation.

GM1 145.A.200(a)2 Management system

SAFETY POLICY

(a) The safety policy is the means whereby the organisation states its intention to maintain and, where practicable, improve safety levels in all its activities and to minimise its contribution to the risk of an aircraft accident or serious incident as far as is reasonably practicable. It reflects the management's commitment to safety, and should reflect the organisation's philosophy of safety management, as well as being the foundation on which the organisation's management system is built. It serves as a reminder of 'how we do business here'. The creation of a positive safety culture begins with the issuance of a clear, unequivocal policy.

(b) The commitment to apply 'just culture' principles forms the basis for the organisation internal rules describing how 'just culture' principles are guaranteed and implemented.

AMC1 145.A.200(a)3 Management system

SAFETY MANAGEMENT KEY PROCESSES

(a) Hazard identification processes

1. Reactive and proactive schemes for hazard identification should be the formal means of collecting, recording, analysing, acting on, and generating feedback about hazards and the associated risks that may affect safety.
2. The organisation should in particular focus on:
   (i) hazards that may be generated from limitations in human performance; and
   (ii) hazards that may stem from the organisational set-up or the existence of complex operational and maintenance arrangements (such as when multiple organisations are contracted, or when multiple levels of contracting/subcontracting are included).

(b) Risk management processes

1. A formal safety risk management process should be developed and maintained that ensures that there is:
   (i) analysis (in terms of the probability and severity of the consequences of hazards and occurrences);
   (ii) assessment (in terms of tolerability); and
   (iii) control (in terms of mitigation) of risks to an acceptable level.
2. The levels of management who have the authority to make decisions regarding the tolerability of safety risks, in accordance with (b)1(ii), should be specified.

(c) Internal investigation

1. In line with its just culture policy, the organisation should define how to investigate incidents such as errors or near misses, in order to understand not only what happened, but also how it happened,

to prevent or reduce the probability and/or consequence of future recurrences (refer to AMC1 145.A.202).

2. The scope of internal investigations should extend beyond the scope of the occurrences required to be reported to the CAAT in accordance with point 145.A.60.

(d) Safety performance monitoring and measurement

1. Safety performance monitoring and measurement should be the processes by which the safety performance of the organisation is verified in comparison with the safety policy and the safety objectives.

2. These processes may include, as appropriate to the size, nature and complexity of the organisation:

(i) safety reporting, addressing also the status of compliance with the applicable requirements;

(ii) safety reviews, including trend reviews, which would be conducted during the introduction of new products and their components, new equipment/technologies, the implementation of new or changed procedures, or in situations of organisational changes that may have an impact on safety;

(iii) safety audits that focus on the integrity of the organisation's management system, and on periodically assessing the status of safety risk controls; and

(iv) safety surveys, examining particular elements or procedures in a specific area, such as identified problem areas, or bottlenecks in daily maintenance activities, perceptions and opinions of maintenance management personnel, and areas of dissent or confusion.

(e) Management of change

The organisation should manage the safety risks related to a change. The management of change should be a documented process to identify external and internal changes that may have an adverse effect on safety. It should make use of the organisation's existing hazard identification, risk assessment and mitigation processes.

(f) Continuous improvement

The organisation should continuously seek to improve its safety performance and the effectiveness of its management system. Continuous improvement may be achieved through:

1. audits carried out by external organisations;

2. assessments, including assessments of the effectiveness of the safety culture and management system, in particular to assess the effectiveness of the safety risk management processes;

3. staff surveys, including cultural surveys, that can provide useful feedback on how engaged personnel are with the management system;

4. monitoring the recurrence of incidents and occurrences;

5. evaluation of safety performance indicators and reviews of all the available safety performance information; and

6. the identification of lessons learned.

(g) Immediate safety action and coordination with the operator's Emergency Response Plan (ERP)

1. Procedures should be implemented that enable the organisation to act promptly when it identifies safety concerns with the potential to have an immediate effect on flight safety, including clear instructions on who to contact at the owner/operator, and how to contact them, including outside of normal business hours. These provisions are without prejudice to the occurrence reporting required by point 145.A.60.

