

## Critical Shortage of Civil Aviation Maintenance Personnel.

### **AMROBA URGENT PROPOSAL/RECOMMENDATION**

***"That the Federal Government urgently give the Education Department the responsibility to give effect to the Chicago Convention's Annexes 8 and 1 "Aircraft Maintenance Engineer" (AME) 'avionics/mechanical' personnel training standards and additional AME licencing training standards to enhance civil aviation safety and global trading capability."***

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### Urgent Government Actions

#### **1. Adoption and Implementation of Chicago Convention Annex 8 Part II, para 6.6.4, and Annex 1, Chapter 4, Aircraft Maintenance Engineer training standards.**

Annex 8 Part II 6.6.4. "The maintenance organization shall establish the competence of maintenance personnel in accordance with procedures and to a level acceptable to the Contracting State granting the approval. [Note: all maintenance personnel, not just aircraft maintenance engineers]"

The Australian government has an obligation and responsibility to adopt and implement the global minimum maintenance personnel training standards and qualifications to enable Australian civil aviation maintenance businesses to participate domestically and globally.

**Action:** The Government make the Federal Education Department legislatively responsible for carrying out and giving effect to the Chicago Convention, as amended by Protocols and Annexes to the Convention, relating to compliance with Annex 8 para 6.6.4 and Annex 1 Chapter 4, *Aircraft Maintenance Engineers*, maintenance personnel international standards and recommended practices, relating to the competence of aircraft maintenance engineers, licenced aircraft maintenance engineers and other aviation maintenance personnel.

**Note:** In 1996, when Minister Sharp initiated a review of the aviation regulations, the review selected harmonisation with the FARs unless a system or subsystem of another regulatory system was seen as world best practice.

[AMSA list of approved training courses](#) provides a model that can be used in civil aviation by CASA.

#### **2. Immediate adoption of missing EASR Parts 66/147 regulatory provisions, especially aircraft maintenance engineer training courses duration periods and add missing licences and certificates.**

EASA has amended EASR Parts 66/147 numerous times since it was partially adopted and implemented as CASR Parts 66/147. EASA stated the reason to change these Parts was to make them work in general aviation. Without these changes being adopted into CASA Parts 66/147, industry is trying to work with dated regulations and requirements that did not work in the EU general aviation sectors.

**Note.** The majority of these changes to harmonise will be made to either CASRs Parts 66 or 147 Manual of Standards and will set standards for the Education Departments.

**Action:** Government direct CASA to prioritise the harmonisation with all provisions of EASRs Part 66 and Part 147 as soon as possible; amended to include the adoption of FAR Part 43 as CASR Part 43, if fully adopted as expected, will include links to CASR Part 66 as FAR Part 43 refers to FAR Part 65, FAAs equivalent of CASR Part 66.

#### **3. Alignment with ICAO maintenance personnel standards will assist with short term fast tracking of qualified maintenance personnel from other major regulatory systems such as EU, US, Brazil, Canada and countries that have adopted either the EU or US systems.**

**Action:** The government must direct the Education Department to adopt and provide aviation maintenance personnel training packages compatible to the ICAO minimum standards and packages including packaging new Aircraft Maintenance Engineer leading to a Licenced Aircraft Maintenance Engineer Licences by year 2024.

## History

Ever since CAA stopped promulgating the ICAO AME minimum syllabi in the early 1990s, the training levels have been changed to match the hours funded in the training sector. Those hours are approximately half what is globally accepted as the minimum AME training hours.

AMROBA raised a detailed RN article in May 2021 addressing all issues associated with the shortage of maintenance personnel and circulated to a number of government personnel hoping to achieve regulatory changes to arrest the decline in numbers by implementing global maintenance personnel and licencing standards. No government department/agency wants the responsibility of what we assert is government's treaty obligations.

This shortage of maintenance personnel has been getting worse year by year since the early 1900s when the Department withdrew their "**Guide to become a licenced aircraft maintenance engineer**". This document promulgated, without unique Australian requirements, ICAO maintenance personnel training syllabi that the State VET systems training courses adopted to meet international minimum training standards.

