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## LAME AND CHIEF ENGINEER TRAINING SYLLABI

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Based on “international training standards” promulgated by the International Civil Aviation Organisation (ICAO) in their Annex 1 Chapter 4 referenced training manual, the following licenced aircraft maintenance engineer syllabi adopts the referenced *Licensed Aircraft Maintenance Engineer* (LAME) training standards, additional to the AME training standards, to meet Australia’s obligation under Article 37 of the Convention.

**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.*

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).*

There are two clear responsibilities placed on the LAME under Annex 1 to meet Annex 8 and Annex 6 requirements and the ICAO AME Training Manual provides the following syllabi to enable the LAME to have the skills and knowledge commensurate with the responsibilities of the LAME.

Annex 8, Chapter 3.

“3.2.3 A Certificate of Airworthiness shall be renewed or shall remain valid, subject to the laws of the State of Registry, provided that the State of Registry shall require that the continuing airworthiness of the aircraft shall be determined by a periodical inspection at appropriate intervals having regard to lapse of time and type of service or, alternatively, by means of a system of inspection, approved by the State, that will produce at least an equivalent result.”

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* requirements 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 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 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.

Chapter 3 syllabi identifies the additional knowledge, post avionic or mechanical pathways, to be achieved to obtain an AME licence. The avionics trade level syllabi is specified in Chapters 7, 8 & 12 and the mechanical syllabi is specified in Chapters 5, 6, 10 & 11.

In addition to the knowledge, experience needs to be assessed by CASA.

Article 37 of the Convention and these Annexes’ provisions gives CASA the right to promulgate the ICAO international LAME training standards syllabi. In addition, it has the right to state the syllabi pathway, based on the ICAO training manual, for an applicant to meet prior to applying for each CASA licence.

Within Chapter 3 there are requirements that not all LAMEs would require to have but they are appropriate for those LAMEs that take on organisational management responsibilities. These provisions have been identified in the following syllabi as applicable to Chief Engineer training.

The additional LAME training requirements above the AME training, should be based self-study, on-line tuition or classroom tuition tested by written examination at the 75% pass mark.

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<b>3.3.1. International and State aviation laws (All LAMEs)</b>	
<ul style="list-style-type: none"> <li>• International Civil Aviation Organization (ICAO): formation, structure, functions, obligations and responsibilities.</li> <li>• Review of ICAO Annexes, particularly:               <ul style="list-style-type: none"> <li>• Annex 1 – Personnel Licensing,</li> <li>• Annex 6 – Operation of Aircraft and (<i>supervise/coordinate release to service</i>)</li> <li>• Annex 8 – Airworthiness of Aircraft (<i>certify airworthy</i>)</li> </ul> </li> <li>• ICAO specifications applicable to the particular course of study (<i>Avionic or Mechanical</i>)</li> <li>• National civil aviation regulations</li> <li>• Government, ministerial and departmental responsibilities for civil aviation within the State</li> <li>• State education competency and licensing regulations for AMEs</li> <li>• Formalities prescribed by the State: Certificates of Airworthiness (CoA), logbooks, Certificates of Maintenance, maintenance schedules, and Certificates of Approval</li> <li>• Format of documents, required signatures, conditions for issue of or compliance, and period of validity</li> </ul>	
<b>3.3.2. Airworthiness requirements (Chief Engineer/ LAME)</b>	
<ul style="list-style-type: none"> <li>• Design requirements (<i>avionics or mechanical</i>): performance, structural strength, handling, aerodynamics, reliability, system or component performance and reliability, engine types and tests</li> <li>• Construction requirements: material quality, construction methods, approved manufacturing organizations, systems of traceability to source of origin, and quality control/assurance</li> <li>• Test requirements: structural test programmes, including “safe life”, “fail safe” and “damage tolerant” testing</li> <li>• Component testing and systems testing</li> <li>• Flight test schedules and engine test schedules</li> <li>• Test programmes for special cases (aircraft, systems and components)</li> <li>• Procedures for the maintenance of continuing airworthiness</li> <li>• Airworthiness directives (AD): indigenous, foreign, issue dissemination, and action</li> <li>• Operational requirements: performance scheduling, flight and operations manuals</li> <li>• Maintenance requirements: use of aircraft maintenance manuals, maintenance schedules, overhaul periods/lives, “on-condition” maintenance programmes and “condition monitoring” programmes</li> <li>• Responsibilities of licensed aircraft maintenance personnel working in an operator or an AMO</li> </ul>	
<b>3.3.3. Civil aviation operating regulations (All LAMEs)</b>	
<ul style="list-style-type: none"> <li>• Regulations concerning aircraft, aircraft operations, safety, and airworthiness requirements</li> <li>• Personnel licensing, maintenance of competency, approved organizations, and training requirements</li> <li>• Aircraft and aircraft maintenance documentation</li> </ul>	
<b>3.3.4. Air transport operations (Chief Engineer only)</b>	
<ul style="list-style-type: none"> <li>• Brief historical review of commercial aviation</li> <li>• Outline of major factors in airline organization and economics</li> <li>• Description of route network of State concerned</li> </ul>	

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## Doc 7291 Part D1, Chapters 3 Syllabi. LAME/Chief Engineer Responsibilities

### 3.3.5. Organisation and management of the operator (Chief Engineer only)

- 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

### 3.3.6. Operator economics related to maintenance (Chief Engineer only)

- 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

### 3.3.7. Approved maintenance organizations (Chief Engineer/LAME)

- 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

### 3.3.8. Aircraft maintenance licence requirements (All LAMEs)

- 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

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### Doc 7291 Part D1, Chapters 3 Syllabi. LAME/Chief Engineer Responsibilities

#### 3.3.9. The role of ~~the State aviation regulatory body~~ CASA (All LAMEs)

- 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.

#### 3.3.10. Aircraft certification, documents and maintenance (All LAMEs certifying as airworthy)

##### (1) Aircraft, propeller & engine Type Certification (*LAME certifying as airworthy*)

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

##### (2) Individual aircraft certification (*LAMEs certifying as airworthy*)

- 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) Requirements for continuing airworthiness (*LAMEs certifying as airworthy*)

- 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))