Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICES

Revision 24 dated 25 January 2018

ISSUED BY:
CIVIL AVIATION AUTHORITY OF SINGAPORE

Civil Aviation Authority of Singapore

Date: 25 January 2018

AIRWORTHINESS NOTICES
REVISION 24 DATED 25 January 2018

Please be informed that the following Notices have been revised/cancelled:-

Notice No.	Issue	Date	Remarks
A0	24	25 January 2018	Revised
A1	5	25 January 2018	Revised
B5	4	1 July 2003	Cancelled
C4	6	1 July 2003	Cancelled
C9	2	1 July 2003	Cancelled
C10	3	1 July 2003	Cancelled
C13	2	1 July 2003	Cancelled
C20	3	1 July 2003	Cancelled
C26	2	1 July 2003	Cancelled
C27	2	1 July 2003	Cancelled
C32	2	1 July 2003	Cancelled
C34	2	1 July 2003	Cancelled
C36	2	1 July 2003	Cancelled
C37	4	1 July 2003	Cancelled
C38	3	1 July 2003	Cancelled
C39	2	1 July 2003	Cancelled
C40	4	1 July 2003	Cancelled
C45	2	1 July 2003	Cancelled
C46	2	1 July 2003	Cancelled
C47	2	1 July 2003	Cancelled
C48	2	1 July 2003	Cancelled
C49	2	1 July 2003	Cancelled
C56	1	16 November 2009	Cancelled

Issued by
SAFETY POLICY & LICENSING DIVISION
CIVIL AVIATION AUTHORITY OF SINGAPORE

AIRWORTHINESS NOTICES

RECORD OF REVISIONS

#A0 Issue No.	Date	Inserted by	#A0 Issue No.	Date	Inserted by
16	1 July 2003	CAAS			
17	1 April 2004	CAAS			
18	1 July 2004	CAAS			
19	1 July 2005	CAAS			
20	15 August 2006	CAAS			
21	1 June 2007	**CAAS**			
22	1 February 2008	CAAS			
23	16 November 2009	CAAS			
24	**25 January 2018**	**CAAS**			

No. A0

Issue 24

25 January 2018

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

This Airworthiness Notice contains a list of the current Airworthiness Notices. This copy supersedes revision issue 23 dated 16 November 2009.

Notice No	Issue	Date	Subject
A0	24	25 January 2018	Contents
A1	5	25 January 2018	Foreword
A2	-	-	Cancelled
A3	-	-	Cancelled
B1	-	-	Cancelled
B2	-	-	Cancelled
B3	3	1 July 2003	Aircraft Engines, Engine Modules, APUs and Propellers obtained from sources not under the Airworthiness Control of CAAS
B4	-	-	Cancelled
B5	-	-	Cancelled
B6	3	15 August 2006	Manufacture and Inspection of Aircraft Parts and Approval of Materials for the Repair or Overhaul of Aircraft
B7	-	-	Cancelled
B8	3	1 July 2003	Renewal of Certificates of Airworthiness
B9	-	-	Cancelled
B10	2	1 July 2003	Acceptance Standards for the Maintenance, Overhaul, Repair of Second-hand Imported Aircraft for which a Singapore Certificate of Airworthiness is sought

Notice No	Issue	Date	Subject
B11	18	1 July 2004	Recognition of the Republic of Singapore Air Force (RSAF) Qualified Senior Technicians' Experience as Aeronautical Engineering Experience
B12	20	1 June 2007	Aircraft Maintenance Examination Credits for Graduates of Aeronautical Engineering Diploma Programmes Conducted by Singapore Polytechnic and Ngee Ann Polytechnic
C1	-	-	Cancelled
C2	2	1 July 2003	Tyre Wear Limits
C3	-	-	Cancelled
C4	-	-	Cancelled
C5	4	1 July 2009	Suspected Unapproved Parts
C6	4	1 July 2003	Carriage of Emergency Locator Transmitter (ELT)
C7	-	-	Cancelled
C8	2	1 July 2003	Microbiological Contamination of Fuel Tanks of Turbine Engine Aircraft
C9	-	-	Cancelled
C10	-	-	Cancelled
C11	2	1 July 2003	Carbon Monoxide Contaminations in Aircraft
C12	2	1 July 2003	Maintenance of Cockpit and Cabin Combustion Heaters and their Associated Exhaust Systems
C13	-	-	Cancelled
C14	2	1 July 2003	Gas Turbine Engines Parts Subject to Retirement
C15	-	-	Cancelled
C16	-	-	Cancelled
C17	2	1 July 2003	Vertical Speed Indicators on Imported Aircraft
C18	-	-	Cancelled
C19	-	-	Cancelled
C20	-	-	Cancelled
C21	3	1 July 2003	Fatigue Lives

Notice No	Issue	Date	Subject
C22	-	-	Cancelled
C23	-	-	Cancelled
C24	2	1 July 2003	Overhaul and Inspection Requirements for Variable Pitch Propellers
C25	2	1 July 2003	Power Supply Systems for Aircraft Radio Installations
C26	-	-	Cancelled
C27	-	-	Cancelled
C28	2	1 July 2003	Electrical Generation Systems – Aircraft not exceeding 5700kg MTWA
C29	2	1 July 2003	Fire Precautions – Aircraft Toilets
C30	2	1 July 2003	Automatic Direction Finding Equipment on Turbine Engined Aeroplanes and Helicopters
C31	2	1 July 2003	Communications Transmitters in the VHF Radio Telephony Band 118-136 MHz
C32	-	-	Cancelled
C33	-	-	Cancelled
C34	-	-	Cancelled
C35	2	1 July 2003	Ground Operation of Aircraft Radar Equipment
C36	-	-	Cancelled
C37	-	-	Cancelled
C38	-	-	Cancelled
C39	-	-	Cancelled
C40	-	-	Cancelled
C41	2	1 July 2003	Electrical Generation Systems – Single Engine Aircraft
C42	2	1 July 2003	Acceptance of Aircraft Standard Parts by Users
C43	-	-	Cancelled
C44	2	1 July 2003	Tyre Bursts in Flight – Inflation Media
C45	-	-	Cancelled
C46	-	-	Cancelled

Notice No	Issue	Date	Subject
C47	-	-	Cancelled
C48	-	-	Cancelled
C49	-	-	Cancelled
C50	-	-	Cancelled
C51	-	-	Cancelled
C52	3	11 December 2002	Enhanced Ground Proximity Warning System (EGPWS)
C53	-	-	Cancelled
C54	-	-	Cancelled
C55	1	1 February 2008	Additional Cabin Safety Requirements for Airbus A380 Aircraft
C56	-	-	Cancelled

No.A1

Issue 5

25 January 2018

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

FOREWORD

1 General

1.1 Airworthiness Notices are issued by the Civil Aviation Authority of Singapore (CAAS) to circulate information of an administrative or technical nature to all concerned with the airworthiness of civil aircraft.

1.2 Airworthiness Notices replace all Notices to Licensed Aircraft Engineers and to Owners of Civil Aircraft previously issued by the former Department of Civil Aviation.

2 Contents List

2.1 Notice A0 is the contents page which contains a list of all the current Notices. When a Notice becomes redundant it will be withdrawn and shown as "Cancelled" in Notice A0.

2.2 Notice A0 is issued with every issue of Notices and the changes would be marked by marginal lines. The issue number of Notice A0 would increase by 1.

3 Arrangement

3.1 Each Notice is identified by an alphabet and a number, followed by an issue number and an issue date.

3.2 When a procedure which has already been the subject of a Notice is changed, the particular Notice is re-issued under the same number but bearing a new issue number and issue date.

3.3 Material differences between issues are marked by marginal lines.

3.4 All Notices are concerned with matters affecting the airworthiness of civil aircraft. The type of information contained therein is categorised as follows:

(a) Part A - General Administration
(b) Part B - Procedures
(c) Part C - Matters directly involving airworthiness.

The Notice number will be prefixed with the relevant alphabet to denote the appropriate category.

4 Publication

4.1 The Notices are made available on CAAS website.

No.B3

Issue 3

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

AIRCRAFT ENGINES, ENGINE MODULES, APUS AND PROPELLERS OBTAINED FROM SOURCES NOT UNDER THE AIRWORTHINESS CONTROL OF THE CAAS

1 Where aircraft engines, engine modules, APUs and propellers (hereafter called Powerplants) which have been overhauled, repaired or operated by organisations not under the airworthiness control of the CAAS (e.g. Government or foreign organisations) are obtained for use in aircraft for which a Singapore certificate of airworthiness is held or required, some form of acceptance by the CAAS is necessary so that paragraph 10 of the Air Navigation Order can be complied with. If the following facts (paragraph 1.1 to 1.3) can be established and the appropriate procedures of paragraphs 1.4 to 1.6 completed, the item may be regarded as having been operated, overhauled, repaired or modified in a manner, and with material of a type approved by the CAAS. Paragraphs 2.1 and 2.2 are appropriate to 'pool', 'lease', 'loan' or 'power-by-the-hour' powerplant in a similar way. The appropriate methods of signifying that items have been accepted under this Notice are prescribed in paragraph 3.

1.1 The powerplant shall be of a type approved by the CAAS, and the constructor shall, at the time of the original build, have been acceptable for the purpose to the CAAS.

1.2 The build standard shall be acceptable to the CAAS, i.e :

(a) A list of any modifications or repair schemes not approved by the original constructor shall be provided to the CAAS, which will determine whether any further investigation is required.

(b) Where military types are similar to a civil equivalent and have been modified to comply with civil requirements, this shall have been done in conjunction with the constructor in each particular case, unless agreed otherwise with the CAAS.

(c) All applicable Airworthiness Directives shall have been accomplished, including Airworthiness Directives of the State of Design.

(d) The last overhaul and any subsequent repairs shall have been undertaken to a specification and by an organisation or person, acceptable to the CAAS. Where an appropriate arrangement exists between the CAAS and the responsible authority of a foreign country, overhaul and repair organisations appropriately authorised by that authority would be acceptable to the CAAS.

