



香港特別行政區政府
民航處

Civil Aviation Department

The Government of the Hong Kong
Special Administrative Region

HKAR-145

Approved Maintenance Organisations

**Issue 5 Revision 6
28 January 2025**

CAD 145

Enquires on the contents of the Hong Kong Aviation Requirements should be addressed to:

Civil Aviation Department
Flight Standards and Airworthiness Division
Airworthiness Office
E-mail: awo@cad.gov.hk

Please note that the HKAR-145 is available at CAD website:
<http://www.cad.gov.hk>.

Hardcopies will not be published.

CONTENTS (Layout)

HKAR-145

APPROVED MAINTENANCE ORGANISATIONS

FOREWORD

CHECKLIST OF PAGES

PREAMBLES

SECTION 1 REQUIREMENTS

SECTION 2 ACCEPTABLE MEANS OF COMPLIANCE (AMC)

SECTION 3 GUIDANCE MATERIAL (GM)

SECTION 4 APPENDICES

APPENDIX 1 Reserved

APPENDIX 2 ORGANISATIONS APPROVAL CLASS AND RATING SYSTEM

APPENDIX 3 SOME OUTLINE EXAMPLES OF ORGANISATIONAL STRUCTURES POSSIBLE UNDER HKAR-145

APPENDIX 4 FUEL TANK SAFETY TRAINING

APPENDIX 5 PROCEDURES FOR THE GRANT AND VARIATION OF HKAR-145 APPROVAL

APPENDIX 6 PROCEDURES FOR THE RENEWAL OF HKAR-145 APPROVAL

APPENDIX 7 ACCEPTANCE CRITERIA FOR ORGANISATIONS WORKING UNDER THE PROVISIONS OF HKAR 145.1(e)

APPENDIX 8 ACCEPTANCE CRITERIA FOR CERTIFYING STAFF OF APPROVED MAINTENANCE ORGANISATIONS UNDER THE PROVISIONS OF HKAR 145.30(j)(5) and (6)

APPENDIX 9 TRAINING PROGRAMME AND FACILITIES

APPENDIX 10 MINIMUM REQUIREMENTS FOR HKAR-145 PERSONNEL

APPENDIX 11 AIRCRAFT COMPONENT CERTIFYING STAFF

APPENDIX 12 DEVELOP MAINTENANCE ORGANISATION
EXPOSITION PROCEDURES FOR WELDER
QUALIFICATION AND APPROVAL

CONTENTS (Details)

HKAR-145

APPROVED MAINTENANCE ORGANISATIONS

<u>Paragraph</u>	<u>Page</u>
FOREWORD	F-1
CHECKLIST OF PAGES	CL-1
PREAMBLES	P-1
SECTION 1 REQUIREMENTS	
General and Presentation	1-0-1
HKAR 145.1 General	1-1
HKAR 145.3 Effectivity	1-2
HKAR 145.5 Definitions	1-2
HKAR 145.10 Scope and applicability	1-3
HKAR 145.15 Application and issue	1-4
HKAR 145.20 Terms of approval	1-4
HKAR 145.25 Facility requirements	1-4
HKAR 145.30 Personnel requirements	1-6
HKAR 145.35 Certifying staff and support staff	1-12
HKAR 145.40 Equipment and tools	1-14
HKAR 145.42 Acceptance of aircraft components	1-15
HKAR 145.45 Maintenance data	1-16
HKAR 145.47 Production planning	1-18
HKAR 145.48 Performance of maintenance	1-18
HKAR 145.50 Certification of maintenance	1-19
HKAR 145.55 Maintenance records	1-20
HKAR 145.60 Occurrence reporting	1-21
HKAR 145.65 Safety and quality policy, maintenance procedures and quality system	1-21
HKAR 145.70 Maintenance organisation exposition	1-22
HKAR 145.75 Privileges of the HKAR-145 approved maintenance organisation	1-24

<u>Paragraph</u>		<u>Page</u>
HKAR 145.80	Limitations on the HKAR-145 approved maintenance organisation	1-24
HKAR 145.85	Changes to the HKAR-145 approved maintenance organisation	1-25
HKAR 145.90	Continued validity of approval	1-25
HKAR 145.95	Findings	1-26
HKAR 145.97	Equivalent safety case	1-26
HKAR 145.100	Revocation, suspension, limitation or refusal to renew the approval certificate	1-26

SECTION 2 ACCEPTABLE MEANS OF COMPLIANCE (AMC)

General, Presentation and Background		2-0-1
AMC 145.10(a)	Scope and applicability	2-1
AMC 145.10(b)	Applicability	2-1
AMC 145.20	Terms of approval	2-2
AMC 145.25(a)	Facility requirements	2-3
AMC 145.25(b)	Facility requirements	2-3
AMC 145.25(d)	Facility requirements	2-3
AMC 145.30(a)	Personnel requirements	2-4
AMC 145.30(b)	Personnel requirements	2-4
AMC 145.30(c)	Personnel requirements	2-5
AMC 145.30(d)	Personnel requirements	2-5
AMC 145.30(e)	Personnel requirements	2-7
AMC 145.30(f)	Personnel requirements	2-10
AMC 145.30(g)	Personnel requirements	2-12
AMC 145.30(h)(1)	Personnel requirements	2-14
AMC 145.30(j)(3)	Personnel requirements	2-14
AMC 145.30(j)(3)(i)	Personnel requirements	2-14
AMC 145.30(j)(3)(ii)	Personnel requirements	2-15
AMC 145.30(j)(4)	Personnel requirements	2-16
AMC 145.35(a)	Certifying staff and support staff	2-17
AMC 145.35(b)	Certifying staff and support staff	2-18
AMC 145.35(c)	Certifying staff and support staff	2-18
AMC 145.35(d)	Certifying staff and support staff	2-18

<u>Paragraph</u>		<u>Page</u>
AMC 145.35(e)	Certifying staff and support staff	2-19
AMC 145.35(f)	Certifying staff and support staff	2-20
AMC 145.35(j)	Certifying staff and support staff	2-20
AMC 145.35(m)	Certifying staff and support staff	2-21
AMC 145.35(n)	Certifying staff and support staff	2-21
AMC 145.40(a)	Equipment and tools	2-22
AMC 145.40(b)	Equipment and tools	2-22
AMC 145.42(a)(2)	Acceptance of aircraft components	2-22
AMC 145.42(a)(3)	Acceptance of aircraft components	2-23
AMC 145.42(a)(4)	Acceptance of aircraft components	2-24
AMC 145.42(a)(5)	Acceptance of aircraft components	2-24
AMC 145.42(b)(1)	Acceptance of aircraft components	2-25
AMC 145.42(b)(3)	Acceptance of aircraft components	2-25
AMC 145.42(c)	Acceptance of aircraft components	2-27
AMC 145.45(b)	Maintenance data	2-28
AMC 145.45(c)	Maintenance data	2-29
AMC 145.45(d)	Maintenance data	2-29
AMC 145.45(e)	Maintenance data	2-30
AMC 145.45(f)	Maintenance data	2-30
AMC 145.45(g)	Maintenance data	2-31
AMC 145.47(a)	Production planning	2-31
AMC 145.47(b)	Production planning	2-32
AMC 145.47(c)	Production planning	2-32
AMC No. 1 to 145.48(b)	Performance of maintenance	2-32
AMC No. 2 to 145.48(b)	Performance of maintenance	2-32
AMC No. 3 to 145.48(b)	Performance of maintenance	2-33
AMC No. 4 to 145.48(b)	Performance of maintenance	2-33
AMC 145.48(c)	Performance of maintenance	2-36
AMC 145.50(a)	Certification of maintenance	2-36
AMC 145.50(b)	Certification of maintenance	2-36

<u>Paragraph</u>		<u>Page</u>
AMC No. 1 to 145.50(d)	Certification of maintenance	2-37
AMC No. 2 to 145.50(d)	Certification of maintenance	2-38
AMC 145.50(e)	Certification of maintenance	2-43
AMC 145.50(f)	Certification of maintenance	2-44
AMC 145.55(c)	Maintenance records	2-44
AMC 145.60(b)	Occurrence reporting	2-45
AMC 145.65(a)	Safety and quality policy, maintenance procedures and quality system	2-45
AMC 145.65(b)	Safety and quality policy, maintenance procedures and quality system	2-45
AMC 145.65(b)(2)	Safety and quality policy, maintenance procedures and quality system	2-46
AMC 145.65(c)(1)	Safety and quality policy, maintenance procedures and quality system	2-46
AMC 145.65(c)(2)	Safety and quality policy, maintenance procedures and quality system	2-48
AMC 145.70(a)	Maintenance organisation exposition	2-49
AMC 145.75(b)	Privileges of the HKAR-145 approved maintenance organisation	2-53
AMC 145.80	Limitations on the HKAR-145 approved maintenance organisation	2-56
AMC 145.85	Changes to the HKAR-145 approved maintenance organisation	2-56

SECTION 3 GUIDANCE MATERIAL (GM)

General and Presentation		3-0-1
GM 145.1	General	3-1
GM 145.10	Scope and applicability	3-1
GM 145.30(a)	Personnel requirements	3-3
GM 145.30(b)	Personnel requirements	3-3
GM 145.30(e)	Personnel requirements	3-3
GM 145.30(j)(4)	Personnel requirements (Flight crew)	3-10
GM 145.42(b)(1)	Acceptance of aircraft components	3-12
GM 145.42(b)(2)	Acceptance of aircraft components	3-14

<u>Paragraph</u>		<u>Page</u>
GM 145.42(c)	Acceptance of aircraft components	3-15
GM 145.48	Performance of maintenance	3-16
GM 145.48(c)	Performance of maintenance	3-16
GM 145.48(d)	Performance of maintenance - critical design configuration control limitations (CDCCL)	3-16
GM 145.55(a)	Maintenance records	3-17
GM 145.60(a)	Occurrence reporting	3-18
GM 145.60(c)	Occurrence reporting	3-18
GM 145.65(b)(2)	Safety and quality policy, maintenance procedures and quality system	3-18
GM 145.65(c)(1)	Safety and quality policy, maintenance procedures and quality system	3-19
GM 145.70(a)	Maintenance organisation exposition	3-21

SECTION 4 APPENDICES

Appendix 1	Reserved	4-APP 1-1
Appendix 2	Organisations approval class and rating system	4-APP 2-1
Appendix 3	Some outline examples of organisational structures possible under HKAR-145	4-APP 3-1
Appendix 4	Fuel tank safety training	4-APP 4-1
Appendix 5	Procedures for the grant and variation of HKAR-145 approval	4-APP 5-1
Appendix 6	Procedures for the renewal of HKAR-145 approval	4-APP 6-1
Appendix 7	Acceptance criteria for organisations working under the provisions of HKAR 145.1(e)	4-APP 7-1
Appendix 8	Acceptance criteria for certifying staff of approved maintenance organisation under the provisions of HKAR 145.30(j)(5) and (6)	4-APP 8-1
Appendix 9	Training programme and facilities	4-APP 9-1
Appendix 10	Minimum requirements for HKAR-145 personnel	4-APP 10-1
Appendix 11	Aircraft component certifying staff	4-APP 11-1
Appendix 12	Develop maintenance organisation exposition procedures for welder qualification and approval	4-APP 12-1

FOREWORD

- 1 EASA Part-145 has been selected to provide where appropriate the content of the Hong Kong Aviation Requirements for Approved Maintenance Organisations (HKAR-145).
- 2 Amendments are incorporated into the text by means of a 'Revision' or a complete 'Re-issue'.
- 3 New, amended and corrected text is indicated by a marginal line.

