CASR Part 66 Regulatory Implementation

The is an object case study in how to fail when implementing regulatory change.

CASR Part 66/147 was introduced in 2010 based on 17 European regulated maintenance personnel training modules that CASA never attained vocational government support to implement.

Employers are supposed to employ aircraft maintenance engineers (AME) qualified with the applicable trade modules plus module 10 for AME licences without type ratings.

18 years after implementation and VET modules training packages and qualifications still not available from VET training establishments, Education RTOs or CASA approved MTOs

Industry Expectations – Basic Modules Qualifications – Trade/Licence		
Aircraft Maintenance Engineer	**Trade Modules**	**Licenced AME Modules**
Aeroplane (turbine) maintenance engineer	**1 – 9, 11,** 15 & 17	B1.1. Same as trade plus 10
Aeroplane (piston) maintenance engineer	**1 – 9, 11,** 16 & 17	B1.2. Same as trade plus 10
Helicopter (turbine) maintenance engineer	**1 – 9, 12** & 15	B1.3. Same as trade plus 10
Helicopter (piston) maintenance engineer	**1 – 9, 12** & 16	B1.4. Same as trade plus 10
Avionics maintenance engineer	**1 – 9, 13** & 14	B2. Same as trade plus 10
ICAO training standards for LAME	NA	Refer Attachment A

Implementing part 66 is an inter-governmental issue and the responsibility is on CASA to obtain other government departments and agencies, like the Department of Education, to support for the implementation of CASA regulatory standards.

The biggest drawback was when CASA regulatory adopted parts of a foreign system but not crucial regulatory provisions like listing predicated regulatory course hours and theoretical and practical split as aviation regulatory standards. Until the EASA course duration is promulgated by CASA, the appropriate government funding will not be allocated in Australia. **18 years after implementing, CASA still haven't promulgated the EASR Part 147 course hours.**

EASR Part 147 Appendix I

Basic Training Course Duration

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

Basic Course	Duration (in hours)	Theoretical training ratio (in %)
A1	800	30 to 35
A2	650	30 to 35
A3	800	30 to 35
A4	800	30 to 35
B1.1	**2 400**	**50 to 60**
B1.2	**2 000**	**50 to 60**
B1.3	**2 400**	**50 to 60**
B1.4	**2 400**	**50 to 60**
B2	**2 400**	**50 to 60**

Not yet regulatory promulgated – how tolerant must an industry be.

All Asian and other countries that adopted EASR Parts 66/147 promulgated the training hours.

Adopton of a system based on increased training hours naturally fails the expected outcomes.

EASA Latest 2018 Part66/147 Amendments.

EASA has made considerable changes to EASR Part 66/147 to address the shortfall of their regulatory standards and licencing for general aviation. Without doubt, CASA should fully adopt these standards, including the amended Course Duration to cover GA licencing. This enables CASA to meet their obligations under the Civil Aviation Act to promulgate clear and concise aviation standards.

EASR Part 66 2018 amendment in chart form (red indicate new ratings for Australia).

