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AVIATION MRO
2017 & ON

Aircraft Maintenance Engineer & Licensing Skills – 2017 & On

Modernising the aviation MRO workforce skills and clarifying the role of the licenced aircraft maintenance engineer.

Executive Summary

Regulatory change over the last 3 decades has diminished the clarity, roles and skills of the MRO workforce and, in particular, the role and responsibilities of the licenced aircraft maintenance engineer. The licenced aircraft maintenance engineer's role of ensuring on-going aircraft conformity with applicable airworthiness standards and regulatory requirements must be clarified. This is an obligation, under Annex 8, that is imposed when the period of validity of the certificate of airworthiness is indefinite.

This role is imperative to the on-going airworthiness of aircraft, especially in the non-airline sectors across Australia. It is also important when an aircraft is sold and transferred to have maintenance records confirming the validity of the certificate.

This post implementation review must correct the flaws introduced over time and return to international standards associated with trade and licencing knowledge and skills. Failure to meet international standards and obligations can have a negative effect on recognition of Australia's maintenance capability.

AMROBA has made many submissions over the last decade attempting to make the best of CASA's past non-harmonised changes that are the real reason we are in the mess we are today. Our industry's small businesses cannot afford another change that creates confusion like the current unworkable system.

This document is a composition of previous submissions to CASA prior to, and encouraging this Part 66 Post Implementation Review. The implementation of CASR Part 66 was a complete failure and has done enormous damage to the aircraft maintenance engineer apprenticeship system. Resurrecting and correctly implementing a national aircraft maintenance engineer apprentice system with transportable skills must be achieved as part of this licencing review.

The future licenced aircraft maintenance engineer must be responsible for continuingly certifying aircraft as airworthy by performing conformity inspections post many maintenance activities. Correctly identifying the role and responsibilities of the licenced aircraft maintenance engineer will positively input to safety.

For the first time in many years, there is a positive cooperative feeling that the needs of the industry to have a highly skilled workforce, supervised by knowledgeable and competent licenced aircraft maintenance engineers, can be attained in a timely manner as a result of this post implementation review.

The issues that have been generated by the implementation of CASR Part 66 highlighted the deficiencies in the basic aircraft maintenance engineer training standards and skills. This is the opportunity to correct the identified deficiencies.

Ken Cannane *Dated:* *10th July 2016*

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Safety All Around.

Table of Contents

1 Major Points 4

2 Industry Required AME Skills 6

3 Nationally Skilled AMEs 7

4 Can a National AME Apprentice System be Implemented? 8

5 Privileges & Scope of Licence 9

6 AME Licencing System Post 2017 10

7 Transition to the New System 11

8 Consequential Actions 12

9 The ICAO Training Model 13

1 Major Points

1. Regulate AME training standards to comply with ICAO standards:
   a. ICAO avionics trade training syllabi: ICAO avionics syllabi .
   b. ICAO mechanical trade training syllabi: ICAO mechanical syllabi .
   c. ICAO underpinning skills for both syllabi: ICAO foundation syllabi .
   d. Industry wide apprenticeships not business specific apprenticeships.
   e. Transportable AME skills & qualification employable in all sectors.

2. CASA promulgated ICAO AME training standards enables the Education Department's *Aerospace Industry Reference Committee* to develop NVET training packages to support AMEs and LAME qualifications:
   a. The practical and associated knowledge elements of the training should be provided under the competency based training system by RTOs.
   b. The knowledge elements of the training, for licencing purposes, should be legislated to enable:
      i. Self-study + examination @ 75% pass mark.
      ii. On-line + examination @ 75% pass mark.
      iii. Course + examination @ 75% pass mark.

   Note: This is the flexibility of the EASA system and it would keep costs down.