HONG KONG AVIATION REQUIREMENTS
CHECKLIST OF PAGES
APPROVED MAINTENANCE ORGANISATIONS

FIRST ISSUE, DATED 1 February 1993
 REVISION 1, DATED 1 August 1994
 SECOND ISSUE, DATED 1 June 1996
 REVISION 1, DATED 1 August 1997
 ISSUE 3, DATED 1 June 1999
 REVISION 1, DATED 1 August 2000
 REVISION 2, DATED 1 July 2001
 REVISION 3, DATED 28 February 2002
 REVISION 4, DATED 15 December 2003
 REVISION 5, DATED 1 May 2005
 ISSUE 4, DATED 28 February 2008
 REVISION 1, DATED 1 December 2008
 REVISION 2, DATED 23 February 2009
 REVISION 3, DATED 30 November 2009
 REVISION 4, DATED 31 October 2012
 REVISION 5, DATED 10 December 2012
 REVISION 6, DATED 5 December 2014
 REVISION 7, DATED 29 May 2015
 ISSUE 5, DATED 30 November 2016
 REVISION 1, DATED 8 November 2018
 REVISION 2, DATED 31 July 2019
 REVISION 3, DATED 30 June 2022
 REVISION 4, DATED 1 February 2023
 REVISION 5, DATED 30 April 2024
 REVISION 6, DATED 28 January 2025

The following pages of HKAR-145 are now current:

Page No.

Title Page
 ii
 C-1 to C-7
 F-1
 CL-1 to CL-2
 P-1 to P-18
 1-0-1
 1-1 to 1-26
 2-0-1 to 2-0-2
 2-1 to 2-56
 3-0-1
 3-1 to 3-22
 4-APP 1-1
 4-APP 2-1 to 4-APP 2-5

Legend

28 January 2025
 28 January 2025
 1 February 2023
 30 November 2016
 28 January 2025
 28 January 2025
 8 November 2018
 28 January 2025
 8 November 2018
 30 April 2024
 8 November 2018
 1 February 2023
 30 June 2022
 30 June 2022

HKAR-145

4-APP 3-1 to 4-APP 3-2	30 November 2016
4-APP 4-1 to 4-APP 4-5	1 February 2023
4-APP 5-1 to 4-APP 5-4	30 April 2024
4-APP 6-1 to 4-APP 6-5	30 April 2024
4-APP 7-1 to 4-APP 7-4	30 June 2022
4-APP 8-1	1 February 2023
4-APP 9-1 to 4-APP-4	30 June 2022
4-APP 10-1	30 April 2024
4-APP 11-1 to 4-APP 11-4	1 February 2023
4-APP 12-1 to 4-APP 12-2	1 February 2023

PREAMBLES**HKAR-145**

This HKAR-145 was issued on 1 February 1993 and became effective on 1 February 1993, with the exception of HKAR 145.1, which became effective on 1 December 1995. The preambles are intended to be a summarised record of the main changes introduced by each amendment of HKAR-145.

Issue 1***1 February 1993***

- New requirement for maintenance organisations involved in maintenance of aircraft with either a Transport Category (Passenger) or Transport Category (Cargo) Certificate of Airworthiness operated for Commercial Air Transport, with an effectivity date of 1 February 1993.

Issue 1 Revision 1***1 August 1994***

- Added a definition for 'organisation' to HKAR 145.5.
- Amended HKAR 145.75(c) to permit line maintenance of aircraft at any location.
- Other minor changes also incorporated.

Issue 2***1 June 1996***

- Advisory Circulars Joint (ACJs) have been replaced by Acceptable Means of Compliance (AMCs) and Interpretative/Explanatory Material (IEMs).
- Section 2 Appendix 1 amended to include information on the HKAR-145 approval class ratings.
- New paragraphs IEM 145.70(a)(9) and (10) introduces an example of an accountable manager's commitment statement and a reminder that a change of accountable manager requires a new signature to the statement.
- Section 2 Appendix 3 is amended to include Issue 2 of CAD Form One which aligns it with the equivalent FAA Form 8130-3 and JAA Form One and changes the associated instructions for use and completion of the CAD Form One.
- A new maintenance status namely 'retreaded' for aircraft tyres also incorporated.
- Amends HKAR 145.3 which stated that 145.1 came into force on 1 December 1995.
- Other minor changes are incorporated.

Issue 2 Revision 1

1 August 1997

- Amended HKAR 145.50(c) to extend the validity of component release certificates issued prior to 1 January 1994 to 1 January 2000.
- Amended Box 19 of CAD Form One.
- Other minor changes are incorporated.

Issue 3

1 June 1999

- This was a significant amendment to HKAR-145. The main elements were:
 - the introduction of a standard and limitation regarding sub-contracting - HKAR 145.1(e) and Appendix 6 of Section 2 refers;
 - the introduction of more detail on quality systems with a particular reference to small HKAR-145 organisations - HKAR 145.65(b) and Appendix 5 of Section 2 refers;
 - more detail on approved data - HKAR 145.45 refers;
 - more detail on continuation training - AMC 145.30(d) refers;
 - the introduction of a new HKAR 145.100 addressing the revocation of HKAR-145 approval certificates; and
 - the clarification of what an 'organisation' is in HKAR 145.5.
- Other minor changes also incorporated.
- Presentation of Section 1 has been changed from a two-column format to a single column format.

Issue 3 Revision 1

1 August 2000

- Amended HKAR 145.3(d) to change the compliance date to read in line with APPENDIX 6
- Added to the HKAR 145.5 the definition of 'HKAR-145 certification authorisation'.
- Amended HKAR 145.30 to include the other personnel qualified as prescribed that may be used as certifying staff in such circumstances.
- Amended the title of HKAR 145.35 and the associated AMCs to read Certifying Staff. The paragraphs have been amended to include the qualification basis, in particular the maintenance experience and training required, for issue and re-issue of HKAR-145 certification authorisation to certifying staff.

- Amended the incorrect reference used in paragraph 4.4 of APPENDIX 6.
- Other minor amendments are incorporated.

Issue 3 Revision 2

1 July 2001

- Amended AMC 145.30(a) stating that a HKAR-145 approved maintenance organisation should specify the minimum qualification of the managers.

Issue 3 Revision 3

28 February 2002

- Amended the HKAR 145.3 paragraph to include the compliance date of HKAR 145.30(e), (f)(1), (f)(2) and (i).
- The term "Director" appeared throughout the requirements have been amended to read "Director-General".
- The term "approved data" appeared throughout the requirements have been amended to read "maintenance data".
- The term "customer" has been used in lieu of referrals to "aircraft operator" in various HKAR-145 paragraphs.
- Added to the HKAR 145.5 paragraph the definitions of "Maintenance Organisation Exposition" and "Quality Policy".
- Added to the HKAR 145.30 paragraph for a senior person to be nominated held responsible for monitoring the quality system of the organisation.
- "Maintenance manhour plan" has been upgraded to become a requirement.
- Inclusion of personnel requirements for those personnel who carry out and/or control a continued airworthiness non-destructive test of aircraft structure and/or aircraft components.
- Inclusion of personnel requirements on aircraft maintenance certifying staff with regards to the implementation of HKAR-66 requirements.
- The HKAR 145.35 paragraph amended where affected by the implementation of HKAR-66 requirements.
- Inclusion in the HKAR 145.45 paragraph regarding the process of repair by HKAR-145 organisations.
- Inclusion of a requirement on a common workcard or worksheet system to be used in HKAR-145 organisations.

- Amended the HKAR 145.50 paragraph regarding certification of incomplete maintenance.
- Inclusion in the HKAR 145.50 to permit an aircraft to fly after a component change under specific conditions in the temporary absence of an appropriate component release certificate.
- Added a new requirement for establishing a quality policy within a HKAR-145 organisation.
- Other minor changes also incorporated.

Issue 3 Revision 4

15 December 2003

- Inclusion of a note under HKAR 145.1(c).
- Amendments made to HKAR 145.5 Definitions:
 - "*Aircraft component*" definition revised to link up with the changes made to Section 2 Appendix 3.
 - Include the definitions of "Human Factors" and "Human Performance".
- Amendments made to HKAR 145.30(b), HKAR 145.65(a) and HKAR 145.70(a) for the new requirement on safety policy.
- Amendments made to delete the sample quality policy statement in AMC 145.65(a).
- Amendments made to HKAR 145.30(e) to extend the personnel requirements on competence to management personnel.
- Amendments made to HKAR 145.30(e) and HKAR 145.65(b) to address human factors and human performance.
- Inclusion of personnel requirements on aircraft component maintenance certifying staff in HKAR 145.30(i).
- Inclusion in HKAR 145.45 the requirements on recording and notification of inaccurate maintenance data, procedures and practices.
- Added a new topic, HKAR 145.47, the requirements on production planning and shift changeover.
- Introduce changes to the HKAR 145.60 and include a new sub-paragraph in it requiring an internal occurrence reporting structure to assess and extract occurrences to be reported under HKAR 145.60(a). Additional information is contained in AMC 145.60.
- Deleted the Note under paragraph 1 of AMC 145.1 and the contents of Appendix 7. These materials are irrelevant to HKAR-145.

HKAR-145

- AMC 145.65(b) has been amended to address the need for procedures to detect and rectify maintenance errors that may endanger the safe operation of an aircraft.
- Appendix 2 amended to align with the additional or revised HKAR-145 requirements.
- Appendix 3 amended to remove those parts relating to manufacture of items. Also, the CAD Form One has been revised to Issue 6.
- Appendix 5 amended to align with the additional or revised HKAR-145 requirements.
- Minor adjustments made in Appendix 6.
- A new Appendix 8 which includes the Maintenance Human Factors training syllabus has been introduced.

Issue 3 Revision 5

1 May 2005

- Amendments made to HKAR 145.30(j) to include two new sub-paragraphs (4) and (5) for the acceptance of non HKAR-66 licences in overseas line and base aircraft maintenance.
- Amendments made to AMC 145.30(a)7 and IEM 145.60(c) to correct the references used.