Since then, politicians, government departments and agencies have denied responsibility for setting **aircraft maintenance engineer** training that meets treaty minimum standards.

This denial of responsibility by government means failure to implement the international personnel skill standards required under an international treaty commonly known as the Chicago Convention, its Annexes, Protocols and ICAO Assembly Resolutions that successive governments have endorsed, implemented in accordance with the ICAO advisory documents referred to in the Annexes, etc. This Convention was ratified in 1947.

### **Why aren't we fully harmonised?**

The **Convention** sets the minimum personnel training standards for pilots, air traffic controllers, licenced and unlicenced aircraft maintenance engineers and others. Globally, all Contracting States to the Convention have an obligation to adopt and implement into the State's national laws the Standards & Recommended Practices (SARP) in the Annexes.

Every Convention Annex includes the following text to assist countries to adopt Annex SARPs.

**"Use of the text of the Annex in national regulations.** *The Council, on 13 April 1948, adopted a resolution inviting the attention of Contracting States to the desirability of using in their own national regulations, as far as practicable, the precise language of those ICAO Standards which are of a regulatory character and also of indicating departures from the Standards, including any additional regulations that are important for the safety or regularity of air navigation. **Wherever possible, the provisions of Part II of this Annex have been written in such a way as would facilitate incorporation, without major textual changes, into national legislation.**"*

Since 1948, ICAO has made it easy to adopt standards directly into Australian regulations by using the ICAO text and definitions so we are seen as being close to harmonised with these world standards.

The applicable Convention Articles associated with training have hardly been changed since Australia ratified the Convention some 7 decades back. But we are now having difficulties because, in AMROBA's opinion, not regulatory implementing these minimum international standards, has prevented NVET training packages fit for purpose in maintenance organisations. After 7 decades, there is still no dedicated NVET qualification

Chicago Convention Obligations and Responsibilities		
Obligation	Responsibility	Outcome
<p><b>Article 37.</b> <i>Adoption of International Standards and Procedures</i></p> <p><b>Note:</b> ICAO amends Annexes to the Convention to include standards and recommended practices for personnel that Australian AMEs should meet these <b>ICAO minimum standards.</b></p>	<p><b>Each contracting State (Australia) <u>undertakes to collaborate international uniformity in regulations, standards, procedures, and organization in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity will facilitate and improve air navigation.</u></b></p> <p><i>To this end the International Civil Aviation Organization shall adopt and amend from time to time, as may be necessary, international standards and recommended practices and procedures dealing with:</i></p> <p><b>(d) <u>Licensing of operating and mechanical personnel;</u></b></p>	<p>The international standards for <b>aircraft maintenance engineers trade levels are very specific and additional licencing knowledge is detailed in referenced ICAO documents.</b></p> <p>System is based on trade levels with additional licencing knowledge.</p> <p><b>NOT ACHIEVED IN AUSTRALIA</b></p>
<p><b>Annex 8, Part II, Chapter 6.6. Personnel,</b></p> <p><b>Annex 1, Chapter 4. Licences and Ratings for Personnel other than Flight Crew</b></p>	<p><b>Annex 8 para 6.6.4.</b></p> <p><b><i>The maintenance organization shall establish the competence of maintenance personnel in accordance with procedures and to a level acceptable to the Contracting State granting the approval. If the person signing the maintenance release is a non-licensed person, the person shall meet the qualification requirements specified in Annex 1 — Personnel Licensing to sign a maintenance release.</i></b></p> <p><b>Note</b> — Guidance material to design training programmes to develop knowledge and skills in human performance can be found in ICAO's Human Factors Training Manual (Doc 9683).</p> <p><b>4.2.1.4 AME/LAME Training</b></p> <p><b>Recommendation:</b> <i>The applicant should have completed a course of training appropriate to the privileges to be granted.</i></p> <p><b>Note:</b> The Manual on Training of Aircraft Maintenance Personnel (Doc 10098) contains guidance material on the design and development of a training programme for aircraft maintenance personnel.</p> <p><b>Note:</b> this manual also refers to Doc 7192 Part D that lists syllabi for the avionic and mechanical aircraft maintenance engineer and additional licence rating knowledge standards.</p>	<p>The Annex and ICAO documents are compatible with Australia's competency-based training system.</p> <p>Clearly places responsibility on government to promulgate the levels for all civil aviation maintenance personnel.</p> <p><b>NOT ACHIEVED IN AUSTRALIA</b></p> <p>Annex compatible NVET courses have not been achieved by government.</p> <p>ICAO AME trade training has never been correctly implemented since pre 1990s in Australia. Need dedicated ICAO compatible NVET <b>AME</b> courses, not "Aeroskills" generic courses.</p> <p><b>NOT ACHIEVED IN AUSTRALIA</b></p>