3. CASA must also promulgate the ICAO LAME specific training requirements:
   a. ICAO LAME specific knowledge syllabi: ICAO LAME syllabi .
   b. This ICAO syllabi can be split between LAME & Chief Engineer knowledge.
   c. The knowledge element for the LAME and C/E regulatory requirements must support the various AME licence pathways (e.g. applicable design standards):
      i. Self-study + examination @ 75% pass mark
      ii. On-line + examination @ 75% pass mark
      iii. Course + examination @ 75% pass mark
   d. The FAR system use of the Inspection Authorisation, adopted by NZ, has the clearest regulatory system on this requirement.

4. Adopting the above approach supports changing the B1 licence split that is based on engine type, to aircraft type certification standards:
   a. CASR Part 23 next year will automatically adopt the new international Part 23 standard of ≤ 19 seats/5818 Kg.
   b. This must replace the 5700Kg/9 seat split currently implemented under CASR Part 66.
   c. The 19 seat split was basis for the CAR31 group ratings – a return to what worked.
   d. The new global Part 23 also removes other aircraft type descriptors and only uses "Normal category" for all classes of aeroplanes outside "Transport category".
   e. The normal category can be piston or turbine powered.
   f. It also provides a technical reason to base the B licences on aircraft or systems design certification basis.
   g. A LAME certifies that the aircraft, engine, propeller, system is "airworthy", that is, it conforms to its design standards.

5. The "Group" rating system for the B1.2 & 1.4 makes sense with adoption of the new ≤ 19 seats/5818 Kg international Part 23 design standard:
   a. The group rating system was introduced to enable licences to be issued once experience was attained in the Group.
   b. It will enable improvements to the industry trade training system that has been deskilled the workforce in the last couple of decades.
   c. Under the group ratings system, CASA would reserve the right to nominate a requirement for a manufacturer's course to be completed if, post consultation, they determined the complexity of the systems needed manufacturer's training.
   d. CASR Part 23, for example, may create new innovation and designs powered by piston or turbine engines needing a course to attain the knowledge required.
   e. This is similar to the same process with "group" ratings in the past.

B1.1	B1.2	B1.3	B1.4	B2
Part 25	***Part 23***	***Part 29***	***Part 27***	***All Parts***
Specific Type Ratings	***Group Ratings***	***Specific Type Ratings***	***Group Ratings***	***Group and Type Ratings***
Design standards	Design Standards	Design Standards	Design Standards	Design Standards
Type Course	General or Type	Type Course	General or Type	Systems & Type

6. Replace the current 5700kg/9 seat arbitrary definition for licencing purposes:
   a. CASA's predecessors had evaluated aircraft designs and complexities when they raised the group ratings to 19 seats. History was ignored.
   b. The adoption of the 5700Kg/9 seats disrupted AME licencing in general aviation and created confusion and unnecessary training costs.
   c. CASA always has the option to review the complexity of an aircraft's maintenance requirements and deciding to require no additional training, manufacturer's training or specific type rating.
   d. CASA can also specify that specific aircraft in a group rating need to have evidence of completed a manufacturer's technical course.
   e. What was seen as complicated, e.g. digital technology, is the norm today.

Addressing the above issue will provide Australia with competent AMEs and aircraft/systems type design knowledgeable LAMEs that can certify the aircraft and its systems continue to conform with design standards, including modifications and repair design standards.

2 Industry Required AME Skills

An aircraft maintenance engineer (AME) must be able to perform repair and maintenance of the airframes, engines, propellers and avionics/mechanical systems that makes aeroplanes and helicopters safe to operate. The job includes inspection, repair and maintenance of the electronic, structural, avionic and mechanical elements of an aircraft. An AME tradesperson will routinely assess how worn the different parts are and determine whether those that are too worn out will be repaired or replaced entirely. This is done using visual and several diagnostic devices, manual and mechanical tools and computers. These tools are used to maintain aircraft to the applicable airworthiness standards and applicable regulatory requirements.