1.3 In all cases, it shall be established, by the methods of (a) or (b) below, that the powerplant has not become unserviceable as a result of operational abuse, inadequate maintenance or unsuitable storage. Log books alone must not be regarded as sufficient evidence of serviceability because they do not always provide a complete record of defects and work carried out.

(a) It may be possible to make this judgement from the knowledge of the previous users. Where an appropriate arrangement exists between the CAAS and the responsible authority of a foreign country, a statement certifying serviceability issued by an organisation appropriately authorised by that authority will be acceptable. Failing this, reference shall be made to the CAAS, which will make a decision taking into account, such information as may be available from the responsible authority, the constructor and the previous operator.

(b) Where adequate assurance cannot be obtained under the methods of (a), the item shall be dismantled sufficiently (taking into account any recommendations issued by the constructor) to enable a judgement to be reached based on the revealed condition. If necessary, rectification action shall be taken before the item is regarded as complying with this paragraph 1.3. If it cannot be established that the engine powerplant are accurate and complete, all life limited parts must be scrapped. In addition, reference must be made to the CAAS for a decision on whether any other parts should be scrapped in the absence of satisfactory records.

NOTE: It will usually be difficult to establish serviceability of any item which has been used for type testing, or outside the disciplines of aviation regulations (e.g. in boats, hovercraft, power stations).

1.4 Where an assembly is broken down for use as individual parts, a statement of acceptability, in which the source of supply is indicated, shall be included in the release documents. For example, where an engine has been broken down into spares, the identity of the engine from which the part was taken should be referred to in the certification on the following lines - "Cylinder head removed from Gypsy Major 10 MK 2-2 engine, Serial No. 12345, checked for serviceability and modification standard, and the following work completed ...". Such a certification can be given by any organisation or person who can sign a statement in accordance with paragraph 3 of this Notice. In addition, the holder of an aircraft maintenance engineer's licence endorsed in Category "C" for the type of engine, may certify such spare parts as his licence permits him to dismantle, assemble and incorporate in engines.

1.5 Civil identification plates shall be fitted, where applicable, and log books or their equivalent, as appropriate, shall be issued. Original or certified true copies of any necessary documents (e.g. modification standard, test results) arising from construction or previous overhaul shall be provided with the release documents.

1.6 A statement of any limitations (e.g. overhaul periods, time used of any retirement or ultimate □ scrap □ lives) shall be provided with the release documents.

2 Powerplants which fall into the categories defined in 2(a) and 2(b) are treated under different rules (see 2.1 and 2.2) which replace those in paragraph 1.

(a) 'Pool' powerplants:
engines interchanged between certain participating airlines on a temporary (get-you-home) basis limited to a maximum of 200 hours.

(b) 'Lease', 'Loan' or 'Power-by-the-hour' engines:
engines which are supplied to operators under various agreements for long-term periods, usually from the manufacturer or his agent, but which are not necessarily newly overhauled when supplied.

2.1 **Pool Powerplants**

2.1.1 The use of pool powerplants, for the limited purpose and period covered by the definition, is permitted provided:

(a) The conditions relating to airworthiness, which must apply for a pooling agreement to be entered into, are laid down in advance by the operator, agreed by CAAS and lodged permanently in some suitable record of procedures.

(b) The conditions require consideration not only of the local history of the engine but of the source of engine overhaul and repair where this is other than by the pool partner.

(c) Applicable mandatory directives, instructions and notices are met.

(d) The Singapore operator obtains from the overseas operator a signed statement certifying the powerplant is airworthy when released on loan, declaring any restrictions in cycles or hours, etc., relating to inspection, replacement, or overhaul as necessary to maintain the airworthiness of the item during the period of loan. He must also, with the Certificate of Release to Service for the installation of the engine, complete the statement as required by 3.3 below.

2.2 **Lease/Loan/power-by-the-hour engines**

2.2.1 Where a powerplant is obtained from the original manufacturer or a CAAS approved overhaul organisation for long term loan or 'power-by-the-hour' lease and has been operated by a non-Singapore operator since the last time the engine was available to the manufacturer/overhauler for an assessment similar to that detailed in paragraph 1.3(b), it will be acceptable for the serviceability of the powerplant to be confirmed as follows :

(a) The manufacturer/overhauler or his authorised representative must issue certification of serviceability, having been satisfied at least that:

(i) The previous operator has declared the powerplant to be serviceable at the time of removal, or has stated known defects.

(ii) Any outstanding defected have been rectified.

(iii) All defects which were recorded during the term of the previous lease appear to have been rectified satisfactorily.

(iv) The powerplant's performance is satisfactory (This may be by reference to the previous operator's logged data where this is suitable).

(v) The powerplant has been stored satisfactorily and has not become deficient since removal from the aircraft due to the removal of any components.

(vi) The status of all life-limited components in the engine is clearly defined.

(vii) Inspection of the powerplant by the manufacturer or his authorised representative to a published schedule has been carried out to the extent necessary to confirm and certify that the powerplant is serviceable at the time of despatch.

(viii) All applicable Airworthiness Directives of the State of Design have been accomplished.

3 Statement(s) in accordance with 3.1(a); or paragraphs 3.1(b) and 3.2 (accompanied by a Certificate of Release to Service for the actual stripping, rectification and rebuilding carried out) or 3.3, as appropriate, shall be entered in the applicable engine or propeller log book, to enable Certificates of Release to Service to be issued when required by paragraph 10 of the ANO.

3.1 (a) "Part … S/N … has been accepted by the CAAS in accordance with Airworthiness Notice No. B3, paragraphs 1.1, 1.2 and 1.3(a)".

(b) "In respect of Part … S/N … compliance has been shown with Airworthiness Notice No. B3, paragraphs 1.1 and 1.2. The part will be accepted by the CAAS when compliance with paragraph 1.3(b) has been established." The statement shall be signed by a CAAS Airworthiness Officer.

3.2 "Part ... S/N ... has been examined in accordance with Airworthiness Notice No.B3, paragraph 1.3(b), and (no evidence of operational abuse, inadequate maintenance or unsuitable storage has been revealed)*, (appropriate action has been taken to restore serviceability)*."

This statement shall be signed either by an organisation accepted by the CAAS for the construction or overhaul, or by a licensed aircraft maintenance engineer accepted by the CAAS for the overhaul, of the item concerned.

3.3 "Part ... S/N ... has been accepted under procedures complying with Airworthiness Notice No. B3, paragraph 2.1* or 2.2*.

This statement shall be signed by the person issuing the Certificate of Release to Service for the installation of the item concerned.

4 Cancellation

4.1 This Notice cancels Airworthiness Notice B3, Issue 2, dated 1 July 1989, which should be destroyed.

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*Delete whichever is not applicable

No.B6

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

MANUFACTURE AND INSPECTION OF AIRCRAFT PARTS AND APPROVAL OF MATERIALS FOR THE REPAIR OF OVERHAUL OF AIRCRAFT

1 The attention of all concerned is drawn to the fact that cases have occurred where:

(a) defective parts have been replaced by parts manufactured without reference to drawings, the defective parts being used as a pattern; or

(b) components, for which no certificate of compliance could be produced, have been embodied in civil aircraft. In some cases parts had been obtained from stocks which were surplus to the requirements of the Services, or from various sources other than the manufacturer.

2 In circumstances such as those referred to in paragraph 1(a) there is considerable risk of the new part being made to incorrect dimensions and/or of incorrect materials.

3 In every case where it is necessary to manufacture any detail or component of an aircraft for which a certificate of airworthiness has been issued or is to be issued or renewed, such replacements must be manufactured, inspected and installed to approved drawings.

4 Certification of any repair or replacement under the requirements of the Air Navigation Order and Section 4 Chapter 4.4 of the Singapore Airworthiness Requirements should not be made unless either:

(a) the replacement parts have been approved by the manufacturers of the aircraft; or

(b) the parts have been manufactured and inspected to standard approved drawings (approved repair schemes issued by certain manufacturers coming under this heading); or

(c) the repair has been approved as a modification subsequent to the issue of a certificate of airworthiness.

5 The existence of an inspection stamp is not in itself sufficient evidence of approval of materials, details or components; approved certificates are also required, and these documents should be held available for examination when an aircraft is inspected for the issue or renewal of a certificate of airworthiness.

No.B8

Issue 3

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

RENEWAL OF CERTIFICATES OF AIRWORTHINESS

1 Certificates of airworthiness will be renewed on application form CAAS(AW)29 provided that the procedures prescribed by the following are adhered to.

2 Renewal application form must be forwarded direct to the Airworthiness/Flight Operations Division of CAAS with cheque for the appropriate fee made payable to the "Civil Aviation Authority of Singapore" one month prior to expiry of the certificate.

3 **Flight Test**

The aircraft should be flight tested in accordance with the relevant airworthiness flight test schedule approximately one month prior to expiry of the certificate, and a flight test report completed in accordance with the requirements of the schedule submitted two weeks prior to the certificate of airworthiness expiry. This report should be checked, including the climb performance against flight manual requirements and all defects investigated and corrected prior to submission.

If a programme for aircraft performance and engine condition monitoring has been approved by CAAS, the relevant data should be submitted.

4 Other documents to be submitted with flight test report are :

(a) certificate of airworthiness;

(b) flight manual;

(c) aircraft log book, engine log books and propeller log books (if applicable);

(d) copies of log book entries in duplicate for the aircraft, engines and propellers;

(e) weight and centre of gravity schedule in duplicate whenever the aircraft hasbeen re-weighed or a revised schedule is raised without weighing; and

(f) a copy of the insurance certificate or cover note.

No.B10

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

ACCEPTANCE STANDARDS FOR THE MAINTENANCE, OVERHAUL AND REPAIR OF SECOND-HAND IMPORTED AIRCRAFT FOR WHICH A SINGAPORE CERTIFICATE OF AIRWORTHINESS IS SOUGHT

1 It is noted that, in the past, difficulty has been experienced in establishing whether compliance is shown with the CAAS requirements in respect of the maintenance, overhaul and repair of second-hand aircraft imported into Singapore. Examples of difficulties are as follows:

(a) Repairs having been embodied without adequate records to establish compliance with an approved scheme or manual acceptable to either the CAAS or other airworthiness authority.