Issue 4

28 February 2008

- The infrastructure of the HKAR-145 publication has been changed. Section 1 contains the requirements whilst Section 2, 3 and 4 contain the Acceptable Means of Compliance (AMC), the Guidance Material (GM) and the Appendices respectively.
- Introduced the definition of "Large Aircraft" for the purpose of implementing the HKAR-145 requirements.
- Incorporated the AMC 145.25(a) and (c) on "facilities" and "working environment" into the HKAR 145.25 requirements.
- The requirements on "accountable manager" have now been consolidated into one single paragraph: HKAR 145.30(a).
- The requirements on "key personnel" have now been consolidated into one single paragraph: HKAR 145.30(b).
- With regard to "certifying staff" requirements, an option has now been incorporated for the base maintenance of small aircraft. HKAR 145.30(h)(2) refers.
- The reference to HKAR-AMEL licences in HKAR 145.30(j) has now been removed.
- With regard to "aircraft on ground" situation, an option has now been incorporated for the HKAR-145 organisation to use its employees holding equivalent type authorisation on aircraft of similar technology, construction and systems. HKAR 145.30(j)(3)(i) refers.

- Added a new sub-paragraph HKAR 145.30(j)(6) to allow the use of certifying staff holding CCAR-66 and MAR-66 licences.
- Extended the applicability of HKAR 145.35 requirements to include "category B1 and B2 support staff".
- Introduced a new sub-paragraph HKAR 145.35(b) to prescribe that maintenance authorisations shall be related to the basic categories or sub-categories and any type rating listed on the aircraft maintenance licence held by the certifying staff.
- Incorporated the AMC 145.40(a) on "tools" and "equipment" into the HKAR 145.40 requirements.
- Included in HKAR 145.40(b) that "records of traceability to standards" shall be kept.
- Introduced a new paragraph HKAR 145.42 on "acceptance of aircraft components".
- Amended HKAR 145.45(b) such that most of the "maintenance data" are now addressed to the authority responsible for the oversight of the aircraft or aircraft component concerned.
- Incorporated the AMC 145.45(f) on "complex maintenance tasks" into the HKAR 145.45(e) requirements.
- Incorporated the AMC 145.45(g) and (h) on "procedure ensuring the maintenance data is kept up to date" into the HKAR 145.45(g) requirements.
- Incorporated the AMC 145.55(c) on "storage of records" into the HKAR 145.55(c) requirements.
- Included in HKAR 145.75(b) "the limitations on scope of work" that can be carried out in a sub-contracted organisation.
- Included in HKAR 145.90 "the handling of audit findings" as one of the criteria for the continued validity of approval.
- Introduced a new paragraph HKAR 145.95 on "categorizing and handling of audit findings".
- Re-numbered the paragraph HKAR 145.95 to HKAR 145.97.
- Added the definition of "line and base maintenance" in AMC 145.10(a).
- Re-located the table for "the Category C ATA Specifications" in Appendix 1 to AMC 145.20.
- Added "the work outside the scope of HKAR-145 approval" in AMC 145.30(d)2.
- Added the need for "keeping the assessment records" in AMC 145.30(e)1.
- Added the clause prescribing that "initial and recurrent training should be provided and recorded" in AMC 145.30(e)2.

- Introduced new AMC for "one-off authorisation where the authorised person is a staff member of the contracted maintenance organisation". AMC 145.30(j)(3)(i) refers.
- Introduced new AMC for "one-off authorisation where the authorised person is NOT a staff member of the contracted maintenance organisation". AMC 145.30(j)(3)(ii) refers.
- Included in AMC 145.35(a) stating that "the HKAR-145 maintenance organisation should hold copies of document that attest to qualification and experience".
- Introduced new AMC for "HKAR-145 maintenance organisation to ensure compliance with HKAR-145 and HKAR-66 before an authorisation is issued". AMC 145.35(b) refers.
- Introduced new AMC for "component eligibility". AMC 145.42(b) refers.
- Introduced new AMC for "parts manufacturing". AMC 145.42(c) refers.
- Introduced new AMC for "unsalvageable aircraft components". AMC 145.42(d) refers.
- Introduced new AMC addressing the "handling of new and used aircraft components" in various scenario. AMC 145.50(a) refers.
- Re-located IEM 145.1 to Section 3 as GM 145.1.
- Re-located IEM 145.5 to Section 3 as GM 145.5.
- Re-located IEM 145.10(b) to Section 3 as AMC 145.10(b).
- Re-located IEM 145.55(a) to Section 3 as GM 145.55(a).
- Re-located IEM 145.60(c) to Section 3 as GM 145.60(c).
- Re-located IEM 145.70(a) to Section 3 as GM 145.70(a).
- Re-located IEM 145.95(a) to Section 3 as GM 145.97.
- Re-located the Appendix 1 "organisations approval class and rating system" to Section 4 as Appendix 2. For class A, there are now A1, A2, A3 and A4 ratings. The A1 and A2 are solely for aeroplanes and helicopters. Airships are now covered under A4 "aircraft other than A1, A2 and A3".
- Re-located the Appendix 2 "topics of a maintenance organisation exposition (MOE)" to go under the new AMC 145.70(a). The AMC also carries additional information on "small organisations", "electronic presentation of MOE", and "MOE supplement for those organisations accepted under Joint Maintenance Management or Technical Arrangement with other aviation authorities".
- Re-located the Appendix 3 "CAD Form One" to Section 4 as Appendix 1. The format of CAD Form One has also been modified to that of EASA.
- Re-located the Appendix 4 "examples of organisation structure" to Section 4 as Appendix 3.

- Re-located the Appendix 5 "example quality audit plan" to Section 4 as GM 145.65(c)(1).
- Re-located the Appendix 6 "sub-contracting" to the new AMC 145.75(b).
- Re-located the Appendix 8 "training syllabus for initial human factors training" to Section 4 as GM 145.30(e).
- Introduced a new GM 145.10 providing guidance on how the smallest organisations satisfy the intent of HKAR-145 requirements.

Issue 4 Revision 1

1 December 2008

- Added an effective date for the implementation of a Safety Management System in HKAR 145.3.
- Added a new sub-paragraph HKAR 145.30(a)(4) stating the accountable manager shall ensure an implementation of a Safety Management System.
- Amended the HKAR 145.50 paragraph to include the basic details required for a Certificate of Release to Service.
- Added to the HKAR 145.70 paragraph that copies of all exposition amendments shall be furnished promptly to all parties.
- Amended AMC 145.30(b) to include a Safety Manager as a nominated person of the HKAR-145 approved maintenance organisation.

Issue 4 Revision 2

23 February 2009

- Introduced a new GM 145.65(b)(2) stating specialised maintenance activities should be carried out in accordance with the standards specified by OEM or Design Approval holders.

Issue 4 Revision 3

30 November 2009

- Amended Section 4 Appendix 1 to refer HKAR-2 Chapter 31 for use and instructions for the completion of the Authorised Release Certificate (CAD Form One).

Issue 4 Revision 4

31 October 2012

- Amended Section 1 HKAR 145.30 (j)(4) and (5) referring to acceptable issuing authorities mentioned in Chapter 9 of HKAR-2.

Issue 4 Revision 5

10 December 2012

- Amended address and telephone number of CAD on page ii.

Issue 4 Revision 6

5 December 2014

- Amended Section 1 HKAR 145.30 (f) for the acceptance of an equivalent NDT standard in accordance with Hong Kong Airworthiness Notice No. 94.
- Amended AMC 145.30 (f)2 stating an equivalent NDT standard in accordance with Hong Kong Airworthiness Notice No. 94.

Issue 4 Revision 7

29 May 2015

- Added in Section 3 a new paragraph GM145.30(b) Personnel requirements.

Issue 5

30 November 2016

- Amended the referencing paragraphs of Appendix No. 1 to Hong Kong Airworthiness Notice No. 17 in the 'NOTE' of HKAR 145.1(c).
- Added definition of 'Support staff' and included some editorial changes in HKAR 145.5.
- Added HKAR-66 category B3 personnel may carry out and/or control colour contrast dye penetrant tests in HKAR 145.30(f)(2).
- Added HKAR-66 category B2* and B3 in HKAR 145.30(g).
- Added HKAR-66 category B2* and included some editorial changes in HKAR 145.30(h)(1).
- Added HKAR-66 category B2* and B3, and included some editorial changes in HKAR 145.30(h)(2)(i).
- Deleted 'flight engineer' for being authorised to perform repetitive pre-flight airworthiness directive.
- Added a new paragraph HKAR 145.30(j)(4) for issuing limited certification authorisation to the commander for performing specific tasks in the case of aircraft operating away from a supported location.
- Re-numbered the subsequent paragraphs to HKAR 145.30(j)(5), 145.30(j)(6) and 145.30(j)(7) respectively.
- Amended the title of HKAR 145.35 to 'Certifying staff and support staff'.
- Amended the subsequent paragraphs HKAR 145.35(a), 145.35(c), 145.35(d) and 145.35(e) by changing 'B1 and B2 support staff' to 'support staff'.
- Amended the retention period of certifying staff records from 'two years' to 'three years' in HKAR 145.35(j).

- Added a new paragraph HKAR 145.35(m) for issuing authorisation to category A certifying staff.
- Amended HKAR 145.42(d) by indicating ‘... repair solution has been approved according to HKAR-21 or accepted by the Director-general’.
- Editorial changes in paragraphs HKAR 145.45(b)(1), 145.45(b)(3) and 145.50(a).
- Amended the retention period of maintenance records from ‘two years’ to ‘three years’, and included some editorial changes in HKAR 145.55(c).
- Deleted the obsolete reference ‘HKAR-1 Sub-section 1.8-8’ from HKAR 145.65(b)(4).
- Amended ‘B1 and B2 support staff’ to ‘support staff’ in HKAR 145.70(a)(6).
- Amended the scope of category C component rating in AMC 145.20 as follows:
 - Changed ATA specification from ‘100’ to ‘2200’
 - Added a new clause ‘If the maintenance manual (or equivalent document) does not follow the ATA Chapters, the corresponding subjects still apply to the applicable C rating’
 - Amended ‘Electrical Power’ as ‘Electrical Power & Lights’ and added ‘ATA Ch. 85’ into C5 rating
 - Added ‘ATA Ch. 44 and 50’ into C6 rating
 - Amended ‘Fuel – Airframe’ as ‘Fuel’ and added ‘ATA Ch. 47’ into C9 rating
 - Amended ‘Hydraulic’ as ‘Hydraulic Power’ of C12 rating
 - Amended ‘Instruments’ as ‘Instruments/Recording Systems’ and added ‘ATA Ch. 42 & 46’ into C13 rating
 - Amended ‘Pneumatic’ as ‘Pneumatic & Vacuum’ of C17 rating
 - Added new ratings ‘C21 & C22’ and ‘ATA Ch. 41 & 84’ respectively
- Added a new paragraph regarding area for studying maintenance instructions and completing maintenance records in AMC 145.25(b).
- Elaborated the meaning of ‘sufficient staff’ in paragraph 1 of AMC 145.30(d).
- Amended the paragraph 2 of AMC 145.30(d) that planned absence should be considered when developing the manhour plan.
- Amended AMC 145.30(e) with a detailed procedure for competence assessment, added new fuel tank safety and EWIS training requirements, and included some editorial changes.
- Re-numbered the subsequent paragraphs 6 to 10 of the original AMC 145.30(e).