AME Licence	Rating	Scope
A	A 1	Aeroplanes Turbine – no type rating, subject to compliance with the requirements of Part 145.A.35
	A 2	Aeroplanes Piston – no type rating, subject to compliance with the requirements of point 145.A.35
	A 3	Helicopter Turbine – no type rating, subject to compliance with the requirements of point 145.A.35
	A 4	Helicopter Piston – no type rating, subject to compliance with the requirements of point 145.A.35
B	B1.1	Aeroplanes Turbine – **specific aircraft type rating**
	B1.2	Aeroplanes Piston – deemed to meet L1C, L1, L2C & L2 knowledge requirements. Can be full subgroup and/or full group ratings.
	B1.3	Helicopter Turbine – can be full subgroup or group rating.
	B1.4	Helicopter Piston – can be full subgroup or group rating
	B2	Applicable to all aircraft. Applicable Aircraft rating, Group 1. Can be full subgroup rating.
	B2 L (new)	Applicable to all aircraft other than those in Group 1 (type rating) with at least one 'system ratings' • Communication/navigation (com/nav), • Instruments, • Autoflight, • Surveillance, • Airframe systems. Appropriate manufacturers or full subgroup rating.
	B3 (new)	Applicable to piston-engine non-pressurised aeroplanes of 2,000 kg MTOW and below. Deemed to meet knowledge requirements for L1C, L1, L2C and L2 ratings. • Wooden structured aeroplanes • Metal tubing structured, fabric covered, aeroplanes, • Metal structured aeroplanes, • Composite structure aeroplanes.
L (new)	L1C	Composite Sailplanes
	L1	Sailplanes – same scope as B3 above
	L2C	Composite powered sailplanes & composite ELA1 aeroplanes – same scope as B3 above
	L3H	Hot-air balloons
	L3G	Gas Balloons
	L4H	Hot-air airships – includes L3H knowledge requirements
	L4G	ELA2 gas airships, - includes L3G knowledge requirements
	L5	Gas airships other than ELA2
Groups [Applies to the above. May be by subgroup or full group applied]	1	**Aircraft with type ratings**
	2	2a: single turboprop engine aeroplanes & turbojet and multiple-turboprop aeroplanes deemed low complexity by CASA
		2b: single turbine engine helicopter & multiple-turbine engine helicopters deemed low complexity by CASA
		2c: single piston engine helicopters & multiple piston engine helicopters deemed low complexity by CASA
	3	Piston engine aeroplanes other than those in Group 1.
	4	Sailplanes, powered sailplanes, balloons and airships, other than those in Group 1

Just like the Canadian licencing system, the examination and course standards are promulgated by the regulator as part of their responsibility to promulgate standards and issue licences.

The following charts enables training 'modules' to be adapted to implement the new GA licence ratings.

For categories A, B1 and B3 (mechanical):

Subject module	A or B1 aeroplane with:		A or B1 helicopter with:		B3
	Turbine engine(s)	Piston engine(s)	Turbine engine(s)	Piston engine(s)	Piston engine non-pressurised aeroplanes of 2,000 kg MTOM and below
1	X	X	X	X	X
2	X	X	X	X	X
3	X	X	X	X	X
4	X	X	X	X	X
5	X	X	X	X	X
6	X	X	X	X	X
7A	X	X	X	X	
7B					X
8	X	X	X	X	X
9A	X	X	X	X	
9B					X
10	X	X	X	X	X
11A	X				
11B		X			
11C					X
12			X	X	
13					
14					
15	X		X		
16		X		X	X
17A	X	X			
17B					X

For categories B2 and B2L (avionics):

Subject module/submodules	B2	B2L
1	X	X
2	X	X
3	X	X
4	X	X
5	X	X
6	X	X
7A	X	X
7B		
8	X	X
9A	X	X
9B		
10	X	X
11A		
11B		
11C		
12		
13.1 and 13.2	X	X
13.3(a)	X	X (for system rating ‘Auto flight’)
13.3(b)	X	
13.4(a)	X	X (for system rating ‘Com/Nav’)

Subject module/submodules	B2	B2L
13.4(b)	X	X (for system rating 'Surveillance')
13.4(c)	X	
13.5	X	X
13.6	X	
13.7	X	X (for system rating 'Auto flight')
13.8	X	X (for system rating 'Instruments')
13.9	X	X
13.10	X	
13.11 to 13.18	X	X (for system rating 'Airframe systems')
13.19 to 13.22	X	
14	X	X (for system ratings 'Instruments' and 'Airframe systems')'
15		
16		
17A		
17B		

In addition, the EASR Part 147 Appendix 1 has been amended to include these new licences and ratings that should also be covered by the national VET system.

EASR Part 147 Appendix I

Basic training course duration

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

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	2400	50–60
B1.2	2000	50–60
B1.3	2400	50–60
B1.4	2400	50–60
B2	2400	50–60
B2L	1500	50–60
B3	1000	50–60

B2L licence.