(b) Modifications having been embodied without adequate records to indicate either the source of approval or the organization responsible for embodiment of the modification.

(c) Doubt as to the extent of compliance with the CAAS maintenance schedule requirements, particularly those relating to major inspections or overhaul work which are intended to ensure the structural integrity of the aircraft and those relating to overhaul periods of components and accessories when compared with the overhaul periods which have previously been applied.

2 Prospective purchasers of second-hand aircraft from sources outside Singapore are advised that, in future, before a certificate of airworthiness is issued in respect of an imported second-hand aircraft, the CAAS will require to be satisfied that:

(a) both the approval and embodiment of repairs and modification comply with corresponding Singapore Airworthiness Requirements, or that, if this cannot be established, satisfactory supporting evidence is available from an acceptable source such as the original manufacturer, other airworthiness authority, or a suitably approved design organisation in Singapore;

(b) the aircraft has been inspected, its condition has been established and reports have been supplied to the CAAS;

(c) all airworthiness directives or mandatory modifications and inspections have been complied with; and

(d) a check to the manufacturer's recommended maintenance programme, or to the standard of an approved maintenance schedule for the type has been certified.

No.B11

Issue 18

1 July 2004

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

RECOGNITION OF THE REPUBLIC OF SINGAPORE AIR FORCE (RSAF) QUALIFIED SENIOR TECHNICIANS' EXPERIENCE AS AERONAUTICAL ENGINEERING EXPERIENCE

1 General

1.1 SAR Section 7, Chapter 7.3, paragraph 2 (Experience Requirements), sub-paragraph 2.1 (a) requires a minimum of 4 years of aeronautical engineering experience[1] for the grant of an AME licence in any category.

1.2 This Airworthiness Notice provides recognition of the work experience of ex-RSAF Qualified Senior Technicians (QSTs), who have specialised in trades relevant to civil aircraft maintenance, for a partial credit towards this requirement.

2 Effectivity

2.1 This Airworthiness Notice comes into effect immediately.

3 Credit to be Granted

3.1 The CAAS may grant a 2-year credit in aeronautical engineering experience based on RSAF's attestation (by means of a Certificate of Competence) that the QST has served at least 4 years as a certifying technician specialising in the trades relevant to civil aircraft maintenance as stipulated in paragraph 5 below.

3.2 In addition, this 2-year credit grant will be accorded only if the QST joins a civil aircraft maintenance organisation within 1½ years after leaving the RSAF.

3.3 This credit shall not be used in conjunction with any other credits provided for under the Note of SAR Section 7, Chapter 7.3, paragraph 2 (Experience Requirements), sub-paragraph 2.1 (a).

[1] Aeronautical engineering experience is defined as the recent experience gained in the maintenance or overhaul of complete aircraft or major components and accessories of aircraft, engines, electrical, instrument and radio equipment.

4 Certificate of Competence

4.1 The Certificate of Competence is controlled and provided by the RSAF only to individual QSTs who qualify under the criteria stated in paragraph 3.1.

4.2 A copy of this certificate must be submitted to the CAAS:

(a) when applying to sit for AME basic examinations (which may require the candidate to show at least 2 years of aeronautical engineering experience); or

(b) when applying for the grant of an AME licence.

4.3 The original Certificate of Competence must be presented to the CAAS for verification during the interview for the grant of an AME licence.

4.4 A sample copy of the Certificate of Competence is available in **Appendix 1.**

5 Relevant Trades

5.1 For the purpose of controlling the issuance of the Certificate of Competence, the RSAF shall consider the following specialisation trades as 'relevant trades':

(a) Airframe (Fixed wing);

(b) Airframe (Rotary wing);

(c) Engine (Fixed or rotary wing aircraft engine);

(d) Electrical and Instruments; and

(e) Radar and Communications (Air Navigation and Communications only).

No. B11 Appendix 1

Issue 18

1 July 2004

SAMPLE OF CERTIFICATE OF COMPETENCE

RSAF-AAIS CAREER TRANSITION SCHEME

Certificate of Competence

NAME & RANK
NRIC

The above-mentioned serviceman has served in the Republic of Singapore Air Force (RSAF) as an AAA Senior Technician since dd/mmm/yyyy.

During his tenure in the RSAF, he has satisfied the RSAF's training requirements on aircraft maintenance and has been authorised to carry out maintenance and repair on the BBB aircraft / systems type. He has a total of xx years of RSAF aviation experience since his initial authorisation.

Rank & name's authorisation on RSAF aircraft / system type would be recognised for a period of 1½ years from dd/mmm/yyyy when he leaves the organisation.

This certificate is issued under the authority of Air Manpower Department.

XXX XXXX XXXX
COL XXXX XXXX
Head Air Manpower
Dd/mmm/yyyy

Notes: (These notes are not included in the actual certificate)

i) AAA – The possible entries under this field are:
Airframe Fixed Wing Senior Technician
Airframe Rotary Wing Senior Technician
Engine Senior Technician
Aircraft Communication and Navigation System Senior Technician
Electrical Instrument Senior Technician

ii) BBB – The possible entries are:
F16, F5, A4, C-130, E-2C, CH-47, UH-1H, FENNEC, UAV, Super Puma and AH-64.

No. B12

Issue 20

1 June 2007

AIRWORTHINESS NOTICE

AIRCRAFT MAINTENANCE EXAMINATION CREDITS FOR GRADUATES OF AERONAUTICAL ENGINEERING DIPLOMA PROGRAMMES CONDUCTED BY SINGAPORE POLYTECHNIC AND NGEE ANN POLYTECHNIC

1 General

1.1 This Airworthiness Notice serves to inform persons intending to obtain an AME licence that credits towards CAAS SAR Section 7 basic examination papers may be obtained by satisfactorily completing an aeronautical engineering diploma programme offered by Singapore Polytechnic or Ngee Ann Polytechnic.

2 Effectivity

2.1 This Airworthiness Notice comes into effect on 1 June 2007.

3 Credits

3.1 The credits that may be obtained through the respective polytechnics' programmes are as follows:

a) Singapore Polytechnic's Diploma in Aeronautical Engineering (DARE)

A11 : Auxiliary Airframe Systems
A12 : Structures and Repairs
A14 : Hydraulic and Pneumatic Power Systems
A16 : Air-Conditioning & Pressurisation Systems
A17 : Avionic Systems
B12 : Aerodynamics and Mechanical Control
B13 : Electrical and Instrument Systems
C11 : Piston Engine Theory & Construction
C14 : Turbine Engine Theory and Construction
C15 : Turbine Engine Systems
H11 : Human Factors and Error Management

b) Singapore Polytechnic's Diploma in Aerospace Electronics (DASE)

E11 : Electrical Systems
F11 : Maintenance Practices and Aerodynamics
F12 : Electrical Fundamentals
F13 : Servomechanisms and Electronics

F14 : Digital Techniques
I11 : Instrument Systems
I12 : Inertial Navigation & Reference Systems
R11 : Radio Fundamentals
H11 : Human Factors and Error Management

c) Ngee Ann Polytechnic's Diploma in Aerospace Technology

A11 : Auxiliary Airframe Systems
A12 : Structures and Repairs
A14 : Hydraulic and Pneumatic Power Systems
A16 : Air-Conditioning & Pressurisation Systems
A17 : Avionic Systems
B11 : Maintenance Practices and Materials
B12 : Aerodynamics and Mechanical Control
B13 : Electrical and Instrument Systems
C14 : Turbine Engine Theory and Construction
C15 : Turbine Engine Systems
H11 : Human Factors and Error Management

d) Ngee Ann Polytechnic's Diploma in Electronics and Telecommunication Engineering (Avionics)

F12 : Electrical Fundamentals
F13 : Servomechanisms and Electronics
F14 : Digital Techniques
R11: Radio Fundamentals
H11: Human Factors and Error Management

4 Certificate of Recognition

4.1 Students who have successfully obtained the relevant diploma and obtained acceptable grades in the polytechnic modules correlated to the above SAR Section 7 subjects may obtain a Letter of Recognition from their respective polytechnic upon graduation.

Note: Information pertaining to the correlation of modules to SAR 7 subject should be available from the polytechnic that is conducting the course.

4.2 The Letter of Recognition will list the credits granted towards one or more SAR Section 7 basic papers listed in paragraph 3 above.

4.3 A copy of this letter must be submitted to CAAS if the student wishes to be considered for exemption against the appropriate SAR Section 7 AME basic examination subject (s).

No.C2

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

TYRE WEAR LIMITATIONS

1 Introduction

1.1 This Notice provides general guidance on the subject of tyre wear limitations for operators of all public transport aeroplanes of more than 5 700 kg maximum weight for which a limiting tyre tread depth is not available.

2 Discussion

2.1 Accidents and incidents, resulting from both loss of braking friction and loss of directional control on wet runways, continue to occur. While the scheduled accelerate stop and landing distances provide some allowance for deterioration in friction, it has been established that this allowance is not sufficient to maintain the required level of safety if tyres which are more than 80% worn are used in wet runway operations.

2.2 As it is not possible fully to allow for this by increasing the scheduled distances (because of the frequency of incidents caused by loss of directional control, even on the most favourable wheel arrangements), the CAAS favours the retention of current scheduled distances, together with a recommended minimum tread depth applicable to all aircraft tyres.

3 Recommendation

3.1 In the absence of evidence of the safety of a lower limit for a particular aircraft/ tyre/operation combination, it is recommended that a tyre be withdrawn from service when it is worn to such an extent that its wet runway performance would be seriously impaired. This may be defined as when:

(a) it is worn such that any groove has a depth of less than 2mm of tread for more than one quarter of the tread circumference; or

(b) at any place on the circumference the tread pattern is worn to a depth of less than 2mm across the whole width of the tread in contact with the runway.

Note : This is not a rigid definition and equivalence may be provided if, for example, tyre wear is such that whilst one groove is less than 2mm all the others are 3mm or more.