2. If applicable, procedures should be implemented to enable the organisation to react promptly if

the ERP is triggered by the operator and it requires the support of the Part 145 organisation.

GM1 145.A.200(a)3 Management system

SAFETY RISK MANAGEMENT — INTERFACES BETWEEN ORGANISATIONS

(a) Safety risk management processes should specifically address the planned implementation of, or participation of the organisation in, any complex operational and maintenance arrangements (such as when multiple organisations are contracted, or when multiple levels of contracting/subcontracting are included).

(b) Hazard identification and risk assessment start with the identification of all the parties involved in the arrangement, including independent experts and non-approved organisations. This identification process extends to cover the overall control structure, and assesses in particular the following elements across all subcontract levels and all parties within such arrangements:

1. coordination and interfaces between the different parties;
2. applicable procedures;
3. communication between all the parties involved, including reporting and feedback channels;
4. task allocation, responsibilities and authorities; and
5. the qualifications and competency of key personnel with reference to point 145.A.30.

(c) Safety risk management should focus on ensuring the following aspects:

1. clear assignment of accountability and allocation of responsibilities;
2. that only one party is responsible for a specific aspect of the arrangement, with no overlapping or conflicting responsibilities, in order to eliminate coordination errors;
3. the existence of clear reporting lines, both for occurrence reporting and progress reporting;
4. the possibility for staff to directly notify the organisation of any hazard that suggests an obviously unacceptable safety risk as a result of the potential consequences of this hazard.

(d) The safety risk management processes should ensure that there is regular communication between all the parties involved to discuss work progress, risk mitigation actions, and changes to the arrangements, as well as any other significant issues.

GM2 145.A.200(a)3 Management system

MANAGEMENT OF CHANGE

(a) Unless they are properly managed, changes in organisational structure, facilities, the scope of work, personnel, documentation, policies and procedures, etc. can result in the inadvertent introduction of new hazards, and expose the organisation to new or increased risk. Effective organisations seek to improve their processes, with conscious recognition that changes can expose the organisation to potentially latent hazards and risks if they are not properly and effectively managed.

(b) Regardless of the magnitude of a change, large or small, its safety implications should always be proactively considered. This is primarily the responsibility of the team that proposes and/or implements the change. However, a change can only be successfully implemented if all the personnel affected by the change are engaged, are involved and participate in the process. The magnitude of a change, its safety criticality, and its potential impact on human performance should be assessed in any change management process.

(c) The process for the management of change typically provides principles and a structured framework for managing all aspects of the change. Disciplined application of the management of change can maximise the effectiveness of the change, engage the staff, and minimise the risks that are inherent in a change.

(d) The introduction of a change is the trigger for the organisation to perform their hazard identification and risk management processes.

Some examples of change include, but are not limited to:

1. changes to the organisational structure;
2. the inclusion of a new aircraft type in the terms of approval;
3. the addition of aircraft of the same or a similar type;
4. significant changes in personnel (affecting key personnel and/or large numbers of personnel, high turn-over);
5. new or amended regulations;
6. competition (e.g. new competitor);
7. changes to the customer base (e.g. loss of major customer);
8. changes to the security arrangements;
9. changes in the financial status of an organisation;
10. new schedule(s), location(s), equipment, and/or operational procedures; and
11. the addition of new subcontractors.

(e) A change may have the potential to introduce new, or to exacerbate pre-existing, human factor issues. For example, changes in computer systems, equipment, technology, and personnel changes, including changes in management personnel, procedures, work organisation, or work processes are likely to affect performance.

(f) The purpose of integrating human factors (HF) into the management of change is to minimise potential risks by specifically considering the impact of the change on the people within a system.

(g) Special consideration, including any HF issues, should be given to the 'transition period'. In addition, the activities utilised to manage these issues should be integrated into the change management plan.

(h) Effective management of change should be supported by the following:

1. Implementation of a process for formal hazard identification/risk assessment for major operational changes, major organisational changes, changes in key personnel, and changes that may affect the way maintenance is carried out;
2. Identification of changes that are likely to occur in business which would have a noticeable impact on:
   (i) resources — material and human;
   (ii) management direction — policies, processes, procedures, training; and
   (iii) management control.
3. Safety cases/risk assessments that are aviation-safety focused.
4. The involvement of key stakeholders in the change management process, as appropriate.