- Added definition of ‘standards acceptable to Director-General’ in AMC 145.30(f).
- Added ‘category B2*’ in paragraph 1 of AMC 145.30(g).
- Amended the list of tasks permitted to be carried out by HKAR-66 category A certifying staff in paragraph 3 of AMC 145.30(g).
- Added new paragraphs 4 and 5 to AMC 145.30(g) to clarify the requirement of category B1, B2/B2* and B3 certifying staff in the case of aircraft line maintenance.
- Added a new paragraph 3 to AMC 145.30(h)(1) to clarify the qualification requirements of certifying staff and support staff during aircraft base maintenance.
- Added a new paragraph AMC 145.30(j)(4) for the issue of limited certification authorisation to flight crew.
- Amended the title of AMC 145.35(a), 145.35(b), 145.35(d), 145.35(e), 145.35(f) and 145.35(j) from ‘Certifying staff and category B1 and B2 support staff’ to ‘Certifying staff and support staff’.
- Elaborated the requirements and procedures for assessment of the competence of certifying staff and support staff in AMC 145.35(a).
- Amended AMC 145.35(f) by indicating the exception case as ‘where any of the unforeseen cases of HKAR 145.30(j)(5) applies’, and assessment of the competence of certifying staff and support staff should be referred to AMC 145.30(e) as applicable.
- Amended paragraph 1 item g of AMC 145.35(j) by changing ‘approval’ to ‘authorisation’.
- Added a new paragraph AMC 145.35(m) that it is the responsibility of the HKAR-145 organisation issuing the category A certifying staff authorisation to ensure task training received by the person covers all the tasks to be authorised.
- Added definition of ‘standards acceptable to the Director-General’ in paragraph 3 of AMC 145.40(b).
- Amended paragraph 1 of AMC 145.42(b) by changing ‘Block 13’ to ‘Block 12’.
- Editorial change in paragraph 2 of AMC 145.42(b).
- Amended paragraph 1 of AMC 145.45(b) to include ‘Critical Design Configuration Control limitations’.
- Added a new ‘NOTE’ related to CDCCL in AMC 145.45(d).
- Added a new paragraph 1 to AMC 145.45(e) regarding the transcription of maintenance data onto work cards or worksheets, and re-numbered the subsequent paragraphs.
- Relocated the contents of paragraphs 2 and 3 of AMC 145.45(g) to the new paragraph AMC 145.45(f).

- Relocated the contents of AMC 145.50(a), except paragraph 1.2, to the new paragraph AMC No. 2 to 145.50(d).
- Amended the original paragraph 1.2 of AMC 145.50(a) by changing “Hazard seriously the flight safety” to “Endangers the flight safety”.
- Added two new paragraphs 2 and 3 to AMC 145.50(b):
 - Introduced an alternate abbreviated certificate of release to service
 - Certificate of Release to Service should relate to the task specified in the TC/STC holder’s or operator’s instruction or the aircraft maintenance programme which itself may cross-refer to the maintenance data.
- Retitled the original ‘AMC 145.50(d)’ to ‘AMC No. 1 to 145.50(d)’, and in paragraph 7 changed the ‘Block 13’ to ‘Block 12’.
- Updated the ‘Block’ numbers in paragraphs 2.4 and 2.9 of AMC No. 2 to 145.50(d).
- Added a new paragraph 4 to AMC 145.65(b)3 regarding the consideration of CDCCL and fuel tank safety when carrying out a modification, repair or maintenance.
- Added a new paragraph to AMC 145.70(a) that the exposition should contain information on how the maintenance organisation complies with CDCCL instructions, and included some editorial changes.
- Added a new paragraph 2 (Competence assessment procedure) to GM 145.30(e).
- Added a new paragraph 3 (Template for recording experience/training) to GM 145.30(e).
- Added a new paragraph GM 145.30(j)(4) regarding the theoretical knowledge and practical skills training provided to flight crew.
- Revised the proposed audit plan and added a new ‘Note 3’ in GM 145.65(c)(1).
- Editorial changes on paragraph 3 of GM 145.70(a).
- Editorial change on GM 145.97(a).
- Revised the scope of approval in paragraph 12 and Table 1 of Appendix 2.
- Added a new Appendix 4 ‘Fuel tank Safety Training’.

Issue 5 Revision 1***8 November 2018***

- Deleted ‘loose pages’ from paragraph 2.1 of Section 1- Requirements.
- Amended HKAR 145.5 to add definition of ‘Critical Maintenance Task’ and ‘Maintenance

Records’, and revise definitions of ‘Maintenance’, ‘Modification’, ‘Pre-flight inspection’ and ‘Repair’.

- Amended HKAR 145.15 to add ‘(See Appendix 5)’.
- Amended HKAR 145.15(a) to add ‘Form DCA 190’.
- Amended HKAR 145.30(a) to add ‘Form DCA 192’.
- Amended HKAR 145.30(g) to have the provision for task trained certifying staff holding privileges described in HKAR 66.20(a)1 and HKAR 66.20(a)3(ii) to carry out minor scheduled line maintenance and simple defect rectification and delete the last sentence ‘such HKAR-66 certifying staff B1, B2/B2*...defect rectification’.
- Amended HKAR 145.30(h)(1)(i) to use the term ‘B1 and B2/B2* support staff ’ instead of ‘support staff’.
- Amended HKAR 145.30(h)(2)(ii) to delete the reference of HKAR 145.30(h)(1).
- Amended HKAR 145.30(j)((1) to:
 - Change the applicability from ‘limited line maintenance’ to ‘line maintenance’.
 - Add provision for line maintenance organisation under the quality system of a HKAR-145 approved maintenance organisation at a location other than Hong Kong to use certifying staff holding valid aircraft maintenance licence considered by the Director-General as comparable with HKAR-66.
 - Add a ‘Note’ to elaborate the licence considered by the Director-General as comparable with HKAR-66.
 - Specify the conditions for authorisation of each individual certifying staff.
- Amended HKAR 145.30(j)(5) to correct the reference that is not applicable to this subparagraph.
- Amended HKAR 145.30(j)5(f) to make reference to HKAR-66 regarding the level of type training for base maintenance support staff.
- Amended HKAR 145.30(j)5(g) to make reference to HKAR-66 regarding the level of type training for base maintenance certifying staff.
- Amended HKAR 145.30(j)(6) to add ‘Any’ in the beginning of the last sentence of the first paragraph.
- Amended HKAR 145.30(j)(6)(e) to make reference to HKAR-66 regarding the level of type training for line maintenance certifying staff.
- Amended HKAR 145.35(b) to add HKAR 66.20(a)3(ii).

- Added a new paragraph HKAR 145.35(n) regarding task training and practical experience for Category B2* aircraft maintenance licence holder carrying out minor scheduled line maintenance and simple defect rectification.
- Added a new requirement HKAR 145.48 'Performance of maintenance'.
- Amended HKAR 145.55(c)(3) to change the period of retained maintenance records from 'two years' to 'three years'.
- Editorial change on HKAR 145.65(b).
- Deleted HKAR 145.65(b)(3) and (b)(4) as the requirements have been addressed by HKAR 145.48.
- Added a new sub-paragraph HKAR 145.65(d) regarding the establishment of a safety management system meeting the relevant CAD 712 Requirements.
- Amended HKAR 145.70(a)(6) to add 'scope of approval' of the certifying staff and support staff.
- Deleted 'loose pages' from paragraph 2.1 of Section 2 – Acceptable means of compliance (AMC)
- Editorial changes on AMC 145.20 regarding Ratings C1, C3 and C13.
- Amended to AMC 145.30(e)8 to define the timeline for the completion of EWIS training.
- Amended AMC 145.30(g)1 to correct the reference of HKAR-66.
- Amended AMC 145.30(g)2 to replace 'HKAR-66 category A' by 'HKAR 66.20(a)(1) and HKAR 66.20(a)(3)(ii) personnel'.
- Amended AMC 145.30(g)(3) to replace 'Category A certifying staff' by 'HKAR 66.20(a)1 and HKAR 66.20(a)3(ii) personnel'.
- Amended paragraph 2 of AMC 145.30(h)1 to correct the reference of HKAR-66.
- Amended AMC 145.35(a) to indicate additional information is provided in AMC 66.20(b)3.
- Added AMC 145.35(c) regarding the interpretation of '6 months of actual relevant aircraft maintenance experience in any consecutive 2-year period'.
- Amended AMC 145.35(f) to replace 'HKAR-145.30(j)(5)' with 'HKAR-145.30(j)(3)'.
- Added AMC 145.35(n) regarding the authorisation for Category B2* licence holder releasing minor scheduled line maintenance and simple defect rectification.
- Added AMC No. 1 to AMC 145.48(b).
- Added AMC No. 2 to 145.48(b) regarding Critical Maintenance Tasks.

- Added AMC No. 3 to 145.48(b) regarding Error-capturing methods.
- Added AMC No. 4 to 145.48(b) regarding Independent Inspection.
- Added AMC 145.48(c) regarding procedures for minimising multiple errors and the possibility of error being repeated in identical tasks.
- Deleted AMC 145.65(b)(3).
- Amended AMC 145.70(a) to use the term ‘Critical maintenance procedures and error-capturing methods’ in Parts 2.23 and L2.7 of the sample MOE.
- Amended AMC 145.70(a) by adding Part 3.15 regarding training procedure for on-job-training to the sample MOE.
- Deleted ‘loose pages’ from paragraph 2.1 of Section 3 – guidance material (GM)
- Amended GM 145.30(e)1 to add ‘Critical maintenance tasks and error-capturing methods (independent inspection, reinspection, etc.)’ to the training syllabus.
- Amended GM 145.30(e)2 to replace ‘critical task’ by ‘critical maintenance task’ of the table.
- Added a new paragraph GM 145.48 (Performance of maintenance).
- Added a new paragraph GM 145.48(c) (Performance of maintenance).
- Added new paragraph GM 145.48(d) (Performance of maintenance - critical design configuration control limitations).
- Amended GM 145.60(c)(iv) to replace the reference ‘145.60(a)’ with ‘145.60(b)’.
- Amended GM 145.65(c)(1)2 to add the reference ‘145.48’ on the audit plan.
- Editorial change on Table 1 of Appendix 2 regarding Rating C13.
- Added Appendix 5 (Procedures for the grant and variation of HKAR-145 Approval).
- Added Appendix 6 (Procedures for the renewal of HKAR-145 Approval).

Issue 5 Revision 2***31 July 2019***

- Amended paragraph (b)(2) of AMC No. 4 to 145.48(b) to add two ‘Notes’ for clarifying the meaning of ‘similar task in a product of similar category and having received specific practical training in the task to be inspected’.