No.C5

Issue 4

1 July 2009

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

SUSPECTED UNAPPROVED PARTS

1 Introduction

1.1 CAAS has been concerned about the possibility of unapproved parts being used on aircraft by Maintenance Organisation. Evidence indicates that these counterfeit or fraudulent parts were mainly originated from foreign sources.

1.2 In addition to manufacturing and marketing unapproved parts, there were also issues on falsification of release documentation in the aviation industries.

1.3 Installing unapproved parts onto aircraft has serious airworthiness implications. To illustrate just how serious, the following two examples are quoted involving aircraft which are available in the international market place:

a) A helicopter main rotor blade complete with release documentation was traced as having been scrapped by the manufacturer during the manufacturing process.

b) An engine mount described as fitted new to an aircraft in 1979 was traced as having been factory installed in 1966.

2 Unapproved Parts

2.1 For the purpose of this notice an unapproved part is a part or material intended for installation to a type certificate product/ aircraft, which has been neither manufactured according to an approved procedure, nor conforms to an approved type design; or which fails to conform to declared specifications or accepted industry standards (i.e. standard parts).

2.2 Unapproved parts include, but are not limited to:

a) Parts specified in the illustrated part catalogues (IPC) of a type certificate aircraft, but which have been manufactured, reclaimed or reworked and then marked by an authorized source and provided with documents which indicate falsely that the part are genuine and conform to the approved type design, or meet a particular industry standard and are offered for use as conforming with an aircraft manufacturer's authorized IPC.

b) Parts shipped directly to users by manufacturers, suppliers or distributors who do not themselves hold appropriate production approvals for the parts, and have not been authorized to make direct shipments to users or stockists, by the type certificate

holder, who alone has the production approval, e.g. production overruns. This is a particular phenomenon in the United States.

c) Parts which have not been maintained overhaul or repair in accordance with requirements of approved airworthiness data and statutory requirements, or that have been maintained, overhauled or repaired by persons not authorized to perform and certify these functions.

3 Parts originating from surplus United States military stock

3.1 The United States Department of Defense (DOD) has a programme called "BREAKOUT". Under this programme the DOD uses manufacturer approved drawing, obtained under the terms of production contracts with the original equipment manufacturer, and seek bid from anyone who wishes to make the parts.

3.2 The suppliers of the "BREAKOUT parts may not have the stringent quality controls that are required by the aircraft/component type certificate holder to satisfy FAA requirements. For example, periodic conformity inspections and destructive tests to assure the continued quality of the product may not have been undertaken.

3.3 The US government may also substitute military specification in lieu of original approved material and process specifications; thereby developing parts that do not necessarily conform to the FAA approved civil type design.

4 Additional Information

4.1 The US FAA has issued an advisory circular AC No.21-29B providing information and guidance to the aviation community for detecting and reporting suspected unapproved aircraft parts and procedures for referral of such reports to the appropriate FAA office.

4.2 Because of the increase activity being undertaken in United States against suspected unapproved parts, it is likely that the vendors of these parts will direct their activities towards other parts of the world, because of the reduce risk of detection.

5 Compliance

5.1 Aerospace industry users are reminded that it is possible to confuse a distributor's certification with an original manufacturer's certification. Therefore, more attention should be given when assessing incoming documentation in relation to the terms of the original order. Appendix 1 to Sub-part D of SAR-145 of the Singapore Airworthiness Requirements gives a list of documents that accompany parts obtained from other than CAAS approved sources and this should be referred to as necessary.

5.2 CAAS stresses that CAAS approved distributor must operate in a responsible manner and supply satisfactory parts. Any evidence of unapproved parts must be immediately reported to the Authority (CAAS), Operator and the OEM.

6 **Reporting Requirements**

6.2 In the event, an unapproved part is identified, the person, maintenance organization or operator who is responsible shall make a report base on the CAAS form AW/133 listed in Appendix 1, to furnish the information required as reflected.

6.3 A copy of the completed CAAS AW/133 for unapproved part reporting shall be sent to the address listed below:

Director Airworthiness & Flight Operations
Civil Aviation Authority of Singapore
Airworthiness and Flight Operations Division
Singapore Changi Airport
P.O Box 1, Singapore 918141

6.4 If the reporter is not willing or able to complete the CAAS AW/133, they may alternatively write in to the above address.

6.5 For the sake of making known the suspected unapproved parts to the public and to discourage these fraudulent activities, the information pertaining to the list of suspected unapproved part identified and reporting form can be found in our CAAS website.

http//www.caas.gov.sg

No.C6

Issue 4

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

CARRIAGE OF EMERGENCY LOCATOR TRANSMITTER (ELT)

1 Introduction

1.1 Up to now, only operators of General Aviation aircraft are required to carry automatic emergency locator transmitter (ELT) on all flights. Commercial aircraft usually carry the survival ELT although some also have the automatic types installed.

1.2 The International Civil Aviation Organisation (ICAO) is now introducing a requirement for all aircraft flying overland or overwater to carry an automatically operated emergency locator transmitter (ELT) that operates simultaneously on 406 and 121.5 MHz. This requirement is planned to take effect on 1 January 2002.

1.3 This Notice spells out the ELT requirements for Singapore registered aircraft. This is in addition to the equipment required by the 5th Schedule of the Air Navigation Order.

2 Requirements

2.1 CAAS requires operators of all aircraft in Singapore to fit their aircraft with an automatically operated emergency locator transmitter (ELT) as soon as possible but no later than 31 December 2001. The Director-General of Civil Aviation will monitor the operators' implementation plan and may require an accelerated schedule of implementation if deemed necessary.

2.2 The ELT shall operate on 121.5 MHz, and also on 406 MHz on or after 1 January 2002. All ELT equipment shall be of a type approved by the Director-General of Civil Aviation.

2.3 Specification for the 121.5 MHz component of emergency locator transmitters (ELT) for search and rescue; and information on technical characteristics and operational performance of 121.5 MHz ELT is contained in RTCA Document DO-183 and European Organisation for Civil Aviation Electronics (EUROCAE) Document ED.62.

2.4 Specifications for the 406 MHz component of emergency locator transmitter (ELT) for search and rescue; and information on technical characteristics and operational performance of 406 MHz ELTs are contained in RTCA Document Do-204 and European Organisation for Civil Aviation Electronics (EUROCAE) Document ED.62. Transmission characteristics for emergency locator transmitters operating on 406 MHz are contained in ITU/R M633/1.

No.C8

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

MICROBIOLOGICAL CONTAMINATION OF FUEL TANKS OF TURBINE ENGINED AIRCRAFT

1 Introduction

1.1 Reports have been received that aircraft regularly operating in climatic conditions such as those prevailing between latitudes 30^{o} North and 30^{o} South have been contaminated in the fuel tanks by a fungus. Another aircraft, regularly operating from the United Kingdom, was found to have localised areas of heavy growth when inspected after standing in a heated hangar for two months with fuel in the tanks. It is considered that the storage conditions were a contributory factor.

1.2 In one case contamination was found during an investigation into the cause of erratic fuel contents indication, when white crusty deposits and brown stains were seen on the probes. Further examination revealed the presence of brown/black slimes adhering to horizontal upward facing surfaces within the tanks. Examination by the Commonwealth Mycological Institute, Kew, confirmed that this substance was a fungal growth of the type Cladesporium Resinae.

2 Effects of Contamination

2.1 The problems associated with microbiological growths have been known for some years and research into their behavior has been conducted throughout the world. In the case of Cladesporium Resinae, the spores of the fungus can exist in a dormant state in kerosene fuels in most parts of the world. These will only develop when in contact with water in fuel at temperatures such as those reached when the aircraft or storage tanks are exposed to a warm ambient temperature such as radiation from the sun for long periods in a tropical or sub-tropical environment, or prolonged periods in a heated hangar. If developing fungus forms on water not drained off which adheres to the tank surfaces, the fungus is able to absorb water later introduced with fuel or condensing following a cold soak.

2.2 Where fungus has formed there is a probability that corrosion will occur. Corrosion has been found where fungus has formed on the bottom tank skin, on the chordal support member in the wing root and on fuel pipes within the tank. In some cases aircraft have been sufficiently affected to necessitate replacement of some component parts.

2.3 The fungus itself, if dislodged by fuel during refueling can obstruct fuel filters.

No.C11

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

CARBON MONOXIDE CONTAMINATIONS IN AIRCRAFT

1 All concerned are warned of the possibility of dangerous carbon monoxide concentrations in aircraft. All aircraft types may be affected, but this Notice relates mainly to light aircraft.

Note: Carbon Monoxide (CO), a poisonous gas, is a product of incomplete combustion and is found in varying degrees in all smoke and fumes from burning carbonaceous substances. It is colorless, odourless and tasteless.

2 There are two main sources of contamination:

(a) Modifications, such as those involving the introduction of additional openings in the fuselage or the removal of windows and doors, e.g. for camera installations or parachutists: before approval can be given for such modifications, aircraft must be tested to ensure that the cockpit/cabin is free from unacceptable concentrations. Aircraft modified in accordance with an approved scheme must also be subjected to a similar test.

(b) Defective heating systems of the type which utilise an exhaust heat exchange: physical inspections of such systems should be carried out according to manufacturer's instructions at the intervals specified and whenever carbon monoxide contamination is suspected.

3 The other possible sources of contamination:

(a) Apertures in fire walls of single-engined aircraft, ineffective seals at fuselage strut attachments, defective exhaust manifold slip joints, exhaust system cracks or holes, discharge at engine breathers, defective gaskets in exhaust system joints and faulty silencers: aircraft should be carefully examined for defects of this nature during routine inspections which should occur at sufficiently regular intervals.

(b) Exhaust from other aircraft during ground holding and taxying: the obvious precaution in this case is that ground holding and taxying should be carried out cleared of the exhaust area of preceding aircraft.

4 The CAAS should be contacted in cases where the presence of carbon monoxide is suspected and a test for concentration is considered desirable.