AMEs need to have the following skills to be able to competently do their job:

- **Dexterity**- this is a hands-on job so AMEs need to be able to use their hands to work accurately with various components, including pulling things apart and putting them back together.
- **Detail-oriented**- AMEs have to work to very high, precise standards. The ability to pay attention to the smallest detail or component and ensure every little part is in good condition and in place is important.
- **Technical skills**- part of the job will be about reading different types of instruments such as gauges. The ability to understand how instruments work and diagnostic tools is therefore important.
- **Troubleshooting**- An AME must also be able to get to the cause of a problem and how to go about setting things as they should be.
- **General or Specialised**- There are 'general' and 'specialised' AMEs. General AMEs are those who successfully complete the basic avionic or mechanical AME course and attained an Education issued qualification. Specialised AMEs acquire further qualifications that concentrate on specific skill areas of aircraft maintenance. e.g. NDI, welding, W&B, component overhaul etc.

Without doubt, the industry needs AMEs that have industry wide required skills so they can obtain work in either airline or non-airline MRO businesses by holding transportable skills and qualifications.

The AME, whether skilled in the basic avionic or mechanical streams, needs to be able to add additional skills (competencies) to broaden their employability and/or to specialise in a particular area.

AME qualifications must meet industry standards so they can be accepted by employers as positive [trade] qualifications of a person's competency.

An AME AQF qualification must not limit the trade qualification to either airline or non-airline, aeroplane or helicopter, nor aircraft avionics or mechanical type design standards.

3 Nationally Skilled AMEs

Without doubt, aviation is a global industry where aircraft and aircraft components can move from one regulatory system to another. There is an obligation on Australia to skill maintenance personnel to international standards so that our maintenance is acceptable globally. This aspect alone demands that trade qualifications be based on international standards. ICAO promulgates minimum trade training standards.

CASA is a "standard setting government agency" with a government obligation under the Convention for setting aircraft maintenance personnel standards but the Federal and State Education Departments are responsible for providing academic training and qualifications to provide a skilled workforce in any industry.

CASA's role therefore is to promulgate international maintenance personnel training standards as an obligation under the Convention. These international training standards ensures skills and qualifications acceptable globally.

The recently formed Federal Education Department's *Aerospace Industry Reference Committee* (AIRC) has a responsibility to direct and approve the AME training packages. These training packages need to meet the personnel standards promulgated by CASA.

Currently, we have a State controlled apprentice system funded through the Education Departments and supported by the Federal Education Department. The creation of the Industry Reference Committees was to give industry more of a say in obtaining skills the industry needs. It also allows CASA to promulgate ICAO's standards.

Therefore, a national AME apprentice/training system is achievable under the new *Aerospace Industry Reference Committee* with CASA promulgating, under CASR Part 147, the personnel qualifications to meet ICAO's international AME training standards.

A national system means industry would benefit by maintenance personnel with academic qualifications that are transportable and acceptable to employers. It has been a long time since employers have been able to accept education qualifications as confirmation of a person's workplace competencies.

However, up till now, the employer/apprentice contract are State based and require the employer to provide formal training with a RTO. Under these State training contracts, the training provider can tailor the training to meet the employer needs.

A properly structured AIRC AME training package should provide the full ICAO practical skills plus applicable knowledge so the AME, avionics/mechanical, will have industry wide transportable trade qualifications.

This system would exclude the LAME specific knowledge requirements to supervise/manage maintenance personnel and to coordinate maintenance to issue a release to service. What has been missing for the last couple of decades is the crucial knowledge to certify as airworthy post maintenance and to inspect to determine conformity with design standards.

However, training associated with the LAME ICAO privileges are clearly documented by ICAO and is important to release aircraft in an international airworthy condition conforming to design standards. i.e. certify as airworthy.

4 Can a National AME Apprentice System be Implemented?

Or, will the NVET qualification provide the same knowledge and practical skills in every State and Territory?

This is the responsibility of another government regulator for the vocational education and training sector, the Australian Skills Quality Authority (ASQA) who perform regulation of vocational education and training providers and accredited vocational education and training courses approved by *Industry Reference Committees*.