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 SYSTEMS	100	

Harmonising VET terminology with international standards - Important.

Global aviation course terminology is based on job classification. "AME" & "LAME".

The need for **aircraft maintenance engineer** (**AME)** regulatory modular training packages is needed to provide domestic & global aviation recognition. This change in education course terminology will enable Australian VET qualifications to be recognised both domestically and internationally thus assisting VET education providers to offer AME training both domestically and internationally. Australian VET RTOs should be actively involved in the education of the Asia/Pacific aviation maintenance training market.

1. International terminology needs to be adopted to training packages.
    a. Replace "**MEA training packages**" with "**AME modular training packages**".
    b. Enables global recognition of VET qualifications.
    c. "**AME modular training packages**" are used in Europe and most INDO/Asia/Pacific countries.
    d. There is no recognition of the Australian terminology that comes from a past era of skill training.
    e. Regulatory terminology civil domestic and internationally use either:
        i. Aircraft Maintenance & Engineering for diverse industry jobs such as in Australia; or
        ii. Aircraft Maintenance Engineering when only training for an AME licence is used.
    f. The aviation regulatory imposed training modules can be used for associated aviation support jobs as is done in New Zealand.

The same VET competency units, compliant with regulatory standards, will identify as "Aircraft Maintenance Engineers": (AME Training packages)

> "**VET Standard: 7.5**. VET accredited courses **confirm recognition to be given** to the course by **licensing**, **regulatory**, professional or **industry bodies** where applicable."

The current training packages are not providing aviation businesses with the standard for skills or qualifications to meet what is required in the maintenance repair overall (MRO) system. They are not compatible with the skills required by legislation and they are not being packaged in the legislative required modular system based on international standards.

From an employer and employee point of view, CASA and government have not implemented the VET training requirements that they introduced in 2010.

How can CASA and government continue to back a system that they introduced without the support of the VET system, comparable to Europe, needed to properly implement it?

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CIVIL AVIATION REQUIREMENTS, LAWS AND REGULATIONS

3.1 INTRODUCTION

3.1.1 International aircraft operations is governed by the rule of law; since the first flight by a heavier-than-air machine, a number of conventions, regulations, legislation, orders, agreements, etc. have been promulgated among and within States to ensure that flights are operated in a safe and orderly manner. Achievement of safety and regularity in air transportation operations requires that all States accept and implement a common standard of aircraft operations with regards to training, licensing, certification, etc. for international operations. The standardization of operational practices for international services is of fundamental importance in order to prevent costly errors which may be caused by misunderstanding or inexperience. Although this manual and other ICAO manuals address international aircraft operations, the need for standardization is equally applicable to all other aircraft operations.

3.1.2 International and national regulations and air laws are promulgated to ensure safety, regularity and efficiency of international aircraft operations. On the international scene, ICAO, pursuant to the provisions of Article 37 of the Convention on International Civil Aviation, develops and adopts Standards and Recommended Practices or SARPs (Annexes to the Convention) as the minimum requirement for aircraft operations. National regulations are developed on the basis of the SARPs, with some variations to suit the specific requirements of individual States. States may enact legislation that may differ significantly from those enacted in other States. However, international aircraft operations share many regulations, laws and statutes. The syllabus contained in this chapter gives an overview of air law as adopted by ICAO and practised in international aircraft operations.

3.2 TRAINING OBJECTIVES

Conditions: The trainees will be provided with a broad outline of the regulatory requirements that must be met by an operator engaged in commercial air transport and an outline of regulatory documents that are significant to the **[Licensed] Aircraft Maintenance (Engineer** / ~~Technician / Mechanic~~) (**AME**) (including those on maintenance), and maintenance control concepts that illustrate the application of regulatory requirements as they relate to the responsibilities and work of the **licenced AME**.

Performance: The trainees will be able to identify the role of international and national aviation regulatory bodies, identify the importance of applicable regulations to aircraft maintenance activities, and describe the application of regulations relating to aircraft maintenance in those areas which fall under the duties and responsibilities of the LAME.