5 Cancellation

5.1 This Notice cancels Airworthiness Notice No.C11, Issue 1, dated 1 August 1973, which should be destroyed.

No.C12

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

MAINTENANCE OF COCKPIT AND CABIN COMBUSTION HEATERS AND THEIR ASSOCIATED EXHAUST SYSTEMS

1 Introduction

1.1 Investigations of a fatal accident to a large transport aircraft had revealed that the flight crew might have been suffering from carbon monoxide poisoning brought about by the gas escaping from combustion heaters of their associated exhaust systems.

Note: Carbon monoxide (CO), a poisonous gas, is a product of incomplete combustion and is found in varying degrees in all smoke and fumes from burning carbonaceous substances. It is colourless, odourless and tasteless.

1.2 Fitment of oversize nozzles to combustion heaters will increase the concentrations of carbon monoxide in exhaust gases and may cause operating difficulties with the heater. Therefore it is imperative that the only nozzles of the type quoted by the manufacturer are fitted and that servicing, overhaul and inspection standards of combustion heaters and their associated exhaust systems are maintained at a high level.

1.3 This Notice has been raised to provide realistic inspection requirement by introducing heater hours as an alternative criterion. However, the aircraft operator is allowed some flexibility by permitting aircraft hours to be used to establish inspection intervals in place of heater hours.

2 Servicing and Overhaul

2.1 The requirements of this paragraph 2 are applicable to all aircraft whether maintained to an approved maintenance schedule or not.

2.2 Except where otherwise agreed by the CAAS, servicing, overhaul and inspection of combustion heaters and their associated exhaust systems shall be in accordance with the instructions contained in the appropriate manuals produced by the aircraft constructor and the equipment manufacturer. If the instructions in the aircraft constructor's manual differ from those in the equipment manufacturer's manual, those of the aircraft constructor shall be assumed to be overriding.

No.C14

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

GAS TURBINE ENGINE PARTS SUBJECT TO RETIREMENT OR ULTIMATE (SCRAP) LIVES

1 The design of gas turbine engines in service is such that certain critical parts, notably compressor and turbine discs, experience cyclic variations of stress due to mechanical and thermal effect which are of sufficient magnitude to result in fatigue damage. The failure of these parts, which under operating conditions may possess more energy than can be absorbed by the surrounding engine structure, can result in damage to the aircraft. It is therefore necessary to limit the life of all critical parts in order to prevent fatigue damage developing into complete failure. As fatigue damage is not detectable by current inspection techniques until cracking has begun, and because crack propagation to the point of failure can be unacceptably rapid, it is necessary to determine a safe life for each critical part by extensive testing.

2 These safe lives, also referred to as retirement lives, ultimate lives, scrap lives and low cycle fatigue (LCF) lives, are mandatory limits which must never be exceeded. For the benefit of operators and engine overhaul agencies, manufacturer also publish this information variously in service bulletins, service memoranda, notices to operators, maintenance manuals, etc. The lives published are accepted by the CAAS and are mandatory and all amendments thereto must first be approved. It may be possible to extend the published lives as a result of further testing and this is normally indicated in the publications as an aid to spares provisioning.

3 The Inspection and Test Certificate of an engine issued by a manufacturer or overhaul agency must include reference to a certified statement in which is recorded the life consumed by each of the life-limited parts fitted in the engine up to the time of release. It may be preferable to include this statement in the engine log book but this will be governed by the system adopted by the operator.

4 Operators are responsible for ensuring the parts fitted to the engines being operated do not exceed the published lives. Therefore it is necessary to maintain accurate up to date records of the life consumed by each engine and this may involve recording flying hours, number of landings, 'touch and go' landings and take-offs, air re-starts etc., dependent upon each constructor's definition of a unit of life. In order to preserve continuity of the records, an up to date statement of the life consumed since last release must accompany each engine when dispatched by an operator to an overhaul agency for repair, modification and partial or complete overhaul.

5 When a new type of turbine-engined aircraft is first introduced into service the operator is responsible for determining a 'typical flight cycle', described in engine terms, applicable to its operation. This should be done by sufficient monitoring of service flights, and as necessary training flights, to provide an adequate knowledge of actual engine flight profiles. If these appear to be in any way more severe than those assumed by the engine constructor, the operator shall inform the engine manufacturer and the CAAS amended approved lives will be published if necessary.

6 Additionally, operators shall monitor a sufficient number of flights at successive intervals of approximately six months (this period may be extended in agreement with the CAAS as increased experience permits) during the subsequent life of the aircraft to determine that the current assumptions are not being invalidated by intended or unintended changes to operating techniques, changes of service routes or operational roles, etc. If there is any reason to believe that the flight cyclic fatigue usage may be more adverse than currently assumed, the operator shall inform the engine constructor and the CAAS with a view to revision of the approved lives.

Note:

(a) As differences between winter and summer operation and differences in the installed position of engines in the aircraft may make significant difference to the usage experienced, these factors should be taken into account in the monitoring programmes. Also because autothrottle and autoland systems can affect the envelope of engine speeds used, it is important that any changes to the characteristics of such systems are assessed.

(b) engine manufacturer is required to publish, in the engine manuals, information concerning the engine flight profile assumed for the establishment of safe lives.

7 Where an operator finds the programme described in paragraph 6 impractical, sufficiently pessimistic assumptions will need to be made in determining, for his particular operation, the safe lives of affected parts, in order to provide for any possible variations of operation likely to occur.

8 Operators must comply with any instructions given by the engine manufacturer’s manual. The operator must inform the engine manufacturer of any conditions of their operation which may be at variance with his instructions.

No.C17

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

VERTICAL SPEED INDICATORS ON IMPORTED AIRCRAFT

1 Introduction

1.1 An incident to a light aircraft has shown the possible danger of the presentation of false information to the pilot due to reversed indication by the vertical speed indicator during a fast rate of descent.

1.2 United Kingdom approved instruments and instruments complying with the United States TSO specification C8b are fitted with stops to prevent such occurrence. It is not known whether other instruments, particularly those likely to be installed in imported aircraft of less than 5 700 kg maximum weight are similarly equipped.

2 Action

2.1 Before issue or renewal of the certificate of airworthiness of an imported aircraft, it shall be established whether the vertical speed indicator is fitted with limit stops. This may be done by test or reference to the manufacturer.

2.2 If stops are not fitted, either the vertical speed indicator shall be replaced by an instrument that has stops, or alternatively the placard defined in paragraph 3 shall be fitted.

3 Placard

3.1 The following placard shall be fitted adjacent to a vertical speed indicator not fitted with stops:

"This indicator is not fitted with limit stops and a rate of change of altitude in excess of the maximum calibration will cause indication in the reverse sense."

3.2 The placard may, as a temporary measure, be typewritten on white card, but shall be replaced by a more permanent placard as soon as possible.

4 Record

4.1 A record of the action taken to comply with paragraph 2 above shall be made in the aircraft log book, quoting the serial number of the instrument.

No.C21

Issue 3

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

FATIGUE LIVES

1 For fatigue reasons the major components (e.g. wings and centre-sections) of certain types of aircraft have lives restricted to a specific number of flying hours, flights or landings. These restrictions have, in the main, been confined to large transport type aircraft but more recently it has been found necessary to introduce similar restriction on certain smaller types of aircraft, some of which are operated in the private category.

2 The "lifing" of components is intended to prevent structural failure under the action of repeated air and ground loads experienced in service, the lives being based on the results of test carried out by the manufacturer of the aircraft. If the specified fatigue life of a critical component is exceeded, the possibility arises of a catastrophic structural failure. Where fatigue lives have been imposed full details have been published by individual manufacturers in their service bulletins and compliance with such information is required by the CAAS. Structural life limitations are determined for likely average utilisation of a type of aircraft. Any operations which depart substantially from the typical require assessment of the structural life limitations for those specified operations and may require alterations in the safe fatigue lives. Examples of operations in this category are low level flights in a maritime surveillance, or geographical survey role (particularly using pressurised aircraft), or long endurance operations.

3 For the purpose of establishing structural life limitations a landing is defined as an occasion when the main undercarriage wheels make contact with the airfield surface and lift is significantly destroyed. A flight is associated with each landing and therefore the total number of flights pressurised and unpressurised is equal to the total number of landings. A pressurised flight is one in which the aircraft's pressurisation system is operated at a pressure differential of 14 KN/M^2 (2 psi) or above.

4 Because of the transfer of components from one aircraft to another, it has in some instances been impossible to establish the remaining safe life of individual components. For this reason it is necessary to ensure that when a component in this category is installed in an aircraft, a record is kept with the aircraft documents showing, as applicable, the hours flown and number of flights or landings already sustained by the component at the time of installation. In the case of pressurised flights the applicable pressure differential may be significant. Certificates of release to service may not be signed until the signatory is satisfied that the required history of the component has been established.

5 Failure to comply with the above procedure may, due to the absence of evidence showing that the components in question have any remaining safe life, result in owners or operators being required to replace such components prematurely.

Note : In addition to recording operating hours of engines, APUs and propellers, the CAAS requires on most engines, APUs and propellers that a record be kept of the cycles completed. Cycles are defined by the manufacturers of each engine, APU and propeller.

No.C24

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

MAINTENANCE REQUIREMENTS FOR VARIABLE PITCH PROPELLERS

1 Introduction

1.1 For most propeller types the propeller manufacturer will publish overhaul periods and any necessary maintenance inspection instructions which will be applied by the operator at the periods specified unless varied by the Approved Maintenance Schedule.

1.2 It has been recognized though that there are a few proper types where the manufacturer has not published overhaul lives in terms of hours or calendar period. In order to ensure that these propellers are being maintained in a satisfactory condition, the inspection of this Notice are required to be applied at the periods stated.

1.3 A situation also exits where, for a low utilization operation, the calendar period can be reached when a propeller has run only a small percentage of its operating hours limit. Under these circumstances, wear would not be expected to be a problem while degradation of seals and corrosion are more likely to exist. This Notice introduces an alternative maintenance policy which, subject to intermediate inspections, as specified in the appendix, will monitor the condition of a propeller such that it can be operated beyond its calendar period to achieve its operating hourly limit.