For ASQA to regulate and accredit a national AME trade training program, then they must take responsibility for accrediting registered training organisations (RTOs) that provide aircraft maintenance, avionic and mechanical, training courses that meets international standards in:

- Australian Capital Territory
- New South Wales
- the Northern Territory
- South Australia
- Queensland, or
- Tasmania

ASQA accrediting national aviation apprenticeship training meeting the ICAO training standards promulgated by CASA and developed and approved by the *Aerospace Industry Reference Committee.*

ASQA Vision:

ASQA's vision is that students, employers and governments have full confidence in the quality of vocational education and training outcomes delivered by Australian registered training organisations.

This is not the current case and it demonstrates that CASA, as the ICAO aviation standard setting regulatory authority, and ASQA, as the education regulatory authority, need to work closely with the *Aerospace Industry Reference Committees* to provide accredited courses in every State and Territory by ASQA accredited RTOs that must provide national AME training that meets industry and CASA needs.

The trades included on the National Skills Needs List (NSNL) are:

- Aircraft Maintenance Engineer (Avionics)
- Aircraft Maintenance Engineer (Mechanical)

We need a training package for both these streams that provide industry wide skills.

The Australian Apprenticeships Incentives Programme provides a number of incentives to assist employers who take on an Australian Apprentice, particularly where the Australian Apprenticeship is in a trade experiencing a skills shortage.

There are multiple government agencies like Trades Recognition Australia that is a skills assessment service provider specialising in assessments for people with trade skills gained overseas or in Australia, for the purpose of migration and skills recognition. A national system will only happen when all the associated government agencies and bodies work together in the interest of the industry.

5 Privileges & Scope of Licence

The current regulatory system, based on a long time flaw in the regulatory system, confuses the difference between licence privileges and the scope of the licence.

The "international" privileges are specified in ICAO Annex 1, Chapter 4. These privileges are associated with standards spelt out in Annex 8 & 6. Annex 8 – ***airworthy*** & Annex 6 – ***maintenance release***.

> **Annex 1, Chapter 4**. ***Privileges*** *of the holder of the licence and the conditions to be observed in exercising such privileges.*
>
> **4.2.2.1**. *Subject to compliance with the requirements specified in 4.2.2.2 and 4.2.2.3, the privileges of the holder of an aircraft maintenance engineer licence* ***shall be to certify the aircraft or parts of the aircraft as airworthy after*** *an authorised repair, modification or installation of an engine, accessory, instrument, and/or item of equipment,* ***and to sign a maintenance release following*** *inspection, maintenance operations and/or routine servicing.*
>
> **Annex 8.** "***Airworthy***. *The status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation.*"
>
> ***Appropriate airworthiness requirements***. *The comprehensive and detailed airworthiness codes established, adopted or accepted by a contracting State for the class of aircraft, engine or propeller under consideration (see 3.2.2 of Part II of the Annex 8).*
>
> **ICAO Doc 7192 Part D1**. *For this reason, the syllabi of instruction for the training of LAMEs should be developed based on the specifications outlined in* ***Chapter 3 of this manual****. The two privileges are:*

1. The responsibility to certify as airworthy cannot be devolved or supervised. This "*system of inspection*" is based on the aircraft, or parts of the aircraft, continuing to meet the aircraft's certificate of airworthiness standards during its life. It is based on an Annex 8 responsibility when the renewable certificate of airworthiness is replaced by a periodical inspection and a continual system of inspection to maintain a valid certificate of airworthiness. Annex 1, 4.2.2.1 first privilege clarifies this responsibility.

2. The responsibility to sign a maintenance release (however described) following maintenance requires supervision and coordination of the maintenance to ensure all appropriate and applicable maintenance tasks are signed by qualified persons and airworthy certifications, associated with item 1 above, have been completed where necessary to confirm the aircraft's certificate of airworthiness remains valid.

Scope on the other hand is based on the licence category and ratings held. The scope limits the capability of the LAME to exercise the ICAO AME privileges to those aircraft or part (system) of an aircraft that are covered by the licence.

Licence Scope is not a privilege – it is based on the AME's technical work capability.

Signing a maintenance release beyond the licence scope can be included if the coordination of the maintenance has been certified by appropriately qualified LAMEs.