- Amended HKAR 145.3(e) to correct the reference to HKAR 145.30(g) and 145.30(h).
- Amended HKAR 145.5 to delete the definitions of ‘Aircraft’, ‘Approved standard’, ‘Chief Executive’, ‘Commercial air transport’, ‘Continuing airworthiness’, ‘Director-General’, ‘Hong Kong’, ‘Inspection’, ‘Maintenance’, ‘Maintenance records’, ‘Modification’, ‘Overhaul’ and ‘Repair’.
- Amended HKAR 145.30(j)(1)(i), 145.30(j)(5) and 145.30(j)(6) to replace the reference to HKAR-2 Chapter 6 with HKAR-145 Appendix 8.
- Amended HKAR 145.40 from ‘Equipment, tools and material’ to ‘Equipment and tools’.
- Amended HKAR 145.42(a), (b) and (c), and deleted 145.42(d).
- Amended HKAR 145.97 to delete the reference to GM 145.97.
- Deleted AMC 145.10(c).
- Amended AMC 145.30(d) paragraph 2 to clarify the manhour plan consideration.
- Amended AMC 145.35(m) to replace the Note to paragraph 1 with new paragraph 2 and 3.
- Amended AMC 145.40(a) to change the title to ‘Equipment and tools’, to delete paragraph 2 and to remove the numbering of the remaining paragraph.
- Amended AMC 145.40(b) to change the title to ‘Equipment and tools’.
- Added AMC 145.42(a)(2), 145.42(a)(3), 145.42(a)(4) and 145.42(a)(5)
- Deleted AMC 145.42(b) and added AMC 145.42(b)(1) and 145.42(b)(3) for the amended HKAR 145.42(b) requirements.
- Amended AMC 145.42(c) for the amended HKAR 145.42(c) requirements.
- Deleted AMC 145.42(d) to align with the deletion of HKAR 145.42(d).
- Amended AMC No. 4 to 145.48(b) to delete the note to paragraph 1.
- Amended AMC 145.70(a) to delete PART 7 from the general organisation of the maintenance organisation exposition.
- Deleted GM 145.5.
- Amended GM 145.10 to delete paragraph 4 and to renumber the ensuing paragraphs.
- Added GM 145.30(a) for additional training information.
- Amended GM 145.30(b) with additional training information.

- Added GM 145.42(b)(1), 145.42(b)(2), 145.42(c).
- Amended GM 145.48(c) to replace duplicate inspection with independent inspection.
- Amended GM 145.55(a) paragraph 1 to add data for modification and repair.
- Deleted GM 145.97(a).
- Deleted Appendix 1.
- Amended Appendix 4 to revise the general requirements of Phase 2 – Detailed training.
- Amended Appendix 5 to require demonstration of the need for HKAR-145 approval in sub-paragraph 1.2 and 2.2, and to re-number the ensuing sub-paragraphs accordingly.
- Added Appendix 7, 8 and 9
- Other minor changes also incorporated.

Issue 5 Revision 4***1 February 2023***

- Amended HKAR 145.30(i) for aircraft component certifying staff of the HKAR-145 approved maintenance organisation to be referred to Section 4 Appendix 11 and delete the requirements specified in the Appendix No.3 to HKAR-1 Sub-section 1.8-13.
- Added AMC 145.30(a) paragraph 2 regarding the minimum requirements for the accountable manager per Section 4 Appendix 10.
- Amended AMC 145.30(b) paragraph 9 to make reference to Section 4 Appendix 10 regarding the minimum requirements for the nominated person(s).
- Amended AMC145.30(f) paragraph 3 by changing “by the type certificate holder / manufacturer in the form of continued airworthiness data, such as in NDT manuals or service bulletins, unless the manual or service bulletin” to “in the maintenance data, unless the maintenance data”.
- Added AMC 145.30(f) paragraph 11 for the authorisation of welder under HKAR-145 Approval.
- Amended GM 145.55(a) paragraph 6 to provide additional guidance for electronic maintenance records.
- Amended Appendix 4 paragraph E (e) to change “instructions for continuing airworthiness (aircraft maintenance manuals, component maintenance manuals, Service Bulletins...) to “applicable maintenance data as defined in HKAR 145.45(b)”.
- Amended Appendix 8 paragraph 2 to remove Joint Aviation Authority (JAA).

- Added Appendix 10, 11 and 12.
- Other minor changes also incorporated.

Issue 5 Revision 5

30 April 2024

- Amended HKAR 145.30(f) by changing “the European standard EN 4179” to “the standards acceptable to the Director-General”.
- Amended AMC 145.30(f)2, 3, 4 & 6 by changing “the European standard EN 4179” to “the standards acceptable to the Director-General”.
- Amended AMC 145.30(f)7 to include qualification procedures detailed in the maintenance organisation exposition for NDT Level 3 who is responsible for the technical supervision of NDT.
- Amended AMC 145.30(f)10 by adding “including the Civil Aviation Maintenance Association of China (CAMAC) Standard T/CAMAC0001, the European Standard EN 4179 and the National Aerospace Standard NAS 410.”.
- Deleted ‘Nominated level 3 for NDT’ and Note (5) from the table of Appendix 10 – Minimum requirements for HKAR-145 personnel.
- Deleted Appendix 5 paragraph 1.8 about the requirement to see the accountable manager.
- Amended Appendix 6 paragraph 2.10 to remove the requirement of “The accountable manager must be seen at least once during the audit for approval renewal”.
- Amended Appendix 6 paragraph 2.11 and 2.14 to update the level of finding defined in “Appendix No. 1 of Airworthiness Notice No. 28”
- Other minor changes also incorporated.

Issue 5 Revision 6

28 January 2025

- Amended HKAR 145.30(j)(1) and (j)(6) to allow organisations to use certifying staff holding valid ICAO aircraft maintenance licences in accordance with the national aviation regulations of the State of the location, subject to the acceptance by the Director-General for line maintenance carried out at a location other than Hong Kong.
- Other minor changes also incorporated.

SECTION 1 – REQUIREMENTS

1 *GENERAL*

This Section 1 contains the Requirements for Approved Maintenance Organisations.

2 *PRESENTATION*

- 2.1 Each page being identified by the date of issue and Issue/Revision number under which it is amended or reissued.
- 2.2 Sub-headings are in italic typeface.
- 2.3 Explanatory Notes not forming part of the requirements appear in smaller typeface.
- 2.4 New, amended and corrected text is indicated by a marginal line.

HKAR 145.1 General

(See GM 145.1)

- (a) No aircraft with either a Transport Category (Passenger) or Transport Category (Cargo) Certificate of Airworthiness and when used for commercial air transport may fly unless a Certificate of Release to Service has been issued by an organisation for maintenance carried out on the aircraft or an aircraft component intended for fitment to such an aircraft.

Note: The Air Navigation (Hong Kong) Order 1995 prescribes that if a repair or replacement is made to an aircraft or part of an aircraft when the aircraft is at such a place that it is not reasonably practicable (i) to carry out the work in a manner that a Certificate of Release to Service may be issued, or (ii) for the certificate to be issued at that particular place, the commander may fly the aircraft, if, in his opinion, it is safe to do so, to the nearest place at which a certificate may be issued.

- (b) No organisation may certify for release to service an aircraft with either a Transport Category (Passenger) or Transport Category (Cargo) Certificate of Airworthiness and used for commercial air transport unless approved in accordance with this HKAR-145. Except where stated otherwise in paragraph (e), no organisation may maintain such an aircraft unless appropriately approved in accordance with this HKAR-145 or working under the quality system of an appropriately approved HKAR-145 maintenance organisation.

Note: A HKAR-145 approval is not required for the pre-flight inspection.

- (c) No organisation may certify for release to service an aircraft component intended for fitment to an aircraft with either a Transport Category (Passenger) or Transport Category (Cargo) Certificate of Airworthiness and used for commercial air transport unless approved in accordance with this HKAR-145. Except where stated otherwise in paragraph (e), no organisation may maintain such an aircraft component unless appropriately approved in accordance with this HKAR-145 or working under the quality system of an appropriately approved HKAR-145 maintenance organisation.

Note: The foregoing prohibition shall not apply to aircraft components accepted under the arrangements prescribed in Paragraphs 4.1 and 4.3 to 4.9 of Appendix No.1 to Hong Kong Airworthiness Notice No.17.

- (d) A maintenance organisation approval may be granted for maintenance activity varying from that for an aircraft component to that for a complete aircraft or any combination thereof.
- (e) An organisation working under the quality system of an appropriately approved HKAR-145 maintenance organisation is limited to the work scope permitted by the HKAR145.65(b) procedures and may not carry out a base maintenance check of an aircraft or a complete workshop maintenance check or overhaul of an engine or engine module.

HKAR 145.3 Effectivity

- (a) This HKAR-145 was first issued on 1 February 1993 and became effective on that date with the exception of HKAR 145.1.
- (b) HKAR 145.1 came into force on 1 December 1995.
- (c) A HKAR-145 Approval may be issued by the Director-General of Civil Aviation (hereinafter referred as Director-General) prior to the paragraph (a) date.
- (d) HKAR-145 approved maintenance organisations that have or intend to have maintenance carried out under their quality system by another organisation in accordance with HKAR 145.1(b) or (c) must be in compliance with the limitations of HKAR 145.1(e) after 31 May 2001.
- (e) Organisations that carry out or intend to carry out maintenance of aircraft must be in compliance with HKAR 145.30(g) and HKAR 145.30(h) and HKAR 145.30(j), as appropriate, on or after 1 April 2004 but may choose to be partly or completely in compliance before this date.
- (f) Organisations must be in compliance with HKAR 145.30(f) on or after 31 December 2003.
- (g) Organisations must be in compliance with amended HKAR 145.60 on or after 1 June 2004.
- (h) Organisations must be in compliance with amended HKAR 145.30(e) on or after 1 July 2005.
- (i) Organisations must be in compliance with HKAR 145.47 on or after 1 June 2004.
- (j) Organisations shall implement a Safety Management System on 1 January 2009.

HKAR 145.5 Definitions

(See GM 145.5)

For the purpose of this HKAR-145 the following definitions shall apply:

'Aircraft component' means any engine, propeller, part or appliance.

'Approved by the Director-General' means approved by the Director-General directly or in accordance with a procedure approved by the Director-General.

'CAD' means Civil Aviation Department, Hong Kong, China.

'Certifying staff' means personnel responsible for the release of an aircraft or aircraft

component after maintenance.

'Critical maintenance task' means a maintenance task that involves the assembly or any disturbance of a system or any part on an aircraft, engine or propeller that, if an error occurred during its performance, could directly endanger the flight safety.

'HKAR-145 certification authorisation' means the authorisation issued to certifying staff by the HKAR-145 approved maintenance organisation and which specifies the fact that they may sign HKAR 145.50 Certificate of Release to Service within the limitations stated in such authorisation on behalf of the HKAR-145 approved maintenance organisation.

'Human factors' means principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration of human performance.

'Human performance' means human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.

"Large aircraft" means an aircraft, classified as an aeroplane with a maximum total weight authorized of more than 5700 kg, or a multi-engined helicopter.

'Location' means a place from which an organisation carries on activities or wishes to carry on activities for which a HKAR-145 approval is required.

'Maintenance organisation exposition' means the document(s) that contain the material specifying the scope of work deemed to constitute approval and showing how the HKAR-145 approved maintenance organisation intends to comply with HKAR-145 requirements.