1.4 Any overriding mandatory requirements in respect of particular propellers, issued either by the Airworthiness Authority of the country of manufacture of a propeller, or by the CAAS will take precedence over this Notice. For the purpose of compliance with an AD which specifies requirements as a function of overhaul, the bare blade inspection required by paragraph 4.2.2 shall be deemed as an overhaul.

2 Applicability

2.1 The requirements of this Notice are applicable to variable pitch propellers, variable pitch propellers which have been locked and to ground adjustable propellers.

3 Compliance

3.1 The maintenance policy defined in either paragraph 3.1(a) or (b) or (c) must be applied to all variable pitch and ground adjustable propellers.

(a) Overhaul at the operating hours or calendar period recommended by the manufacturer, whichever occurs first, unless varied by the Approved Maintenance Schedule.

(b) The hub/blade and bare blade inspections specified in paragraphs 4.2.1 and 4.2.2 of this Notice must be applied when:

(i) No calendar or operating hour overhaul intervals are recommended by the manufacturer, or

(ii) Only operating hour overhaul intervals are recommended by the manufacturer with no associated calendar recommendation.

(c) For a propeller fitted to an aircraft which has a low utilization, and for which the manufacturer has specified overhaul periods in terms of operating hours and calendar periods, the calendar life limitation only may be exceeded subject to compliance with the hub/blade and bare blade inspections specified in paragraphs 4.2.1 and 4.2.2 of this Notice.

3.2 The periods of operation or elapsed calendar time prescribed in the appendix to this Notice shall be calculated from the date of the initial installation of the propeller on an aircraft following manufacture or complete overhaul of the propeller and may be preceded by a period of storage of up to 2 years which has been carried out in accordance with the manufacturer's recommendations.

3.3 The applicability and compliance requirements of this Notice are summarized in the appendix to this Notice Tables 1 and 2.

4 Propeller Inspections

4.1 The inspection of propellers required by Tables 1, 2 or 3 must be undertaken by an organisation approved by the CAAS for the purpose. However, with the exception of aircraft used for commercial air transport, the inspections required by Table 2 may, subject to prior approval of CAAS, to be undertaken by an aircraft maintenance engineer licensed in Category C for the type of engine to which the propeller is fitted.

4.2 The inspections and re-work shall be carried out in accordance with the manufacturer's instructions and as a minimum shall include:

4.2.1 Hub/blade inspection

(a) Dismantling of the propeller sufficiently to gain access to the blade root bearing assemblies.

(b) Thorough cleaning of the blade root assemblies.

(c) Examination for pitting, fretting, corrosion, cracking and other damage of the hub, bearings, blade roots and housing, together with replacement if any disturbed seals. All of the blade surfaces shall be examined for damage, delamination (where applicable), and the presence of corrosion, removing the paint finish as necessary. In cases where de-icer boots or overshoes are installed on the blades, a detailed examination for corrosion around their edges shall be carried out, and if any evidence is found, the boots/overshoes shall be removed to permit a full inspection of the masked areas. Any corrosion shall be removed and the blades re-protected. In cases where de-icer boots/overshoes are removed, replacement parts shall be installed using the facilities prescribed and under conditions and procedures specified, in the relevant manufacturer's Overhaul Manual.

(d) Checking the track of the propeller after refitting, then functioning throughout its operational range by means of an engine run to verify correct performance, and to establish that any vibration is within acceptance limits.

4.2.2 Bare blade inspection

In addition to the hub/blade inspection ref 4.2.1:

(a) Remove of all de-icing boots or overshoes and fairings

(b) Removal of all paint and erosion protection

(c) Removal of all blade root bushings and plugs

(d) Inspection of the complete blade surface for the pressure of corrosion. Any corrosion shall be removed and the blades re-protected and prepared for the re-installation of the blade fittings

(e) Full dimensional inspection of all blades

5 Record of accomplishment

5.1 A comprehensive record of the inspection and work done in accordance with paragraph 4 of this Notice shall be retained and an entry, making a cross reference to this document, shall be inserted in the Propeller Log Book.

6 Cancellation

6.1 This Notice cancels Airworthiness Notice C24, Issue 1, dated 1 October 1986 should be destroyed.

No. C24 Appendix 1

Issue 2

1 July 2003

Propellers shall be maintained in accordance with either (a) or (b) of the appropriate following Table:

Table 1 - Propellers fitted to Commercial Air Transport, Public Transport, Aerial Work and Private Category Aircraft; MTWA above 5700kg

(a)	Overhaul Period	Whichever occurs first of operating hours or calendar period as published by the propeller manufacturer unless varied by the Approved Maintenance Schedule
(b)	Overhaul Period	Operating hours as published by the propeller manufacturer or on condition where no life has been published subject to (i) and (ii) below
	(i) Hub/blade inspection period	Inspect at 3 years since new or overhaul or period inspection (ii) below; repeat at 1 year intervals
	(ii) Bare blade inspection period	Not to exceed 6 years since new, overhaul or last bare blade inspection.

Table 2 – Propellers fitted to Commercial Air Transport, Public Transport, Aerial Work and Private Category Aircraft; MTWA below 5700kg

(a)	Overhaul Period	Whichever occurs first of operating hours or calendar period as published by the propeller manufacturer unless varied by the Approved Maintenance Schedule
(b)	Overhaul Period	Operating hours as published by the propeller manufacturer or on condition where no life has been published subject to (i) and (ii) below
	(i) Hub/blade inspection period	Inspect at 3 years since new or overhaul or inspection (ii) below (but may be phased to next annual check or Certificate of Airworthiness Renewal provided period does not exceed 4 years)
	(ii) Bare blade inspection period	Not to exceed 6 years since new, overhaul or last bare blade inspection.

Note : Hub/blade inspections and bare blade inspections are to be in accordance with the procedures of paragraph 4 of this Notice.

No.C25

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

POWER SUPPLY SYSTEMS FOR AIRCRAFT RADIO INSTALLATIONS

1 Introduction

1.1 This Notice draws attention to the dangers of operation of aircraft in which the entire radio installation was supplied via a single electrical feeder circuit, and states that certificates of airworthiness will not be issued or renewed in respect of aircraft in the transport category and of multi-engined aircraft in any category certificated with such systems.

2 Requirement

2.1 The electrical feeder arrangements shall be such that:

(a) where more than one radio system is installed, no likely single failure (e.g. fuse or a relay) will result in the loss of all radio systems;

Note: It is strongly recommended that such a failure should only result in the loss of one radio system.

(b) where duplicate radio systems, or radio systems which can duplicate a function, are installed, no likely single failure (e.g. a fuse or a relay) will result in the loss of both systems.

3 Interpretation

3.1 In examining electrical feeder arrangements to establish compliance with paragraph 2, the examination for likely single failures should include:

(a) the mechanical and electrical aspects of the supply circuit, including the return path of the electrical supply;

(b) the location within the electrical circuit of fuses, circuit breakers and power switching relays, their physical location in the aircraft and the manner in which they are interconnected;

(c) panels for integrated control of radio systems, audio integration systems, and dimmer control equipment for electronic displays.

No.C28

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

ELECTRICAL GENERATION SYSTEMS - AIRCRAFT NOT EXCEEDING 5 700 KG MTWA

1 Introduction

1.1 Investigation into accidents and incidents involving total loss of generated electrical power to aircraft, the MTWA of which does not exceed 5700 kg, have shown certain inadequacies in the failure warnings and indications provided. Experience has shown that the loss of generated electrical power can remain undetected for a significant period of time, resulting in the serious depletion of the available battery capacity and reduced duration of supplies to essential services under these conditions.

1.2 The purpose of this Notice is to publish requirements for certain aircraft to ensure that a clear and unmistakable warning of loss of generated electrical power is given, and to preserve or provide sufficient electrical energy to operate essential services for an adequate period of time in the event of such a loss occurring.

2 Requirement

2.1 For all multi-engined aircraft, the MTWA of which does not exceed 5700 kg, compliance with paragraphs 2.2, 2.3, 2.4 and 2.5 of this Notice, or with a CAAS approved alternative providing an equivalent level of airworthiness, is required.

2.1.1 Where it can be shown that an aircraft is fitted with such limited electrical and radio equipment, or is certificated to operate under such limited conditions (e.g. VMC day only) that the loss of generated electrical power would not significantly prejudice safe flight, the CAAS will, on application, waive the requirements of this Notice where it is satisfied that compliance would not be justified in the circumstances of a particular case.

2.2 Clear visual warning shall be provided, within the pilot's normal line of sight, to give indication of either

(a) reduction of the generating system voltage to a level where the battery commences to support any part of the main electrical load of the aircraft; or

(b) loss of the output of each engine driven generator at the main distribution point or busbars.

2.3 The battery capacity shall be such that in the event of a complete loss of generated electrical power, adequate power will be available for a period of not less than 30 minutes following the failure, to support those services essential to the continued safe flight and landing of the aircraft, (see paragraph 3.1). This includes an assumed period of not less than 10 minutes from operation of the warning specified in paragraph 2.2, for completion of the appropriate drills. This delay may be reduced to not less than five minutes if the warning system is provided with "attention getting" characteristics (e.g. a flashing light). For the purpose of calculations it shall be assumed that the electrical load conditions at the time of failure warning are those appropriate to normal cruising flight at night (see paragraph 3).

2.4 Where all gyroscopic attitude reference instruments, i.e. bank and pitch indicator and turn and slip indicators, are dependent on electrical power for their operation, at least one of these instruments shall continue to operate without crew action for the prescribed 30 minute period.

Notes: (a) For certain aircraft types a turn and slip indicator may not be acceptable as the sole remaining attitude reference instrument.

(b) Certain aircraft are equipped with both electrically operated and air driven attitude reference instruments. In such cases the air driven instruments will be accepted as providing the emergency attitude information provided that the requirements of paragraph 2.4.1 are met.

2.4.1 The instruments with which the requirement of paragraph 2.4 will be met shall be clearly designated, and

(a) shall be so located on the instrument panel that it will be visible to, and usable by, the pilot from his normal position;

(b) shall be provided with means of indicating that the power supply to the instrument is operating correctly.