**What is Government's policy with regards to implementing these Convention requirements?**

From 1947 to 1990, the Civil Aviation Act, regulations and orders were based on adopting and implementing the Chicago Convention, Annexes, Protocols, Resolutions, etc. as close as practical.

Pre multiple Departments and Agencies now supposedly responsible, a single government Department was fully responsible for adopting and implementing SARPs. They always followed the ICAO SARPs and associated ICAO Documents.

### ***e.g. Convention Annex Additional LAME Minimum Training Standards***

**Note:** These are additional to the AME theoretical and practical training in other Chapters.

ICAO Doc 7192 Part D, Chapter 3. LAME Knowledge Subject Standard	Recommended duration (hours)	Level of capability
Chapter 3 - Civil aviation requirements, laws and regulations	LAME TRG ONLY	
3.3.1 International and State aviation law LAME	10	3
3.3.2 Airworthiness requirements LAME	10	3
3.3.3 Civil aviation operating regulations LAME	10	3
3.3.4 Air transport operations LAME Mgr	10	3
3.3.5 Organization and management of the operator LAME Mgr	10	3
3.3.6 Operator economics related to maintenance LAME Mgr	10	3
3.3.7 Approved maintenance organizations (AMOs) LAME Mgr	30	3
3.3.8 Aircraft maintenance licence requirements LAME	20	3
3.3.9 The role of the State aviation regulatory body LAME	10	3
3.3.10 Aircraft certification, documents, and maintenance LAME	10	3
3.3.11 Individual Aircraft Certification LAME	10	3
3.3.12 Requirements for continuing airworthiness LAME	10	3

#### **Notes:**

1. To advance from the trade level identified in other Chapters, the qualified AME needs another **90 hours of training** to obtain the knowledge to perform the duties of a LAME.
2. For a qualified LAME to become a Chief Engineer/Maintenance Manager, the LAME would need an additional **60 hours of training hours**.

#### **FUNDING**

The EASR Annex specifying minimum AME training hours below must immediately be included in the CASR Part 147 Manual of Standards by CASA.

This will enable education funding to be applied to new "Aircraft Maintenance Engineer, avionics & mechanical", training courses that meet the Conventions minimum standards.

Ever since CASA made Parts 66/147, industry has lobbied to include this chart to no avail.

## CASA (Partially) Adopted the European AME Licencing System

### **MAJOR EASR PROVISION NOT ADOPTED**

AMROBA recommended amendment to include the EASA regulatory provisions not adopted to meet the needs of general aviation. Like EASA has split the modules for the B2 avionics licence, the same approach needs to be applied to the general aviation B1.2 mechanical licence, due to certification changes for Part 23, non-transport category aeroplanes. We recommend the B1.2 be modularised between low speed and high speed as defined by CASR Part 23.

The EASR Part 66 B3, desperately needed by general aviation, should be included **before** CASA makes changes to Part 66.

Selective adoption of EASR Parts 66/147 added to the shortage of maintenance personnel.

EASA modular training is still not included in NVET training packages.