'Organisation' means either an organisation registered as a legal entity in any jurisdiction whether or not within the territories of Hong Kong or a natural person. Such an organisation may be located at more than one location and may hold more than one HKAR-145 approval.

'Pre-flight inspection' means the inspection carried out before flight to ensure that the aircraft is fit for the intended flight.

'Support staff' means those staff holding a HKAR-66 aircraft maintenance licence in category B1, B2/B2* and/or B3 with the appropriate aircraft ratings, working in a base maintenance environment while not necessarily holding HKAR-145 certification privileges.

HKAR 145.10 Scope and applicability

(See AMC 145.10 & GM 145.10)

- (a) This HKAR prescribes the requirements to be met by an organisation to qualify for the issue, variation or renewal of a HKAR-145 approval for the maintenance of aircraft and aircraft components.

- (b) An organisation which is located, in whole or in part, within the territories of Hong Kong will be granted approval in respect of any such location within the territories when in compliance with this HKAR-145.
- (c) An organisation which is located, in whole or in part, outside the territories of Hong Kong will only be granted approval in respect of any such location outside the territories if the Director-General is satisfied that there is a need for such approval to maintain aircraft/aircraft components at that location and when in compliance with this HKAR-145.

HKAR 145.15 Application and issue

(See Appendix 5)

- (a) An application for the issue, variation or renewal of an HKAR-145 approval shall be made to the Director-General on a Form DCA 190 (CAD Form Two) and submitted with a copy of the maintenance organisation exposition or amendment thereto.
- (b) An applicant who meets the requirements of this HKAR-145 and has paid any charges prescribed by the Director-General is entitled to a maintenance organisation approval.

HKAR 145.20 Terms of approval

(See AMC 145.20)

The grant of approval is indicated by the issue of an approval certificate (CAD Form Three) to the organisation by the Director-General. The approval certificate will specify the extent of approval. The HKAR-145 approved maintenance organisation shall specify the scope of work deemed to constitute approval in its maintenance organisation exposition. Section 4 Appendix 2 contains a table of all classes and ratings.

HKAR 145.25 Facility requirements

(See AMC 145.25)

The HKAR-145 approved maintenance organisation shall ensure that:

- (a) Facilities are provided appropriate for all planned work, ensuring in particular, protection from the weather elements. Specialised workshops and bays are segregated as appropriate, to ensure that environmental and work area contamination is unlikely to occur.
 - (1) For base maintenance of aircraft, aircraft hangars are both available and large enough to accommodate aircraft on planned base maintenance.
 - (2) For aircraft component maintenance, aircraft component workshops are large enough to accommodate the aircraft components on planned maintenance.

- (b) Office accommodation is provided for the management of the planned work referred to in paragraph (a), and certifying staff so that they can carry out their designated tasks in a manner that contributes to good aircraft maintenance standards.
- (c) The working environment including aircraft hangars, aircraft component workshops and office accommodation is appropriate for the task carried out and in particular special requirements observed. Unless otherwise dictated by the particular task environment, the working environment must be such that the effectiveness of personnel is not impaired:
 - (1) Temperatures must be maintained such that personnel can carry out required tasks without undue discomfort.
 - (2) Dust and any other airborne contamination are kept to a minimum and not be permitted to reach a level in the work task area where visible aircraft/aircraft component surface contamination is evident. Where dust/other airborne contamination results in visible surface contamination, all susceptible systems are sealed until acceptable conditions are re-established.
 - (3) Lighting is such as to ensure each inspection and maintenance task can be carried out in an effective manner.
 - (4) Noise shall not distract personnel from carrying out inspection tasks. Where it is impractical to control the noise source, such personnel are provided with the necessary personal equipment to stop excessive noise causing distraction during inspection tasks.
 - (5) Where a particular maintenance task requires the application of specific environmental conditions different to the foregoing, then such conditions are observed. Specific conditions are identified in the maintenance data.
 - (6) The working environment for line maintenance is such that the particular maintenance or inspection task can be carried out without undue distraction. Therefore where the working environment deteriorates to an unacceptable level in respect of temperature, moisture, hail, ice, snow, wind, light, dust/other airborne contamination, the particular maintenance or inspection tasks must be suspended until satisfactory conditions are re-established.
- (d) Secure storage facilities are provided for aircraft components, equipment, tools and material. Storage conditions ensure segregation of serviceable aircraft components and material from unserviceable aircraft components, material, equipment and tools. The conditions of storage are in accordance with the manufacturer's instructions to prevent deterioration and damage of stored items. Access to storage facilities is restricted to authorised personnel.

HKAR 145.30 Personnel requirements

(See AMC 145.30 & GM 145.30)

- (a) The HKAR-145 approved maintenance organisation shall appoint an accountable manager who has corporate authority for ensuring that all maintenance required by the customer can be financed and carried out to the standard required by HKAR-145 requirements. The accountable manager shall:
- (1) ensure that all necessary resources are available to accomplish maintenance in accordance with HKAR 145.65(b) to support the organisation approval.
 - (2) establish and promote the safety and quality policy specified in HKAR 145.65(a).
 - (3) demonstrate a basic understanding of HKAR-145 requirements.
 - (4) ensure an implementation of a Safety Management System.

The accountable manager shall submit his credentials on Form DCA 192 (CAD Form Four) to the Director-General for acceptance.

- (b) The HKAR-145 approved maintenance organisation shall nominate a person or group of persons, whose responsibilities include ensuring that the organisation complies with HKAR-145 requirements. Such person(s) shall ultimately be responsible to the accountable manager.
- (1) The person or persons nominated shall represent the maintenance management structure of the HKAR-145 approved maintenance organisation and be responsible for all functions specified in HKAR-145 requirements.
 - (2) The person or persons nominated shall be identified and their credentials submitted on CAD Form Four to the Director-General for acceptance.
 - (3) The person or persons nominated shall be able to demonstrate relevant knowledge, background and satisfactory experience related to aircraft/aircraft component maintenance and demonstrate a working knowledge of HKAR-145 requirements.
 - (4) Procedures shall make clear who deputises for any particular person in the case of lengthy absence of said person.
- (c) The accountable manager under paragraph (a) shall appoint a person with responsibility for monitoring the quality system, including the associated feedback system as required by HKAR 145.65(c). The appointed person shall have direct access to the accountable manager to ensure that the accountable manager is kept properly informed on quality and compliance matters.

- (d) The HKAR-145 approved maintenance organisation shall have a maintenance manhour plan showing that the organisation has sufficient staff to plan, perform, supervise, inspect and quality monitor the organisation in accordance with the approval. In addition, the organisation shall have a procedure to reassess work intended to be carried out when actual staff availability is less than the planned staffing level for any particular work shift or period.
- (e) The HKAR-145 approved maintenance organisation shall establish and control the competence of personnel involved in any maintenance, management and/or quality audits in accordance with a procedure and to a standard agreed by the Director-General. In addition to the necessary expertise related to the job function, competence must include an understanding of the application of human factors and human performance issues appropriate to that person's function in the organisation.
- (f) The HKAR-145 approved maintenance organisation shall ensure that personnel who carry out and/or control a continued airworthiness non-destructive test of aircraft structures and/or aircraft components are appropriately qualified for the particular non-destructive test in accordance with the standards acceptable to the Director-General. Personnel who carry out any other specialised task shall be appropriately qualified in accordance with any existing standards recognised by the Director-General as an appropriate standard.
- (1) Notwithstanding paragraph (f), personnel qualified prior to 31 December 2003 in accordance with any standard recognised by the Director-General may continue to carry out and/or control such non-destructive test after 31 December 2003. Any such personnel who intend to carry out and/or control a non-destructive test for which they were not qualified prior to 31 December 2003 shall qualify for such non-destructive test in accordance with the standards acceptable to the Director-General.
- (2) Notwithstanding paragraph (f), those personnel specified in paragraph (g) and (h)(1) and (h)(2), qualified in HKAR-66 category B1 or B3 may carry out and/or control colour contrast dye penetrant tests.
- (g) Any HKAR-145 approved maintenance organisation maintaining aircraft, except where stated otherwise in paragraph (j), shall in the case of aircraft line maintenance, have appropriately type rated certifying staff qualified as category B1, B2/B2*, B3 in accordance with HKAR-66 requirements and HKAR 145.35.

In addition, such HKAR-145 approved maintenance organisation may also use appropriately task trained certifying staff holding the privileges described in HKAR 66.20(a)1 and HKAR 66.20(a)3(ii) and qualified in accordance with HKAR-66 requirements and HKAR 145.35 to carry out minor scheduled line maintenance and simple defect rectification. The availability of such certifying staff shall not replace the need for HKAR-66 category B1, B2/B2* and B3 certifying staff as appropriate.

- (h) Any HKAR-145 approved maintenance organisation maintaining aircraft, except where stated otherwise in paragraph (j), shall:
- (1) In the case of base maintenance of large aircraft, have appropriately type rated certifying staff qualified as category C in accordance with HKAR-66 requirements and HKAR 145.35. In addition, the organisation shall have sufficient appropriately type rated staff qualified as category B1 and B2/B2* in accordance with HKAR-66 requirements and HKAR 145.35 to support the category C certifying staff.
 - (i) B1 and B2/B2* support staff shall ensure that all relevant tasks or inspections have been carried out to the required standard before the category C certifying staff issues the Certificate of Release to Service.
 - (ii) The HKAR-145 approved maintenance organisation shall maintain a register of any such support staff.
 - (iii) The category C certifying staff shall ensure that compliance with subparagraph (i) above has been met and that all work required by the customer has been accomplished during the particular base maintenance check or work package, and shall also assess the impact of any work not carried out with a view to either requiring its accomplishment or agreeing with the operator to defer such work to another specified check or time limit.
 - (2) In the case of base maintenance of aircraft other than large aircraft have either:
 - (i) appropriately type rated certifying staff qualified as category B1, B2/B2*, B3 in accordance with HKAR-66 requirements and HKAR 145.35 or,
 - (ii) appropriately type rated certifying staff qualified as category C and assisted by support staff.
- (i) Any HKAR-145 approved maintenance organisation maintaining aircraft components must have appropriate aircraft component certifying staff qualified in accordance with HKAR 145.35 and requirements specified in Section 4 Appendix 11.
- (j) Notwithstanding paragraphs (g) and (h) above, the HKAR-145 approved maintenance organisation may use certifying staff qualified in accordance with the following provisions:
- (1) For line maintenance carried out by another organisation under the quality system of a HKAR-145 approved maintenance organisation at a location other than Hong Kong, the organisation may use certifying staff :

- (i) holding valid aircraft maintenance licence considered by the Director-General as comparable with HKAR-66; or

Note: Any one of the aircraft maintenance licences issued by the aviation authorities prescribed in Appendix 8 is acceptable to the Director-General for the purpose.

- (ii) holding valid aircraft maintenance licence issued by ICAO Contracting States on the basis of the Standards and Recommended Practices of Annex 1 – Personnel Licensing, in accordance with the national aviation regulations of the State of the location, subject to the acceptance by the Director-General.