6 AME Licencing System Post 2017

Over the last few decades, the AME licence training has drifted from understanding design standards applicable to classes of aircraft and aircraft systems. An international licencing system is based on appropriately qualified LAMEs that can certify the aircraft and/or its systems as continuing to comply with design standards.

This requires an AME licencing system based on the design standards applicable to the aircraft and its system. In addition, CASR Part 23 will automatically adopt EASA/FAR Part 23 consensus standards next year. CASR Part 23 aircraft applicability changes to ≤ **19 seats/5818Kgs**. This removes the contentious 5700 Kg/9 seat limitation imposed when CASR Part 66 was made and returns to past group limits.

B1.1	B1.2	B1.3	B1.4	B2
Part 25	***Part 23***	***Part 29***	***Part 27***	***All Parts***
Type Ratings	*Group Ratings*	*Type Ratings*	*Group Ratings*	*Type & group ratings*
Design standards	Design Standards	Design Standards	Design Standards	Design Standards
Type Course	General or Type	Type Course	General or Type	Systems & Type

The future will require AME licences based on the design standards of aircraft.

ICAO Training Manual – 3.3.2. Airworthiness requirements (C/E & LAME)

- *Design requirements (avionics or mechanical): performance, structural strength, handling, aerodynamics, reliability, system or component performance and reliability, engine types and tests*
- *Construction requirements: material quality, construction methods, approved manufacturing organizations, systems of traceability to source of origin, and quality control/assurance*
- *Test requirements: structural test programs, including "safe life", "fail safe" and "damage tolerant" testing*
- *Component testing and systems testing*
- *Flight test schedules and engine test schedules*
- *Test programs for special cases (aircraft, systems and components)*
- *Procedures for the maintenance of continuing airworthiness*
- *Airworthiness directives (AD): indigenous, foreign, issue dissemination, and action*
- *Operational requirements: performance scheduling, flight and operations manuals*
- *Maintenance requirements: use of aircraft maintenance manuals, maintenance schedules, overhaul periods/ lives, "on-condition" maintenance programs and "condition monitoring" programs*
- *Responsibilities of licensed aircraft maintenance personnel working in an operator or an AMO*

Adopting the aircraft design standards for the B1 licences will enable licensing training to be developed for each aircraft certification base and the depth required depending on the licence rating held.

ICAO clearly supports the distinctive supervisory/management role of the LAME as well as the obligation to certify as airworthy and safe for flight concepts.

7 Transition to the New System

In addition to the system described in the previous section, there is a need for subsets like the Cat "A" licence rating already used by the AMOs supporting major airline sector.

In the non-airline sector there is also a need for a subset, as proposed by CASA, for an "Elementary" rating. Both of these subsets are task related and not related to the role of certifying aircraft, or parts (systems) of the aircraft, as airworthy. Nor do they involve supervision, management, planning, coordinating, etc.

The above would continue under the new system with no change during transition.

Learning from past mistakes.

The problem with transition when Part 66 was introduced is that experience was ignored. The knowledge that experience provides far exceeds theoretical knowledge in many cases. In addition, current licence holders were treated like tertiary students.

In Europe, NAAs simply provided examinations covering the differences between a NAA licence and the new EASR Part 66 licence. This enabled self-study plus the NAA examination to remove differences (exclusions).

Simplifying the transition.

This proposed licence system includes knowledge of aircraft and systems design standards that can be introduced by provision of a CASA promulgated guide and, if needed, self-study and a difference examination for current licence holders.

A guide produced by CASA based on the FAA promulgated Inspection Authorisation Guide and harmonised with the NZ IA training guide would set the standard.

Senior LAMEs, especially those in supervisory and management roles have learnt by experience the design standards used in maintaining aircraft. CASR Part 66 trained LAMEs may need to self-study and pass an open book examination. This would only become necessary once a proper review is carried out of the differences.

Conformity inspection during major base maintenance, modifications and repairs is an essential element of safety. It is what was practiced under the previous 3yr major.