(i) During the management of change process, previous risk assessments and existing hazards are reviewed for possible effect.

AMC1 145.A.200(a)4 Management system

COMMUNICATION ON SAFETY

(a) The organisation should establish communication regarding safety matters that:

1. ensures that all personnel are aware of the safety management activities, as appropriate for their safety responsibilities;
2. conveys safety-critical information, especially related to assessed risks and analysed hazards;
3. explains why particular actions are taken; and
4. explains why safety procedures are introduced or changed.

(b) Regular meetings with personnel, at which information, actions, and procedures are discussed, may be used to communicate safety matters.

GM1 145.A.200(a)4 Management system

SAFETY PROMOTION

(a) Safety training, combined with safety communication and information sharing, forms part of safety promotion.

(b) Safety promotion activities should support:

1. the organisation's policies, encouraging a positive safety culture, creating an environment that is favourable to the achievement of the organisation's safety objectives;
2. organisational learning; and
3. the implementation of an effective safety reporting scheme and the development of a just culture.

(c) Depending on the particular safety issue, safety promotion may also constitute or complement risk mitigation actions.

(d) Qualifications and training aspects are further specified in the AMC and the GM to point 145.A.30.

GM1 145.A.200(a)5 Management system

MANAGEMENT SYSTEM DOCUMENTATION

(a) The organisation may document its safety policy, safety objectives and all its key management system processes in a separate manual (e.g. a Safety Management Manual or Management System Manual), or in its MOE (see AMC1 145.A.70(a), Part 3 'Management system procedures'). Organisations that hold multiple organisation certificates may prefer to use a separate manual in order to avoid duplication. That manual or the MOE, depending on the case, should be the key instrument for communicating the approach to management system for the whole of the organisation.

(b) The organisation may also choose to document some of the information that is required to be documented in separate documents (e.g. policy documents, procedures). In that case, it should ensure that the manual or the MOE contains adequate references to any document that is kept separately. Any such documents are to be considered as integral parts of the organisation's management system documentation.

AMC1 145.A.200(a)6 Management system

COMPLIANCE MONITORING – GENERAL

(a) The primary objectives of compliance monitoring are to provide an independent monitoring function on how the organisation ensures compliance with the applicable requirements, policies and procedures, and to request action where non-compliances are identified.

(b) The independence of the compliance monitoring should be established by always ensuring that audits and inspections are carried out by personnel who are not responsible for the functions, procedures or products that are audited or inspected.

AMC2 145.A.200(a)6 Management system

COMPLIANCE MONITORING – INDEPENDENT AUDIT

1. An essential element of compliance monitoring is the independent audit.

2. The independent audit should be an objective process of routine sample checks of all aspects of the organisation‘s ability to carry out all maintenance to the standards required by this TCAR 8 Part 145. It should include some product sampling, as this is the end result of the maintenance process.

3. The independent audit should provide an objective overview of the complete set of maintenance related activities. It should include a percentage of unannounced audits carried out on a sample basis while maintenance is being carried out. This means that some audits should be carried out during the night for those organisations that work at night.

3a. The organisation should establish an audit plan to show when and how often the activities as required by this TCAR 8 Part 145 will be audited.

4. Except as specified in sub-paragraphs 7 and 9, the audit plan should ensure that all aspects of TCAR 8 Part 145 compliance are verified every year, including all the subcontracting activities, and the auditing may be carried out as a complete single exercise or subdivided over the annual period. The independent audit should not require each procedure to be verified 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 verified every year without resultant findings. Where findings have been identified, the particular procedure should be verified against other product lines until the findings have been rectified, after which the independent audit procedure may revert back to a 1-year interval for the particular procedure.

5. Except as specified otherwise in sub-paragraph 7, the independent audit should sample check one product on each product line every year as a demonstration of the effectiveness of compliance with the maintenance procedures. Procedures and product audits may be combined by selecting a specific product example, such as an aircraft or engine or component, and sample checking all the procedures and requirements associated with the specific product example.