Subject modules	A or B1 aeroplane with:		A or B1 helicopter with:		B2
	Turbine engine(s)	Piston engine(s)	Turbine engine(s)	Piston engine(s)	Avionics
1 Mathematics	X	X	X	X	X
2 Physics	X	X	X	X	X
3 Electrical fundamentals	X	X	X	X	X
4 Electronic fundamentals	X	X	X	X	X
5 Digital techniques electronic instrument systems	X	X	X	X	X
6 Materials and hardware	X	X	X	X	X
7 Maintenance practices	X	X	X	X	X
8 Basic aerodynamics	X	X	X	X	X
9 Human factors	X	X	X	X	X
<b>10 Aviation legislation</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
11A Turbine aeroplane aerodynamics, structures and systems	X				
11B Piston aeroplane aerodynamics, structures and systems		X			
12 Helicopter aerodynamics, structures and systems			X	X	
13 Aircraft aerodynamics, structures and systems					X
14 Propulsion					X
15 Gas turbine engine	X		X		
16 Piston engine		X		X	
17 Propeller	X	X			

**Note:** Module 10 is the data in ICAO Doc 7192 Part D, Chapter 3, previously discussed.

### ***Missing Government Department/Agency Involvement***

Though the aviation regulations demand that the personnel they employ must qualify to these training standards, the national and State education systems, have not been directed by government to adopt.

ASQA, the *Australian Skills Qualification Authority* has not agreed with aviation regulations to provide the training standards specified in aviation regulations.

Our members suffer because of a breakdown in providing the maintenance personnel training that meet international minimum training standards and packaged in a manner acceptable to aviation requirements.

Time for government to urgently provide an all of government approach.

**“EASR Part 147” ‘Appendix I – Basic Training Course Duration’**

**The minimum duration of a complete basic training course shall be as follows:**

This EASR Part 147 regulatory provision has never been adopted into Australian regulation or implemented by a State VET system or the NVET system.

***It is another reason why there is a shortage of maintenance personnel.***

Without a defined education pathway, attracting and retaining becomes a major issue.

Basic Course	Duration (in hours)	Theoretical Training Ratio (in %)
A1	800	30–35
A2	650	30–35
A3	800	30–35
A4	800	30–35
B1.1	2,400	50–60
B1.2	2,000	50–60
B1.2 Low Speed	1,600 (**)	50–60
B1.3	2,400	50–60
B1.4	2,400	50–60
B2	2,400	50–60
B2L	1,500 (*)	50–60
B3	1,000	50–60
(*) This number of hours shall be increased as follows, depending on the additional system ratings selected:		
System Rating (*)	Duration (in hours)	Theoretical Training Ratio (in %)
COM/NAV	90	50–60
INSTRUMENTS	55	
AUTOFLIGHT	80	
SURVEILLANCE	40	
AIRFRAME SYSTEM	100	
(**) This is AMROBA’s proposed number of hours for a B1.2 Low Speed aeroplane + additional 500 High Speed aeroplane training.		
B1.2 HIGH SPEED	400 hours	50–60

CASA has been requested to include this important EASR chart but successive CEOs have failed to include it in the regulation or manual of standards.

In the above chart, EASA training hours are presented against each trade/licencing format. In addition, CASR requirements specifies the modules applicable to each licencing pathway.

- Trade training is covered by all modules except module 10.

CASR Part 66 includes in detail the subjects associated with each licence pathway as well as the depth of the subject by assigning level 1 – 3.

AMROBA and its members find it hard to digest that government and its agencies do not take responsibility for the critical shortage of maintenance personnel and loss of career pathways to attract new personnel into the aviation industry.

***INDUSTRY SUFFERS FROM BAD LEGISLATIVE REQUIREMENTS AND THE FAILURE TO APPLY A WHOLE OF GOVERNMENT APPROACH TO ADOPTING AND IMPLEMENTING OBLIGATIONS AND RESPONSIBILITIES UNDER AN INTERNATIONAL TREATY. THE REQUIREMENT TO GIVE EFFECT TO THE TREATY IS ONLY SPELT OUT IN DETAIL IN THE AIR NAVIGATION ACT.***