2.5 Precise drills covering crew action in the event of electrical general system failures and malfunctions shall be included in the appropriate aircraft manuals, together with a statement of battery endurance under specified load conditions.

3 Additional Information

3.1 When ascertaining that the installed aircraft battery capacity is adequate for compliance with paragraph 2.3, the following loads should be taken into account :

(a) Attitude information (where applicable in accordance with paragraph 2.4).

(b) Essential Radio Communication.

Note: For the purpose of calculations it will normally be accepted that intermittent use of single VHF communication equipment satisfies this requirement. Utilisation on the basis of a total 15 minutes reception plus 3 minutes transmission in the 30 minute period would be an acceptable interpretation.

(c) Essential cockpit lighting.

(d) Pitot head heater (applicable only to those aircraft certificated for flight in icing conditions)

(e) Any other services essential for the continued safe flight and landing of the particular aircraft.

(f) Those services which cannot readily be shed when carrying out the drills required under paragraph 2.5

3.1.1 In order to ensure that the essential services, taken into account in accordance with paragraph 3.1, will function adequately for the prescribed period, the calculation of the duration of battery supply should normally be based on the following assumptions:

(a) Only 75% of the "name plate" rating of the battery is available (this is to take into consideration loss of capacity with age, and a realistic state of charge).

(b) The voltage/time discharge characteristic of the battery, appropriate to the load of the listed services, is not extended beyond a battery terminal voltage of 21.5 volts on a 24 volt system, pro rata for 12 volt systems, (this is to ensure that the voltage available throughout the prescribed period is adequate for satisfactory operation of the services).

Note: Only where compliance with this Notice cannot be shown within the criteria of paragraphs 3.1 and 3.1.1, will consideration have to be given to the fitment of additional, or larger capacity, batteries to particular aircraft.

3.2 Applications for the approval of modifications necessary to ensure compliance with the requirements of this Notice should be made in the manner specified in the Singapore Airworthiness Requirements, Section 4, Chapter 4.7. Owners and operators are recommended to contact the constructor concerned or the main agent for information regarding suitable modifications.

No.C29

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

FIRE PRECAUTIONS - AIRCRAFT TOILETS

1 **Applicability**

1.1 This Notice is applicable to all aircraft over 5 700 kg MTWA operating in the transport category (passenger).

2 **Purpose**

2.1 The purpose of this Notice is to publish requirements aimed at reducing the probability of persons smoking in toilet compartments and at minimising the potential fire hazard caused by persistent smokers.

3 **Requirements**

3.1 Inspection

3.1.1 The following inspection shall be carried out at 1000 hourly intervals, or at such other intervals as may be agreed with the CAAS on the basis of available date :

(a) All receptacles shall be inspected to ascertain that all entry flaps or doors till operate, fit, seal and latch correctly.

(b) Any defects revealed by the inspection of (a) are corrected.

3.1.2 This inspection shall be included in the maintenance schedule using the normal procedures.

Note: Compliance with FAA Airworthiness Directive 74-08-09 Amendment 39-1818 paragraph (d) will ensure compliance with paragraph 3.1.

3.2 Prohibition of smoking in toilet compartments

3.2.1 Smoking shall not be permitted in toilet compartments.

3.2.2 “No smoking” placards and ash trays are required both inside and outside the compartments.

3.2.3 “No smoking” placards shall be displayed so as to be prominent to, and the ash trays shall be obviously and conveniently placed for, those about to enter and those within these compartments.

No.C30

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

AUTOMATIC DIRECTION FINDING EQUIPMENT ON TURBINE ENGINED AEROPLANES AND HELICOPTERS

1 Introduction

1.1 It has been found that beneficial reduction in crew workload can be obtained by replacing ADF equipment employing continuously variable tuning with equipment that is incrementally tuned.

1.2 The purpose of this Notice is to publish requirements of incrementally tuned ADF equipment.

2 Requirement

2.1 ADF installations in aeroplanes and helicopters specified in (a), (b) and (c) shall be of a type where the channel frequency can be incrementally selected in discrete steps and displayed as a row of numerals. Equipment employing a continuously variable control for the 1 kHz selector only will also be accepted as meeting the requirement.

(a) Turbojet engined aeroplanes certificated in the transport category for the carriage of more than 19 persons over the age of three years

(b) Turbojet engined aeroplanes the MTWA which exceeds 15 900 kg

(c) Turbine engined helicopters certificated in the transport category

No.C31

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

COMMUNICATIONS TRANSMITTERS IN THE VHF RADIO TELEPHONY BAND 118-136 MHz

1 Introduction

1.1 ICAO Annex 10, Vol. 1, Part 1, paragraph 4.7.1.1, introduced by amendment 52 dated 23 May 1974, states:

"Where 25 kHz channel spacing is introduced, the radio frequency of operation shall not vary more than plus or minus 0.003 per cent from the assigned frequency for new transmitters installed after 1 January 1974, and for all transmitters after 1 January 1981".

2 Requirement

2.1 All VHF transmissions for Singapore registered aircraft shall comply with the frequency tolerance limits of $\pm$ 0.003 per cent prescribed by ICAO.

3 Implementation

3.1 New installations of VHF communications equipment in aircraft will be approved only if the equipment manufacturer's specification for the equipment shows the transmitter frequency tolerance to be within the limits prescribed in paragraph 2.

3.2 Approval of existing installations of equipment agreed prior to 1 July 1982 will remain valid provided the actual transmissions conform to the required new tolerance.

3.3 The CAAS will continue to monitor aircraft transmissions and to inform any operator whose equipment is observed as failing to comply with paragraph 2.

No.C35

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

GROUND OPERATION OF AIRCRAFT RADAR EQUIPMENT

1 The requirements of this Notice shall apply to all radar equipment with a nominal peak power output rating in excess of 25 kW.

2 During all ground operation, including testing and maintenance of aircraft radar equipment, the operator or person in charge of such equipment shall ensure the following:

2.1 The equipment is not energised in its normal mode (antenna rotating and radar transmitter operative) unless the sector area scanned by the radar beam is clear of the following objects to a distance of 40 metres from the antenna:

(a) aircraft being refuelled or defuelled;

(b) fuel tankers, fuel tanks or fuel storage areas;

(c) persons or cargo;

(d) any other aircraft or aircraft hangar.

Note: For each radar installation the sector area should be defined in terms of readily distinguishable dimensions preferably related to some feature of the aircraft and should appear in the aircraft maintenance manual.

2.2 The equipment is not energised with the antenna stationary when the radar transmitter is operative and the antenna directed towards any of the objects specified in paragraph 2.1 unless the distance separating them from the antenna is in excess of 70 metres.

2.3 The distance specified in paragraphs 2.1 and 2.2 may be reduced by 75 per cent when a CAAS approved beam attenuating device is used between the antenna and any object specified in paragraph 2.1.

2.4 The equipment is not energised in any radiating mode of operation when the aircraft in which the equipment is fitted is in a hangar or other enclosure unless a suitable microwave energy absorbing shield is fitted over the antenna.

2.5 The equipment is not operated in any aircraft during fuelling operations.

Note: During all testing of aircraft radar equipment the beam should, whenever possible, be directed with maximum upward tilt toward a clear area.

No.C41

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

ELECTRICAL GENERATION SYSTEMS – SINGLE-ENGINED AIRCRAFT

1 Applicability

1.1 When Airworthiness Notice C28 was introduced, it was considered inappropriate to impose the whole or part of those requirements on single-engined aircraft. However, systems which were once fitted only in the more complicated twin-engined general aviation aircraft have now been developed and fitted to single-engined aircraft. Thus, greater reliance is being placed on the integrity of the electrical power supplies for such aircraft.

1.2 Recent investigations into accidents and incidents involving loss of electrical power on single-engined aircraft have shown that the standards for warning of failures of generated power have not kept pace with such system developments and inadequacies are all too often apparent.

1.3 The purpose of this Notice is to publish a requirement that clear and unmistakable warning of the loss of generated electrical power shall be provided on single-engined aircraft as detailed in paragraph 2.1.1, by the introduction, where necessary, of retrospective modifications.

2 Requirements

2.1 For all single-engined aircraft fitted with systems or equipment as defined in paragraph 2.1.1 of this Notice, compliance with paragraphs 2.2 and 2.3, or with a CAAS approved alternative providing an equivalent level of airworthiness, is required.

2.1.1 Compliance with this Notice will be required on single-engined aircraft equipped with electrically-operated systems or equipment the loss of which could prejudice continued safe flight and landing. Such systems or equipment include:

(a) electrically-powered mandatory flight instruments where no acceptable alternatives are provided;

(b) electronic ignition;

(c) electrically-operated landing gear;

(d) a minimum radio fit;

(e) any other system which could prejudice continued safe flight and landing.

2.2 A clear and unmistakable red visual warning shall be provided, within the pilot's normal scan of vision, to give indication of the reduction of the voltage at the aircraft bus-bar to a level where the battery commences to support all or part of the electrical load of the aircraft.

2.3 Guidance shall be given in the appropriate aircraft manual(s) on any actions to be taken by the pilot should the warning operate. See also paragraph 3.2.

3 Additional information

3.1 The recommended voltage levels for operating the warning required under paragraph 2.2 of this Notice are 25 volts to 25.5 volts for a nominal 24 volt dc system and 12.5 volts to 13 volts for a nominal 12 volt dc system.

3.2 The battery duration should be sufficient to make a safe landing and should not be less than 30 minutes, subject to the prompt completion of any drills. This duration need only be a reasonable estimate and not necessarily calculated by a detailed electrical load analysis. However, when making this estimate, only 75% of the battery name plate capacity should be considered as available because of loss of battery efficiency during service.

3.3 Owners and operators are recommended to contact the aircraft constructor or main agent for information regarding suitable means of compliance with this Notice.

No.C42

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

ACCEPTANCE OF AIRCRAFT STANDARD PARTS BY USERS

1 Introduction

1.1 This Airworthiness Notice is issued for information and guidance for users to cover procurement of aircraft standard parts and should be read in conjunction with the appropriate Chapters in the Singapore Airworthiness Requirements.