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

   It therefore follows, for example that a maintenance organisation approved under Part 145 with a capability to maintain aircraft, repair engines, brakes and autopilots would need to carry out 4 complete product audits each year, except as specified otherwise in subparagraphs 5, 7 or 9.

6. The product audit means to witness any relevant testing and visually inspect the product and the associated documentation. The product audit should not involve repeated disassembly or testing unless the product audit identifies findings that require such an action.

7. Except as specified otherwise in sub-paragraph 9, where the smallest organisation, that is an organisation with a maximum of 10 personnel actively engaged in maintenance, chooses to contract the independent audit element of the compliance monitoring, it is conditional on the audit being carried out twice every year.

8. Except as specified otherwise in sub-paragraph 9, where the organisation has line stations listed as per 145.A.75(d), the compliance monitoring documentation should include a description of how these line stations are integrated into the function, 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 and the related safety hazards identified. Except as specified otherwise in sub-paragraph 9, the maximum period between audits of a particular line station should not exceed 2 years.

9. Except as specified otherwise in sub-paragraph 5, provided that there are no safety-related findings, the audit planning cycle specified in this AMC may be increased by up to 100%, subject to a risk assessment and agreement by the CAAT.

10. A report should be issued each time an audit is carried out describing what was checked and the resulting non-compliance findings against applicable requirements and procedures.

11. Organisations with a maximum of 10 maintenance staff actively engaged in carrying out maintenance may subcontract the independent audit element of the compliance monitoring function to another organisation or contract a qualified and competent person, with the agreement of the CAAT.

AMC3 145.A.200(a)6 Management system

COMPLIANCE MONITORING — CONTRACTING OF THE INDEPENDENT AUDIT

(a) If external personnel are used to perform independent audits:

1. any such audits are performed under the responsibility of the compliance monitoring manager; and

2. the organisation remains responsible for ensuring that the external personnel have the relevant knowledge, backgrounds, and experience that are appropriate to the activities being audited, including knowledge and experience in compliance monitoring.

(b) The organisation retains the ultimate responsibility for the effectiveness of the compliance monitoring function, in particular for the effective implementation and follow-up of all corrective actions.

AMC4 145.A.200(a)6 Management system

COMPLIANCE MONITORING – FEEDBACK SYSTEM

1. An essential element of the compliance monitoring is the feedback system.

2. The feedback system should not be contracted to external persons or organisations.

2.a. When a non-compliance is found, the compliance monitoring function should ensure that the root cause(s) and contributing factor(s) are identified (see GM1 145.A.95), and that corrective actions are defined. The feedback part of the compliance monitoring function should define who is required to address any non-compliance in each particular case, and the procedure to be followed if the corrective action is not completed within the defined time frame. The principal functions of the feedback system are to ensure that all findings resulting from the independent audits of the organisation are properly investigated and corrected in a timely manner, and to enable the accountable manager to be kept informed of any safety issues and the extent of compliance with Part 145.

3. The independent audit reports referred to in AMC2 145.A.200(a)6 should be sent to the relevant department(s) for corrective action, giving target rectification dates. These target dates should be discussed with the relevant department(s) before the compliance monitoring function confirms the dates in the report. The relevant department(s) are required to implement the corrective action and inform the compliance monitoring function of the status of the implementation of the action.

4. Unless the review of the results from compliance monitoring is the responsibility of the safety review board (ref. AMC1 145.A.200(a)1 point (b)4), the accountable manager should hold regular meetings with staff to check the progress of any corrective actions. These meetings may be delegated to the compliance monitoring manager on a day-to-day basis, provided that the accountable manager:

1. meets the senior staff involved at least twice per year to review the overall performance of the compliance monitoring function; and

2. receives at least a half-yearly summary report on non-compliance findings.

5. All records pertaining to the independent audit and the feedback system should be retained for the period specified in 145.A.55(c) or for such periods as to support changes to the audit planning cycle in accordance with AMC2 145.A.200(a)6, whichever is the longer.

GM1 145.A.200(a)6 Management system

COMPLIANCE MONITORING FUNCTION

The compliance monitoring function is one of the elements that is required to 'ensure' compliance with the applicable requirements. This means that the compliance monitoring function itself should be subject to independent monitoring of compliance in accordance with 145.A.200(a)6.