Updating knowledge

CASA should look seriously at the FAA system of biennial updating of their IAs and introduce a biennial on-line update program which every LAME can access. This program would list airworthiness related changes on-line for the benefit of the LAME.

With regulatory changes happening so regularly, it would ensure the validity of each LAME keeping current with regulatory and design changes.

Determining aircraft/system training

Under the "group" ratings, certain aircraft would still require a manufacturers engineering course. These aircraft, when determined by a CASA/Industry committee, would be promulgated in an AC. Most of these aircraft would be twin engines above the 5700Kgs/9 seat standard. These do not need an additional rating, only confirmation held by the LAME that he/she had attended the manufacturer's course.

NO RETROSPECTIVE ACTION

8 Consequential Actions

One of the major reasons why the role of the LAME has become confusing is that decades of changes to the regulatory system has seen the regulatory airworthiness requirements diminished when compared to international minimum standards.

Some of the changes happened as far back as 1990 and others since then have removed the clarity that were in past requirements. As a few suggestions, the following should be considered so the LAME post this review has regulatory support:

1. **Certify as Airworthy**.
   a. This is a foundation of safety that is in ICAO Annexes and especially for maintaining a valid certificate of airworthiness.
   b. To be able to certify as airworthy post maintenance or inspection means the aircraft, or part (system) of the aircraft, has to be "inspected" to determine it is airworthy and safe for flight.
   c. Create regulatory provision for LAME to perform airworthy inspections.
   d. This ICAO standard has better clarity in FARs better than EASRs.

2. **Airworthiness Requirements**
   a. Neither the CARs nor the CASRs state aircraft are to be inspected to confirm that the aircraft continues to meet its airworthiness requirements.
      i. This needs to change to improve airworthiness inspections.
   b. Neither the CARs or the CASRs state aircraft are to be maintained to the aircraft's airworthiness requirements

3. Clarify the difference between the AME & LAME
   a. The LAME is an AME first and a LAME second.
   b. AMEs are qualified persons competent of doing maintenance.
   c. The LAME role to supervise, coordinate and do conformity inspections need clarification.

CASR Part 43 should be added to the regulatory system, based on FAR Part 43. This meets the non-airline sectors better than any other major regulatory system and would harmonise with the New Zealand.

CASR Pat 42 can be retained for major airline specific areas like CAMOs and other matters associated with major airlines.

9 The ICAO Training Model

<table>
<tr><th colspan="6">Incorporating ICAO International Training Standards into the NVET System & CASA AME Licensing</th></tr>
<tr><th colspan="2">Convention</th><th>Avionics</th><th colspan="3">Mechanical</th><th>CASR</th><th>WHO</th></tr>
<tr><td rowspan="3">Annex 1</td><td>C/E</td><td colspan="4">To manage an approved AMO, a LAME must demonstrate, by examination with a 75% pass, their knowledge of the following subjects, including the design standards applicable to the AME licence category, contained in paragraphs 3.2.1; 3.3.2; 3.3.4; 3.3.5; 3.3.6; 3.3.7; 3.3.8; 3.3.9; 3.3.10 and Section 9 (HF) of ICAO's AME Training Manual. Previous successful examination on any of these subjects is accepted as a credit.</td><td rowspan="4">CASR Part 66</td><td rowspan="4">CASA decree AME Licensing Standards