The HKAR-145 approved maintenance organisation must ensure that each individual certifying staff [see HKAR 145.30(j)(6)] qualified above is in compliance with conditions (i) to (v) as stated in sub-paragraph (6).

- (2) For a repetitive pre-flight airworthiness directive which specifically states that the flight crew may carry out such airworthiness directive, the HKAR-145 approved maintenance organisation may issue a limited HKAR-145 certification authorisation to the aircraft commander on the basis of the flight crew licence held. However, the organisation shall ensure that sufficient practical training has been carried out to ensure that such aircraft commander can accomplish the airworthiness directive to the required standard.
- (3) In the following unforeseen cases, where an aircraft is grounded at a location other than the main base where no appropriate certifying staff are available, the HKAR-145 approved maintenance organisation contracted to provide maintenance support may issue a one-off HKAR-145 certification authorisation:
 - (i) to one of its employees holding equivalent type authorisations on aircraft of similar technology, construction and systems; or
 - (ii) to any person with not less than five years maintenance experience and holding a valid aircraft maintenance licence issued by ICAO Contracting States on the basis of the Standards and Recommended Practices of Annex 1 – Personnel Licensing, rated for the aircraft type requiring certification, provided that there is no organisation appropriately approved under HKAR-145 at that location and the contracted HKAR-145 approved maintenance organisation obtains and holds on file evidence of the experience and the licence of that person.

All such cases as specified in the sub-paragraphs above shall be reported to the Director-General within seven days of the issuance of such certification authorisation. The HKAR-145 approved maintenance organisation issuing the one-off HKAR-145 certification authorisation shall ensure that any such maintenance that could affect flight safety is rechecked by an appropriate HKAR-145 approved maintenance organisation.

- (4) In the case of aircraft operating away from a supported location the HKAR-145 approved maintenance organisation may issue a limited certification authorisation to the commander on the basis of the flight crew licence held subject to being satisfied that sufficient practical training has been carried out to ensure that the commander can accomplish the specified task to the required standard. The provisions of this paragraph shall be detailed in an exposition procedure.
- (5) For base maintenance carried out by a HKAR-145 approved maintenance organisation at a location other than Hong Kong, the organisation may use certifying staff / support staff (see HKAR 145.30(h)) holding valid aircraft maintenance licence qualified in accordance with the national aviation regulations of the State of the location, subject to the Director-General being satisfied that such regulations result in a standard of qualification comparable with HKAR-66. One of the aircraft maintenance licences issued by the aviation authorities prescribed in Appendix 8 is acceptable to the Director-General for the purpose.

The HKAR-145 approved maintenance organisation must ensure that each individual certifying staff / support staff (see HKAR 145.30(h)), qualified above, is in compliance with the following conditions:

- (i) The base maintenance certifying staff must be authorised in accordance with HKAR 145.35.
- (ii) The scope of work of the base maintenance certifying staff / support staff (see HKAR 145.30(h)) shall not exceed the scope of work defined by the national licence held.
- (iii) The base maintenance certifying staff / support staff (see HKAR 145.30(h)) shall demonstrate he or she has received training on human factors and aviation legislation as detailed in HKAR-66.
- (iv) The base maintenance support staff (see HKAR 145.30(h)) shall demonstrate five years maintenance experience.
- (v) The base maintenance certifying staff shall demonstrate eight years maintenance experience, three years of which qualified as a certifying staff in line maintenance or a support staff in base maintenance.
- (vi) The base maintenance support staff (see HKAR 145.30(h)) shall receive type training at a level corresponding to 'Level 3', referred to in paragraph 2 of Section 4 Appendix III to HKAR-66, for every aircraft on which he or she is authorised to make maintenance sign-off (see GM 145.48).
- (vi) The base maintenance certifying staff shall receive type training at a level corresponding to 'Level 1', referred to in paragraph 2 of Section 4

Appendix III to HKAR-66, for every aircraft on which he or she is authorised to make certification.

This sub-paragraph (5) does not apply to the subcontractor(s) of the HKAR-145 approved maintenance organisation.

(6) For line maintenance carried out by a HKAR-145 approved maintenance organisation at a location other than Hong Kong, the organisation may use certifying staff:

(i) holding valid aircraft maintenance licence considered by the Director-General as comparable with HKAR-66; or

Note: Any one of the aircraft maintenance licences issued by the aviation authorities prescribed in Appendix 8 is acceptable to the Director-General for the purpose.

(ii) holding valid aircraft maintenance licence issued by ICAO Contracting States on the basis of the Standards and Recommended Practices of Annex 1 – Personnel Licensing, in accordance with the national aviation regulations of the State of the location, subject to the acceptance by the Director-General.

The HKAR-145 approved maintenance organisation must ensure that each individual certifying staff, qualified above, is in compliance with the following conditions:

(i) The line maintenance certifying staff must be authorised in accordance with HKAR 145.35.

(ii) The scope of work of the line maintenance certifying staff shall not exceed the scope of work defined by the licence held.

(iii) The line maintenance certifying staff shall demonstrate he or she has received training on human factors and aviation legislation as detailed in HKAR-66.

(iv) The line maintenance certifying staff shall demonstrate five years maintenance experience. However, the certifying staff whose authorised tasks do not exceed those of a HKAR-66 Category A certifying staff, need to demonstrate three years maintenance experience only.

(v) The line maintenance certifying staff shall receive type training at a level corresponding to ‘Level 3’, referred to in paragraph 2 of Section 4 Appendix III to HKAR-66, for every aircraft type on which he or she is authorised to make certification. However, the certifying staff who authorised tasks do not exceed those of a HKAR-66 Category A certifying staff may receive task training in lieu of complete type

training.

- (7) In the case of aircraft maintenance, a HKAR-145 approved maintenance organisation may use certifying staff / support staff holding a CCAR-66 People's Republic of China Civil Aircraft Maintenance Personnel License or MAR-66 Aircraft Maintenance Engineer Licence. The recognition of the aforementioned licences however does not apply to validation of foreign licence. The HKAR-145 approved maintenance organisation shall provide training and assessment on Hong Kong aviation legislation/requirements and human factors requirements to the certifying staff / support staff concerned. The HKAR-145 approved maintenance organisation shall also ensure that the aircraft type training received by the certifying staff / support staff concerned meet the standard required by the Director-General.

HKAR 145.35 Certifying staff and support staff (See AMC 145.35)

- (a) In addition to the appropriate requirements of HKAR 145.30(g) and (h), the HKAR-145 approved maintenance organisation shall ensure that certifying staff and support staff have an adequate understanding of the relevant aircraft and/or aircraft component(s) to be maintained together with the associated organisation procedures. In the case of certifying staff, this must be accomplished before the issue or re-issue of the HKAR-145 certification authorisation.

Note: 'Relevant aircraft and/or aircraft components' means those aircraft or aircraft components specified in the particular certification authorisation.

- (b) Excepting those cases listed in HKAR 145.30(j) and HKAR 66.20(a)3(ii), the HKAR-145 approved maintenance organisation may only issue a HKAR-145 certification authorisation to certifying staff in relation to the basic categories or sub-categories and any type rating listed on the aircraft maintenance licence listed in HKAR-66, subject to the licence remaining valid throughout the validity period of the authorisation and the certifying staff remaining in compliance with HKAR-66 requirements.
- (c) The HKAR-145 approved maintenance organisation shall ensure that all certifying staff and support staff are involved in at least six months of actual relevant aircraft or aircraft component maintenance experience in any consecutive two year period. For the purpose of this paragraph 'involved in actual relevant aircraft or aircraft component maintenance' means that the person has worked in an aircraft or aircraft component maintenance environment and has either exercised the privileges of the HKAR-145 certification authorisation and/or has actually carried out maintenance on at least some of the aircraft type systems specified in the particular HKAR-145 certification authorisation.
- (d) The HKAR-145 approved maintenance organisation shall ensure that all certifying staff and support staff receive sufficient continuation training in each two year period to ensure that such staff have up-to-date knowledge of relevant technology, organisation

procedures and human factor issues.

- (e) The HKAR-145 approved maintenance organisation shall establish a programme for continuation training for certifying staff and support staff, including a procedure to ensure compliance with the relevant paragraphs of HKAR 145.35 as the basis for issuing HKAR-145 certification authorisations to certifying staff, and a procedure to ensure compliance with HKAR-66 requirements.
- (f) Except where any of the unforeseen cases of HKAR 145.30(j)(3) apply, the HKAR-145 approved maintenance organisation shall assess all prospective certifying staff for their competence, qualification and capability to carry out their intended certifying duties in accordance with a procedure as specified in the maintenance organisation exposition prior to the issue or re-issue of a HKAR-145 certification authorisation.
- (g) When the conditions of paragraphs (a), (b), (d), (f) and, where applicable, paragraph (c) have been fulfilled by the certifying staff, the HKAR-145 approved maintenance organisation shall issue a HKAR-145 certification authorisation that clearly specifies the scope and limits of such authorisation. Continued validity of the HKAR-145 certification authorisation is dependent upon continued compliance with paragraphs (a), (b), (d) and where applicable, paragraph (c).
- (h) The HKAR-145 certification authorisation must be in a style that makes its scope clear to the certifying staff and any authorised person who may require to examine the authorisation. Where codes are used to define scope, the HKAR-145 approved maintenance organisation shall make a code translation readily available. 'Authorised person' includes the Director-General.
- (i) The person responsible for the quality system shall also remain responsible on behalf of the HKAR-145 approved maintenance organisation for issuing HKAR-145 certification authorisations to certifying staff. Such person may nominate other persons to actually issue or revoke the HKAR-145 certification authorisations in accordance with a procedure as specified in the maintenance organisation exposition.
- (j) The HKAR-145 approved maintenance organisation shall maintain a record of all certifying staff and support staff.

The staff records shall contain:

- (1) details of any HKAR-66 aircraft maintenance licence held;
- (2) all relevant training completed;
- (3) the scope of the HKAR-145 certification authorisation issued, where relevant, and
- (4) particulars of staff with limited or one-off HKAR-145 certification authorisations.

The HKAR-145 approved maintenance organisation shall retain the record for at least three years after the certifying staff or support staff have ceased employment with the HKAR-145 approved maintenance organisation or as soon as the authorisation has been withdrawn. In addition, upon request, the HKAR-145 approved maintenance organisation shall furnish certifying staff with a copy of their personal record on leaving the organisation.

The certifying staff and support staff shall be given access on request to their personal records as detailed above.

- (k) The HKAR-145 approved maintenance organisation shall provide certifying staff with a copy of their HKAR-145 certification authorisation in either a documented or electronic format.
- (l) Certifying staff shall produce their HKAR-145 certification authorisation to any authorised person within 24 hours.
- (m) The holder of a category A aircraft maintenance licence may only exercise certification privileges on a specific aircraft type following the satisfactory completion of the relevant category A aircraft task training carried out by an organisation appropriately approved in accordance with HKAR-145 or HKAR-147. This training shall include practical hands on training and theoretical training as appropriate for each task authorised. Satisfactory completion of training shall be demonstrated by an examination or by workplace assessment carried out by the organisation.
- (n) The holder of a category B2* aircraft maintenance licence may only exercise the certification privileges described in HKAR 66.20(a)3(ii) following the satisfactory completion of
 - (1) the relevant category A aircraft task training and
 - (2) 6 months of documented practical experience covering the scope of the authorisation that will be issued.