GM2 145.A.200(a)6 Management system

(a) The purpose of this GM is to give guidance on one acceptable working audit plan to meet part of the needs of 145.A.200(a)6. There is any number of other acceptable working audit plans.

(b) The audits described in the audit plan are intended to monitor compliance with the applicable requirements, and at the same time to review all areas of the organisation to which those requirements are applicable.

(c) In order to achieve this objective, as a first element, the organisation needs to identify all the regulatory requirements that are applicable to the activity and the scope of work under consideration, to allow the audit plan to focus on the relevant topics. Each topic (e.g. facilities, personnel, etc.) should be cross-referred with the relevant requirement and the related procedure of the organisation in the exposition that describes the particular topic. If an organisation applies an AMC to demonstrate compliance with the rule, that information may also be stated.

(d) As a second element, all the functional areas of the organisation in which Part 145 functions are intended to be carried out, including subcontracting, need to be listed in order to identify the applicability of any topic to each functional area.

(e) A matrix can be used, as shown in the example below, to capture the two elements mentioned above. This matrix is intended to be a living document to be customised by each particular organisation depending on its scope of work and its structure. This matrix should represent the overall compliance of the audit system and needs to be amended, as necessary, based upon any change to the applicable regulations, the procedures of the organisation or the functional areas of the organisation (e.g. a change in the scope of work to include line maintenance, etc.)

Example (to be further completed) of an audit matrix for an organisation involved in aircraft base maintenance that does not hold airworthiness review privilege:

Topic	**Requirement**	**Exposition**	**Functional areas**				
			Base maintenance	Compliance monitoring	Subcontracting	Component workshop	…
Facilities	145.A.25(a)1	1.8	X	N/A	X	X	…
	AMC 145.A.25(a)	2.22	X	N/A	N/A	X	…
	…	…	…	…	…	…	…
Personnel	…	…	…	…	…	…	…
	145.A.30(c)	1.4	N/A	X	N/A	N/A	…
	145.A.30(d)	1.7, 2.22	X	X	X	X	…
	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…
Record-keeping	145.A.55	…	…	…	…	…	…
…	…	…	…	…	…	…	…

(f) The audit plan can be presented as a simplified schedule (see below), showing the operational areas of the organisation against a timetable to indicate when each particular area was scheduled for audit and when the audit was completed. The audit plan should include a number of product audits (depending on the number of product lines), some of which should be unannounced (see AMC2 145.A.200(a)6).

Example (to be further completed) of an audit plan for an organisation, mentioned in point (e), that has 2 base maintenance hangars, and hydraulic and electrical workshops:

Operational area	Functional area	Planned	Completed	Remarks
Base maintenance hangar 1	Base maintenance	mmm yyyy	dd mmm yyyy	
Base maintenance hangar 2	Base maintenance	mmm yyyy	dd mmm yyyy	
Hydraulic workshop	Component workshop	mmm yyyy	dd mmm yyyy	
Electrical workshop	Component workshop	mmm yyyy	dd mmm yyyy	
Subcontractor 1	Subcontracting	mmm yyyy	dd mmm yyyy	
Product audit 1	Base maintenance	mmm yyyy	dd mmm yyyy	
Product audit 2	Component workshop	unannounced	dd mmm yyyy	
…	…	…	…	

(g) The audit of each operational area will review all the topics that are applicable to the relevant functional area. For each topic, the audit should check that the particular Part 145 requirement is documented in the corresponding procedure in the exposition and that the procedure is effectively implemented in the operational area that is being audited. In addition, the audit should also identify any practice/process implemented in the operational area which has not been documented in any procedure in the exposition.

AMC1 145.A.202 Internal safety reporting scheme

(a) Each internal safety reporting scheme should be confidential and enable and encourage free and frank reporting of any potentially safety-related occurrence, including incidents such as errors or near misses, safety issues and identified hazards. This will be facilitated by the establishment of a just culture.