NVET Provider</td></tr>
<tr><td>Annex 8</td><td colspan="4">To certify the aircraft or parts of the aircraft as airworthy a qualified AME must demonstrate, by examination with a 75% pass, their knowledge of the subjects, including the design standards applicable to AME licence category, contained in paragraphs 3.3.1; 3.3.2; 3.3.3; 3.3.4; 3.3.7; 3.3.8; 3.3.9 and 3.3.10 of ICAO's AME Training Manual. Aircraft/Engine/Systems design standards applicable to each licence category. Previous successful examination on any of these subjects is accepted as a credit</td></tr>
<tr><td>M/R CRS</td><td colspan="4">To sign a maintenance release (CRS) an AME must demonstrate, by examination with a 75% pass, their knowledge of the subjects contained in paragraphs 3.3.3; 3.3.4; 3.3.8 and 3.3.9 of ICAO's AME Training Manual.</td></tr>
<tr><td colspan="2">Experience</td><td colspan="4">Post obtaining trade qualifications, CASR Part 66 needs to state the minimum AME experience needed to gain the initial licence. E.g. 2/3 years proposed</td></tr>
<tr><td colspan="8">All knowledge examinations are based on a 75% pass mark as a minimum standard for the CASA aircraft maintenance engineer licensing system.</td></tr>
<tr><td colspan="2" rowspan="3">Annex 6 Part 1, paragraph 8.7.6.3</td><td rowspan="2">The knowledge requirements for an avionics AME are prescribed in the following paragraphs/sections 7.3 (General); 7.4 (elect/electronic); 7.5 (digital); 7.6 (elect systems); 7.7 (instrument systems); 8.3 (AFCS aeroplanes); 8.4 (AFCS Rotary); 8.5 (INS systems); 8.6 (Radio/Rad navigation); of ICAO's AME Training Manual.</td><td colspan="3">The knowledge requirements for a mechanical AME are prescribed in the following paragraphs/sections 5.3 (general); 5.4 (aeroplane); 5.5 (rotorcraft); 3.6 (airship); 6.6 (Fuel Systems); 7.3 (elect general); 7.4 (Elect limited) of ICAO's AME Training Manual.</td><td rowspan="3">CASR Part 145</td><td rowspan="3">CASA decree ICAO Standards.

NVET Provider

Trade Training</td></tr>
<tr><td>6.3 Piston Engine</td><td>6.4 (Propellers)</td><td>6.5 (Turbine Engine)</td></tr>
<tr><td>The practical skills for an avionics AME are prescribed in the following paragraphs/sections 12.3 (Avionics Electrical Practical); 12.4 (Avionics Instruments Practical); 12.5 (Avionics Autoflight Practical); 12.6 (Avionics Radio Practical); 12.7 (Avionics Repair/Maintenance/Testing); 12.8 (Avionics Document Control) of ICAO's AME Training Manual.</td><td colspan="3">The practical skills for a mechanical AME are prescribed in the following paragraphs/sections 10.3 (Airframe Practical); 10.4 (Repair/Testing); 10.5 (Airframe Document Control); 11.3 (Engine/Propeller Practical); 11.4 (Engine/Propeller Component/Testing); 11.5 (Engine/Propeller Document Control) of ICAO's AME Training Manual.</td></tr>
<tr><td colspan="2">Basic academic skills</td><td colspan="4">The following subjects are the basic knowledge for all aircraft maintenance engineers (AME) contained in paragraphs/section 4.3 (mathematics); 4.4 (physics); 4.5 (Technical Drawings); 4.6 (Chemistry); and Section 9 (Human Factors employee aspects) of ICAO's AME Training Manual.</td></tr>
</table>

ICAO Standard – AME Training Manual

1.3.1. The training of AMEs requires the imparting of manual and intellectual skills, sound knowledge of basic theory, and a comprehensive understanding of the aircraft or system upon which they will have to work. They should also develop an appreciation for the high value of, and therefore treat accordingly, the aircraft, test equipment and tools that they will use in their work. Trainees should be instructed and encouraged to develop safe and neat working routines as well as a sense of responsibility, technical honesty and integrity.

1.3.2 Attitudes and responsibility are important and emphasis should always be placed on the following:

a) the responsibility for the safety of co-workers and of the general public;
b) the individual responsibility of the AME for the quality of work performed;
c) the importance of good judgement based on positive knowledge and careful analysis of facts;
d) he importance of asking for help when in doubt;
e) the importance of continuous study to improve knowledge and keep abreast of both technology and techniques;
f) the need to adhere to standard procedures and to establish the prevailing procedures;

Note: Refer CASA's aircraft maintenance engineer licencing prerequisites' pathways for each licence category based on compliance with the ICAO AME training manual

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