Standard of accomplishment:

The regulations and legislation applicable to the described case will be accurately identified. Provisions, practical applications and implementation will also be described to demonstrate understanding of the relevant issues.

3.2.1 REQUIRED KNOWLEDGE, SKILLS, AND ATTITUDES

- International and State aviation laws. (**LAME Knowledge**)
- International Civil Aviation Organization (ICAO): formation, structure, functions, obligations and responsibilities.
- Review of ICAO Annexes, particularly **Annex 1** — *Personnel Licensing*, **Annex 6** — *Operation of Aircraft* and **Annex 8** — *Airworthiness of Aircraft.*

- ICAO specifications applicable to the particular course of study.
- National civil aviation regulations.
- Government, ministerial and departmental responsibilities for civil aviation within the State.
- State competency and licensing regulations for AMEs.
- Formalities prescribed by the State: Certificates of Airworthiness (CoA), logbooks, Certificates of Maintenance, maintenance schedules, and Certificates of Approval.
- Format of documents, required signatures, conditions for issue of or compliance, and period of validity.

3.2.2 Airworthiness requirements (Chief Engineer LAME)

- Design requirements: 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 (AMOs), systems of traceability to source of origin, and quality control/assurance.
- Test requirements: structural test programmes, including "safe life", "fail safe" and "damage tolerant" testing.
- Component testing and systems testing.
- Flight test schedules and engine test schedules.
- Test programmes 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 programmes and "condition monitoring" programmes.
- Responsibilities of licensed aircraft maintenance personnel working in an operator or an AMO.

3.2.3 Civil aviation operating regulations (LAME Knowledge)

- Regulations concerning aircraft, aircraft operations, safety, and airworthiness requirements.
- Personnel licensing, maintenance of competency, approved organizations, and training requirements.
- Aircraft and aircraft maintenance documentation.

3.2.4 Air transport operations (LAME Knowledge)

- Brief historical review of commercial aviation.
- Outline of major factors in airline organization and economics.
- Description of route network of State concerned.

3.2.5 Organisation and management of the operator (Chief Engineer LAME)

- Understanding of the air operator's responsibilities for maintenance and the relationship

between the operator's Maintenance Control Manual and the maintenance organization's Procedures Manual.

- General structure of an airline; functions and organization of various departments; organization of the maintenance department and AMOs; and detailed functions of departments such as Technical, Engineering, Production Engineering, Quality Control/ Assurance and Inspection.
- Documentation of maintenance: use of aircraft manuals, manufacturer's bulletins and ADs, preparation and approval of maintenance schedules, job/task cards, worksheets, aircraft/engine logbooks and operator's technical logbooks.
- Operation of inspection and/or quality departments.
- Stores organization and procedures.
- Planned maintenance work: inspection periods and component lifing, check cycles, rotation of components, and overhaul requirements.
- Hangar layout and equipment, and maintenance docks.
- Workshop safety, fire prevention and first aid.
- Responsibilities of departmental managers.
- Management methods: methods study, time and motion study, statistical methods, budgeting and analysis.

3.2.6 Operator economics related to maintenance.

(Chief Engineer/Engineering Manager)

- **Maintenance costs**: percentage of operating costs, capital equipment costs, labour, consumable stores, stores-inventory, effect of elapsed time on airline costs, man-hours required to complete typical work, and maintenance time overrun penalties.
- Relative costs of overhaul by manufacturer or airline.
- Component/powerplant leasing.
- Planning: analysis of different cyclic systems (progressive and equalized checks, etc.), long-term planning for mixed fleet, balancing work loading, effects of seasonal peaks on work loading, etc.
- Preparation of worksheets and job cards, task time analysis, and task sequencing for optimum down time.
- Development engineering: liaison with manufacturers; study of new aircraft types; performance analysis; modifications policy; defect analysis; engineering contributions to improved utilization; reliability programmes; engine trend monitoring and reliability centred maintenance studies.
- **Labour policy**: skills required, training and recruitment, grading and qualifications; salary structures; agreements with trade unions etc.
- State regulations, incentives and discipline, and welfare.
- **Quality** control/assurance: inspection procedures, documents, records, and sampling techniques; psychological aspects of inspection, and duplicate inspections according to international, national and airline standards.
- **Safety**: national requirements for industrial safety, insurance requirements, hazards from hazardous fluids and gases (such as fuel, hydraulic fluid, vapours), mechanical dangers, and protective measures in work areas.