1.2 For the purpose of this Notice the following definitions apply:-

(a) **Aircraft Standard Parts** are items intended for incorporation into an aircraft, its engines, propellers, or equipment, being items made to National Specifications (AN, MS, etc) and called up by the design organisation as such.

(b) **The User** is the person or organisation incorporating the aircraft standard part into an aircraft, its engines, propellers, or equipment.

(c) **A Design Organisation** is an organisation approved or recognised by the CAAS as competent to design complete aircraft, engines, propellers, equipment, or modifications to such parts.

2 User Responsibilities

2.1 The user of aircraft standard parts is responsible for ensuring that the parts are serviceable and confirm to the standard determined by the appropriate Design Organisation as being suitable for the intended application. In order to discharge this responsibility, the user must when obtaining aircraft standard parts from suppliers ensure that his purchase order contains accurate definitions of the aircraft standard parts to be met by the supplier in satisfying the order.

2.2 No aircraft standard parts certification given by manufacturers and distributors can relieve the user of his responsibility for ensuring that purchased aircraft standard parts are to the required build standard and are of acceptable manufacturing origin.

2.3 The following paragraphs give guidance on acceptable means by which these basic responsibilities may be met.

3 Determination of Quality Control and Certification Requirements

3.1 When an aircraft standard part, as defined in this Notice, is manufactured to a National Specification it should be identified by a description and part number provided either by the Design Organisation directly responsible for the part or by the Design Organisation responsible for the application of the aircraft part.

3.2 The supplier should give some form of certification of conformance of the standard parts with the applicable specification and quoting identifying part numbers.

3.3 Compliance with the requirement for the user to be satisfied, to an extent appropriate to the application, that aircraft standard parts are genuine and serviceable at the time of use will always require some degree of inspection or test.

4 Purchase Order Requirements

4.1 Purchase orders placed on suppliers of aircraft standard parts should specify the following:

(a) The full description and identify of the parts to be supplied; including part numbers and/or specifications, any special finishes and features.

(b) That a certification be made by the supplier, if it is the manufacturer, when despatching the aircraft standard parts that the parts supplied comply in all respects with the description.

(c) In the case where the supplier is a distributor, that a certification from the manufacturer, when despatching the aircraft standard parts that the parts supplied comply in all respects with the description.

5 Verification Procedures

5.1 The user must institute adequate receipt procedures to confirm that aircraft standard parts and their accompanying documentation comply with the terms of the Purchase Order.

5.2 Documentation checks should include verification that part numbers, type numbers, and standards are correct, that the parts were obtained from the sources quoted with correct certification.

No.C44

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

TYRE BURSTS IN FLIGHT - INFLATION MEDIA

1 Applicability

1.1 This Airworthiness Notice is applicable to all Singapore registered aeroplanes over 5700 kg MTWA.

2 Introduction

2.1 The majority of in-flight tyre bursts have been attributed to the tyre carcass being weakened by foreign object damage, scuffing, etc., such that a rapid release of pressure takes place. Such failures are usually experienced when the gear has been retracted for some time and the effects of brake heat transfer, internal tyre temperature and differential pressure are combined.

2.2 A fatal accident involving cabin decompression and fire has highlighted another mode of tyre failure in flight where a tyre may fail explosively without any significant prior degradation. A tyre inflated with air and subjected to excessive heating, possibly caused by a dragging brake, can experience a chemical reaction resulting in release of volatile gases. Such a chemical reaction in the presence of the oxygen in the contained air may result in a tyre explosion in a landing gear bay and/or an in-flight fire since it appears that the protection normally afforded by conventional pressure relief devices in the wheel would be incapable of responding adequately to the rapid increases in temperature and gas pressure associated with auto-ignition.

2.3 Laboratory material and tyre burst testing indicates that the risk of auto-ignition can be reduced by using an inert gas for tyre inflation and servicing.

2.4 Other potential benefits may accrue from the use of nitrogen as it will tend to reduce wheel corrosion, tyre fatigue and the risk of fire when fusible plugs melt due to brake overheating.

3 Compliance

3.1 With immediate effect all braked wheels of retractable landing gear units on aeroplanes defined in paragraph 1 will be required to have tyres inflated with nitrogen, or other suitable inert gas, and maintained such as to limit the oxygen content of the compressed gases to not greater than 5% by volume.

3.2 To ensure compliance with this requirement suitable inflation and servicing procedures must be adopted in consultation with the airframe constructor. At airfields where suitable inert gases are not normally available it is acceptable to use air for inflation or servicing provided

that a suitable entry is made in the technical log and that the tyre is reinflated or serviced in accordance with the agreed procedure at the earliest opportunity or within 25 flight hours, whichever is the sooner.

4 Additional Information

4.1 In addition to compliance with the requirement of paragraph 3 above, tyre and wheel assemblies should be maintained such that greases, solvents, powders and rubber dust are excluded as far as practicable from within the inflation volume.

No.C52

Issue 3

11 December 2002

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

ENHANCED GROUND PROXIMITY WARNING SYSTEM (EGPWS)

1 Introduction

1.1 The Ground Proximity Warning System (GPWS) was introduced to help reduce the risk of "controlled flight into terrain" (CFIT) accidents, whereby properly functioning aeroplanes were flown into terrain (or water or obstacles).

1.2 The Fifth Schedule of the Singapore Air Navigation Order requires that all aeroplanes exceeding 5,700kg maximum total weight authorised or authorised to carry more than nine passengers to be fitted with the GPWS.

1.3 Investigations into aeroplane accidents have shown that although some aeroplanes were equipped with the GPWS, the GPWS did not provide the warning in time for the pilots to avoid mountainous terrain.

1.4 The Enhanced Ground Proximity Warning System (EGPWS) is an improvement on the current GPWS as it incorporates a forward looking terrain avoidance function. This new function would increase the warning times and situational awareness of the pilots. Another term being used for the EGPWS is Terrain Awareness and Warning System (TAWS).

1.5 The International Civil Aviation Organisation (ICAO) has introduced in Annex 6 the requirements for aeroplanes under different weight categories to be equipped by specified dates with the EGPWS.

2 Applicability

2.1 This Airworthiness Notice applies to aeroplanes operated by a Singapore Air Operator Certificate (AOC) Holder, a Singapore flying club/school or the owner of a Singapore-registered aeroplane.

3 Requirements

3.1 All turbine engine aeroplanes operated by an AOC Holder for the purpose of public transport or aerial work and authorised to carry more than five passengers shall be equipped with EGPWS.

3.2 All turbine engine aeroplanes for which the Certificate of Airworthiness is first issued in Singapore (or elsewhere) on or after 1 January 2004:

(a) not operated for the purpose of public transport or aerial work; and

(b) exceeding 5,700kg maximum total weight authorised or authorised to carry more than nine passengers.

shall be equipped with EGPWS.

3.3 From 1 January 2007, all turbine engine aeorplanes:

(a) not operated for the purpose of public transport or aerial work; and

(b) authorised to carry more than five passengers

shall be equipped with EGPWS.

3.4 From 1 January 2007, all piston engine aeroplanes exceeding 5,700kg maximum total weight authorised or authorised to carry more than nine passengers shall be equipped with Enhanced GPWS.

3.5 Notwithstanding the deadline given in paragraphs 3.3 and 3.4 above, it is recommended that:

(a) all turbine engine aeroplanes authorised to carry more than five passengers; and

(b) all piston engine aeroplanes exceeding 5,700kg maximum total weight authorised or authorised to carry more than nine passengers.

be equipped with EGPWS as soon as is practicable even if not operated for the purpose of public transport or aerial work.

No.C55

Issue 1

1 February 2008

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICE

ADDITIONAL CABIN SAFETY REQUIREMENTS FOR AIRBUS A380 AIRCRAFT

1 General

1.1 This Airworthiness Notice serves to provide additional requirements on cabin crew and cabin safety for Singapore AOC holder(s) operating the Airbus A380 aircraft. These requirements are meant to supplement the ANO Fifth Schedule.

2 Effectivity

2.1 This Airworthiness Notice comes into effect on 1 February 2008.

3 Instruments and Equipment

3.1 First aid equipment should be located at easily accessible locations on both the upper and main decks of the aircraft. The quantity of first aid equipment should be determined with regard to the number of passengers required in the ANO Fifth Schedule.

3.2 There should be at least one medical kit on each deck of the Airbus A380 aircraft.

3.3 The number of portable fire extinguishers to be placed on the passenger decks should be derived from the following table:

Maximum approved passenger seating configuration (per deck)	Number of extinguishers
7 to 30	1
31 to 60	2
61 to 200	3
201 to 300	4
301 to 400	5
401 to 500	6
501 to 600	7
601 to more	8

3.4 The maximum approved passenger seating configuration is based on the certification provided by Airbus, and this seating configuration might differ from the configuration adopted by the AOC Holders. The upper deck should be treated separately from the main deck when deriving the number of fire extinguishers required.

3.5 Due to the significant seating capacity on the upper deck of the A380 aircraft, the AOC Holder should treat the seating capacities of the upper deck and main deck separately when determining the number of megaphones to be carried as according to the ANO Fifth Schedule Scale V.

(w) oral and injectable drugs as follows:

(i) Epinephrine 1:1000
(ii) Antihistamine – injectable
(iii) Dextrose 50% (or equivalent) – injectable: 50ml
(iv) Nitroglycerin tablets, or spray
(v) Major analgesic
(vi) Sedative anticonvulsant – injectable
(vii) Antiemetic – injectable
(viii) Bronchial dilator – inhaler
(ix) Atropine – injectable
(x) Adrenocortical steroid – injectable
(xi) Diuretic – injectable
(xii) Medication for postpartum bleeding
(xiii) Sodium chloride 0.9% (minimum 250 ml)
(xiv) Acetyl salicylic acid (aspirin) for oral use
(xv) Oral beta blocker

(x) If a cardiac monitor is available (with or without an AED) add to the above list:

(i) Epinephrine 1:10000 (can be a dilution of epinephrine 1:1000)