(b) The internal safety reporting scheme should contain the following elements:

1. clearly identified aims and objectives with demonstrable corporate commitment;
2. a just culture policy as part of the safety policy, and related just culture implementation procedures;
3. a process to:
   (i) identify those reports which require investigation; and
   (ii) when so identified, investigate all the causal and contributing factors, including any technical, organisational, managerial, or human factors issues, and any other contributing factors related to the occurrence, incident, error or near miss that was identified;
   (iii) if adapted to the size and complexity of the organisation, analyse the collective data showing the trends and frequencies of the contributing factors;
4. appropriate corrective actions based on the findings of investigations;
5. initial and recurrent training for staff involved in internal investigations;
6. where relevant, the organisation should cooperate with the owner, operator or CAMO on occurrence investigations by exchanging relevant information to improve aviation safety.

(c) The internal safety reporting scheme should:

1. ensure the confidentiality of the reporter;
2. be closed-loop, to ensure that actions are taken internally to address any safety issues and hazards; and
3. feed into the recurrent training as defined in AMC5 145.A.30(e) whilst maintaining appropriate confidentiality.

(d) Feedback should be given to staff both on an individual and a more general basis to ensure their continued support of the safety reporting scheme.

GM1 145.A.202 Internal safety reporting scheme

GENERAL

(a) The overall purpose of the internal safety reporting scheme is to use the reported information to improve the level of the safety performance of the organisation, and not to attribute blame.

(b) The objectives of the scheme are to:

1. enable an assessment to be made of the safety implications of each relevant incident (errors, near miss), safety issue and hazard reported, including previous similar issues, so that any necessary action can be initiated; and

2. ensure that knowledge of relevant incidents, safety issues and hazards is shared so that other persons and organisations may learn from them.

(c) The scheme is an essential part of the overall monitoring function and should be complementary to the normal day-to-day procedures and 'control' systems; it is not intended to duplicate or supersede any of them. The scheme is a tool to identify those instances in which routine procedures have failed or may fail.

(d) All safety reports that are judged to be reportable by the person submitting the report should be retained, as the significance of such reports may only become obvious at a later date.

(e) Typical occurrences to be reported are those in which aviation safety was, or could have been endangered, or which could have led to an unsafe condition. If, in the view of the reporter, an occurrence did not endanger aviation safety but, if it was repeated in different but likely circumstances, would create an unsafe situation that could lead to an accident or serious incident, then a report should be made. What is judged to be reportable on one class of product, part, or appliance may not be the same for another, and the absence or presence of a single factor, organisational, human, or technical can transform an occurrence into an accident or serious incident.

(f) The collection and analysis of timely, appropriate and accurate data will allow the organisation to react to the information that it receives, and to take the necessary action.

GM1 145.A.205 Contracting or subcontracting

RESPONSIBILITY WHEN CONTRACTING OR SUBCONTRACTING MAINTENANCE

(a) Regardless of the approval status of the subcontracted organisations, a Part 145 organisation is responsible for ensuring that all subcontracted activities are subject to hazard identification and risk management, as required by point 145.A.200(a)3, and to compliance monitoring, as required by point 145.A.200(a)6.

(b) A Part 145 organisation is responsible for identifying hazards that may stem from the existence of complex maintenance arrangements (such as when multiple organisations are contracted, or when multiple levels of contracting/subcontracting are included) with due regard to the organisations' interfaces (see GM1 145.A.200(a)3). In addition, the compliance monitoring function should at least check that the approval of the contracted maintenance organisation(s) effectively covers the contracted activities, and that it is still valid.

(c) A Part 145 organisation is responsible for ensuring that interfaces and communication channels are established with the contracted maintenance organisation for occurrence reporting. This does not replace the obligation of the contracted organisation to report to the CAAT.

For subcontracted activities, interfaces and communication channels are also needed for the purpose of the internal safety reporting scheme (145.A.202).

GM2 145.A.205 Contracting and subcontracting

DIFFERENCE BETWEEN 'CONTRACTING MAINTENANCE' AND 'SUBCONTRACTING MAINTENANCE'

(a) 'Subcontracting maintenance' means subcontracting to a third party under the maintenance

organisation management system.