3.2.7 Approved maintenance organizations (AMOs) (Chief Engineer Knowledge)

- Concept of a corporate body, its legal responsibilities and organizational structure.
- Group of persons nominated as being responsible for ensuring compliance with approval requirements.
- Establishment of the competence of personnel and training of persons signing maintenance release.
- Issue of terms of approval by the State.
- AMO procedures and procedure manual.
- AMO quality assurance or inspection system.
- AMO facilities, tools, equipment and working environment.
- AMO storage facilities and procedures.
- Access to necessary technical data.
- Record-keeping and records procedures, and issue of a maintenance release.

3.2.8 Aircraft maintenance licence requirements (LAME Knowledge)

- Eligibility, age, limits of location, language and fees.
- Categories of licence as defined in State requirements.
- Knowledge and experience requirements.
- Training requirements.
- Examination requirements and content and issue of licence document.
- Privileges of the licence.
- Revocation and suspension procedures by the State.

3.2.9 The role of the State aviation regulatory body (LAME Knowledge)

- Protection of public interests by establishing the need for and feasibility of air service and ensuring the safety of flight operations conducted within the State.
- Regulation of the degree of competition between operators and exercise of control over commercial air operators.
- Definition of the requirements for State-owned or State-operated facilities and services.
- State authority is normally exercised through the incorporation of civil aviation acts, laws and statutes into the State's legal system. It is also asserted through the establishment of a State Civil Aviation Authority (CAA) which has the power to apply principles set forth in aviation law, develop civil aviation regulations and orders, and establish requirements for the issue of licences, certificates and other instruments of authority deemed necessary for commercial air transport.
- The State must also inspect all aspects of commercial air transport operations to ensure continuing compliance with State requirements, recommend corrective action to air operators and revoke air operators' licences.

3.2.10 Aircraft certification, documents and maintenance (LAME Knowledge)

3.2.10.1 Aircraft, propeller & engine Type Certification (LAME Knowledge)

- Certification rules (e.g. FAR/JAR 23, 25, 27 and 29).
- Type Certification (TC), TC issue, and associated TC Data Sheet.
- Supplemental Type Certification or major modification.

3.2.10.2 Individual aircraft certification (LAME Knowledge)

- Approval of design or production organizations.
- Issue of Certificate of Airworthiness (CofA) and Certificate of Registration (CofR).
- Documents to be carried on-board the aircraft: CofA, CofR, Noise Certificate, Weight and Balance Reports, and Radio Station Licence and Approval.

3.2.10.3 Requirements for continuing airworthiness (LAME Knowledge)

- Understanding of the concept that continuing airworthiness is the process of ensuring that at any time in its operating life, the aircraft should comply with airworthiness requirements and should be in a condition for safe operation.
- Renewal or continued validity of the CofA.
- State approval or acceptance of maintenance programmes, minimum equipment lists, ADs, manufacturer's service information (SBs, SLs, etc.), aircraft maintenance manual, operator maintenance control manual, and AMO Maintenance Procedures Manual.
- Understanding of the importance of defect reporting to the State of Registry and to the organization responsible for the type design.
- Analysis of defect accident or other maintenance or operational information by the organization responsible for the type design.
- Importance of structural integrity with particular reference to supplemental structural inspection programmes and any other requirements related to ageing aircraft.
- Special operational approvals (e.g. Extended Range Operations by Aeroplanes by Twin-engined Aeroplanes (ETOPS), All Weather Operations, Reduced Vertical Separation Minima (RVSM), Required Navigation Performance (RNP), and Minimum Navigation Performance Specifications (MNPS).