This is the case when a third party carries out certain maintenance tasks on behalf of the Part 145 organisation, and the responsibility remains within the Part 145 organisation (this Part 145 organisation must have the tasks within its scope of approval). Whether the third party is approved or not is not relevant for the designation of subcontracting, since the third party will be working under the management system of the Part 145 organisation and the maintenance will be released under the approval of this organisation. See also GM1 145.A.75(b).

(b) 'Contracting maintenance' means contracting to another maintenance organisation which will release the maintenance under its own approval.

This is the case when a Part 145 organisation, contracted to carry out maintenance by an owner/operator, further contracts certain maintenance tasks to another approved Part 145 organisation, and transfers the responsibility for the release of such tasks to the second Part 145 organisation.

Contracting should only be foreseen when it is allowed by the person or organisation that requests the maintenance.

(c) In case (a), the subcontracted organisation works under the approval of the contracting organisation, whereas in case (b), the contracted organisation works under its own approval.

AMC1 to Appendix IV to TCAR 8 Part 145 (e)

Line maintenance certifying staff should demonstrate that he/she received type training and passed examination at a standard not lower than ATA 104 level 2, delivered by a training organisation approved according to a standard acceptable to the CAAT (i.e. EASA Part-147, Transport Canada CAR STD 566, FAA 14 CFR Part 147), for each aircraft type in the scope of work referred to in point (b) of Appendix IV to TCAR 8 Part 145.

Base maintenance certifying staff and support staff should demonstrate that he/she received type training and passed examination at a standard not lower than ATA 104 level 3, delivered by a training organisation approved according to a standard acceptable to the CAAT (i.e. EASA Part-147, Transport Canada CAR STD 566, FAA 14 CFR Part 147), for each aircraft type in the scope of work referred to in point (b) of Appendix IV to TCAR 8 Part 145.

AMC1 to Appendix IV to TCAR 8 Part 145 – (f)

Base maintenance certifying staff should demonstrate he/she received type training and passed examination at a standard not lower than ATA 104 level 3, delivered by a training organisation approved according to a standard acceptable to the CAAT (EASA Part-147, Transport Canada CAR STD 566, FAA 14 CFR Part 147) for each aircraft type in the scope of work referred to in point (b) of Appendix IV to TCAR 8 Part 145.

APPENDICES TO AMC AND GM TO TCAR 8 PART 145

Appendix I to AMC3 145.A.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 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 have CS-25 Amendment 1 or later in their certification basis.

B. Affected organisations

— Part 145 approved maintenance organisations that are involved in the maintenance of the aeroplanes specified in paragraph A, and fuel system components installed on such aeroplanes when the maintenance data is affected by CDCCL.

— The CAAT who is responsible for the oversight of the Part 145 approved organisations specified in this paragraph B.

C. Persons from affected organisations who should receive training

PHASE 1 ONLY

— The group of persons who represent the maintenance management structure of the organisation, the compliance monitoring manager, the safety manager, and the staff who are directly involved in monitoring the compliance of the organisation.

— The personnel of the CAAT who are responsible for the oversight of the Part 145 approved maintenance organisations specified in paragraph B.

PHASE 1 + PHASE 2 + RECURRENT TRAINING

— The personnel of the Part 145 approved maintenance organisation who are 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 organisation.

Type: It should provide an awareness of the principal elements of the subject. It may take the form of a training bulletin, or any other self-study or informative session. The signature of the trainer is required to ensure that the person has passed the training.

Level: It should be a course at the level of familiarisation 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

Staff who have not received the Phase 2 training are required to attend the training within 12 months of joining the organisation.

Type: It should be a more in-depth internal or external course. It should not take the form of a training bulletin, or any form of self-study. At the end of the course, the trainees should be required to take an examination, which should be in the form of multi choice questions, 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 authorised 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.

Recurrent training:

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

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

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

E. Guidelines for preparing the content of Phase 2 courses

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

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

(b) how the mechanics can recognise, interpret and handle the improvements in the 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 programme addressing the following issues:

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

1. ignition source prevention, and
2. flammability reduction,

(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 briefly the 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 organisations, the approval of the initial and continuation training programme and the content of the examination can be achieved by the change to the MOE. The necessary changes to the MOE to meet the content of this appendix should be made and implemented at the time requested by the CAAT.