The task training shall include practical hands on training and theoretical training as appropriate for each task authorised. Satisfactory completion of training shall be demonstrated by an examination or by workplace assessment. Task training and examination/assessment shall be carried out by the HKAR-145 approved maintenance organisation issuing the certifying staff authorisation. The practical experience shall be also obtained within such HKAR-145 approved maintenance organisation.

HKAR 145.40 Equipment and tools (See AMC 145.40)

- (a) The HKAR-145 approved maintenance organisation shall have available and use the necessary equipment and tools to perform the approved scope of work.

- (1) Where the manufacturer specifies a particular tool or equipment, the HKAR-145 approved maintenance organisation shall use that tool or equipment, unless the use of alternative tooling or equipment is agreed by the Director-General via procedures specified in the maintenance organisation exposition.
 - (2) Equipment and tools must be permanently available, except in the case of any tool or equipment that is so infrequently used that its permanent availability is not necessary. Such cases shall be detailed in the maintenance organisation exposition procedure.
 - (3) A HKAR-145 maintenance organisation approved for base maintenance shall have sufficient aircraft access equipment and inspection platforms/docking as required for the proper inspection of the aircraft.
- (b) The HKAR-145 approved maintenance organisation shall ensure that all tools, equipment and particularly test equipment, as appropriate, are controlled and calibrated according to standards acceptable to the Director-General at a frequency to ensure serviceability and accuracy. Records of such calibrations and traceability to the standard used shall be kept by the HKAR-145 approved maintenance organisation.

HKAR 145.42 Acceptance of aircraft components

(See AMC 145.42)

- (a) All aircraft components shall be classified into the following categories:
- (1) Aircraft components which are in a satisfactory condition, released on a Form DCA 1 (CAD Form One) or other acceptable authorised release documents prescribed in Appendix No. 1 to Hong Kong Airworthiness Notice No. 17.

Note Used aircraft component release certificates issued prior to 1 January 1994 by organisations not approved to HKAR-145 remain valid until 1 January 2000.
 - (2) Unserviceable aircraft components which shall be maintained in accordance with HKAR-145 requirements.
 - (3) Unsalvageable aircraft components because they have reached their certified life limit or contain a non-repairable defect.
 - (4) Standard parts which are used on aircraft, engine, propeller or other aircraft component when specified in the maintenance data and accompanied by evidence of conformity traceable to the applicable standard.
 - (5) Material, both raw and consumable, used in the course of maintenance when the HKAR-145 approved maintenance organisation is satisfied that the material meets the required specification and has appropriate traceability. All material must be accompanied by documentation clearly relating to the particular material and containing a conformity to specification statement plus both the

manufacturing and supplier source.

- (b) Aircraft components, standard parts and materials for installation:
- (1) The HKAR-145 approved maintenance organisation shall establish procedures for the acceptance of aircraft components, standard parts and materials for installation to ensure that aircraft components, standard parts and materials are in satisfactory condition and meet the applicable requirements of paragraph (a) above.
 - (2) The HKAR-145 approved maintenance organisation shall establish procedures to ensure that aircraft components, standard parts and materials shall only be installed on an aircraft or aircraft component when they are in satisfactory condition, meet the applicable requirements of paragraph (a) above and the applicable maintenance data specifies the particular aircraft component, standard part or material.
 - (3) The HKAR-145 approved maintenance organisation may fabricate a restricted range of parts to be used in the course of undergoing work within its own facilities, provided procedures are identified in the maintenance organisation exposition.
- (c) Segregation of aircraft components:
- (1) Unserviceable and unsalvageable aircraft components shall be segregated from serviceable aircraft components, standards parts and materials.
 - (2) Unsalvageable aircraft components shall not be permitted to re-enter the aircraft component supply system, unless certified life limits have been extended or a repair solution has been approved according to HKAR-21 or accepted by the Director-General.

HKAR 145.45 Maintenance data (See AMC 145.45)

- (a) The HKAR-145 approved maintenance organisation shall hold and use applicable current maintenance data in the performance of maintenance, including modifications and repairs. 'Applicable' means relevant to any aircraft, aircraft component or process specified in the HKAR-145 approved maintenance organisation's approval class rating schedule and any associated capability list.

In the case of maintenance data provided by an operator or customer, the HKAR-145 approved maintenance organisation shall hold such data when the work is in progress, with the exception of the need to comply with HKAR 145.55(c).

- (b) For the purposes of HKAR-145 requirements, applicable maintenance data shall be any of the following:

- (1) Any applicable requirement, procedure, operational directive or information issued by the authority responsible for the oversight of the aircraft or aircraft component.
 - (2) Any applicable airworthiness directive issued by the authority responsible for the oversight of the aircraft or aircraft component.
 - (3) Instructions for continuing airworthiness, issued by type certificate holders, supplementary type certificate holders, any other organisation required to publish such data by HKAR-21 and in the case of third countries aircraft or aircraft components the airworthiness data mandated by the authority responsible for the oversight of the aircraft or aircraft component.
 - (4) Any applicable standard, such as but not limited to, maintenance standard practices recognised by the Director-General as a good standard for maintenance.
 - (5) Any applicable data issued in accordance with paragraph (d) below.
- (c) The HKAR-145 approved maintenance organisation shall establish procedures to ensure that if found, any inaccurate, incomplete or ambiguous procedure, practice, information or maintenance instruction contained in the maintenance data used by maintenance personnel is recorded and notified to the author of the maintenance data.
- (d) The HKAR-145 approved maintenance organisation may only modify maintenance instructions in accordance with a procedure specified in the maintenance organisation exposition. With respect to those changes, the organisation shall demonstrate that they result in equivalent or improved maintenance standards and shall inform the type certificate holder of such changes unless otherwise agreed by the Director-General. 'Maintenance instructions' for the purposes of this paragraph means instructions on how to carry out the particular maintenance task: they exclude the engineering design of repairs and modifications.
- (e) The HKAR-145 approved maintenance organisation shall provide a common workcard or worksheet system to be used throughout relevant parts of the organisation. In addition, the organisation shall either transcribe accurately the maintenance data contained in paragraphs (b) and (d) onto such workcards or worksheets or make precise reference to the particular maintenance task(s) contained in such maintenance data. Workcards and worksheets may be computer generated and held on an electronic database subject to both adequate safeguards against unauthorised alternation and a backup electronic database, which shall be updated within 24 hours of any entry made to the main electronic database. Complex maintenance tasks shall be transcribed onto the workcards or worksheets and sub-divided into clear stages to ensure a record of the accomplishment of the complete maintenance task.

Where the HKAR-145 approved maintenance organisation provides a maintenance service to an aircraft operator who requires their workcard or worksheet system to be

used then such workcard or worksheet system may be used. In this case, the HKAR-145 approved maintenance organisation shall establish a procedure to ensure correct completion of the aircraft operator's workcards or worksheets.

- (f) The HKAR-145 approved maintenance organisation shall ensure that all applicable maintenance data is readily available for use when required by maintenance personnel.
- (g) The HKAR-145 approved maintenance organisation shall establish a procedure to ensure that maintenance data it controls is kept up to date. In the case of operator/customer controlled and provided maintenance data, the HKAR-145 approved maintenance organisation shall be able to show that either it has written confirmation from the operator/customer that all such maintenance data is up to date or it has work orders specifying the amendment status of the maintenance data to be used or it can show that it is on the operator/customer maintenance data amendment list.

HKAR 145.47 Production planning

(See AMC 145.47)

- (a) The HKAR-145 approved maintenance organisation shall have a system appropriate to the amount and complexity of work to plan the availability of all necessary personnel, tools, equipment, material, maintenance data and facilities in order to ensure the safe completion of the maintenance work.
- (b) The planning of maintenance tasks, and the organising of shifts, shall take into account human performance limitations.
- (c) When it is required to hand over the continuation or completion of maintenance tasks for reasons of a shift or personnel changeover, relevant information shall be adequately communicated between outgoing and incoming personnel.

HKAR 145.48 Performance of maintenance

(See AMC 145.48)

The HKAR-145 approved maintenance organisation shall establish procedures to ensure that:

- (a) after completion of maintenance a general verification is carried out to ensure that the aircraft or aircraft component is clear of all tools, equipment and any extraneous parts or material, and that all access panels removed have been refitted;
- (b) an error capturing method is implemented after the performance of any critical maintenance task;
- (c) the risk of multiple errors during maintenance and the risk of errors being repeated in identical maintenance tasks are minimised; and,

- (d) damage is assessed and modifications and repairs are carried out using data:
- approved by the Director-General; or
 - approved by a HKAR-21 design organisation.

HKAR 145.50 Certification of maintenance

(See AMC 145.50)

- (a) A Certificate of Release to Service shall be issued by appropriately authorised certifying staff on behalf of the HKAR-145 approved maintenance organisation when it has been verified that all maintenance ordered has been properly carried out by the HKAR-145 approved maintenance organisation in accordance with the procedures specified in the HKAR 145.70 maintenance organisation exposition, taking into account the availability and use of the maintenance data specified in HKAR 145.45 and that there are no non-compliances which are known to endanger flight safety.
- (b) A Certificate of Release to Service shall be issued before flight at the completion of any maintenance. A Certificate of Release to Service must contain basic details of the maintenance carried out including detailed reference of the maintenance data used, the date such maintenance was completed and the identity including approval reference of the HKAR-145 approved maintenance organisation and certifying staff issuing such a certificate.
- (c) New defects or incomplete maintenance work orders identified during the above maintenance shall be brought to the attention of the aircraft operator for the specific purpose of obtaining agreement to rectify such defects or completing the missing elements of the maintenance work order. In the case where the aircraft operator declines to have such maintenance carried out under this paragraph, paragraph (e) below is applicable.
- (d) A Certificate of Release to Service shall be issued at the completion of any maintenance on an aircraft component whilst off the aircraft. The CAD Form One constitutes the aircraft component Certificate of Release to Service. When a HKAR-145 approved maintenance organisation maintains an aircraft component for its own use, a CAD Form One may not be necessary depending upon the organisation's internal release procedures defined in the maintenance organisation exposition.
- (e) Notwithstanding paragraph (a), when the HKAR-145 approved maintenance organisation is unable to complete all maintenance ordered, it may issue a Certificate of Release to Service within the approved aircraft limitations. The HKAR-145 approved maintenance organisation shall enter such fact in the aircraft Certificate of Release to Service before the issue of such certificate.
- (f) Notwithstanding paragraph (a) and HKAR 145.42, when an aircraft is grounded at a location other than the main line station or main maintenance base due to the non-availability of an aircraft component with the appropriate release certificate, it is permissible to temporarily fit an aircraft component without the appropriate release

certificate for a maximum of 30 flight hours or until the aircraft first returns to the main line station or main maintenance base, whichever is the sooner, subject to the aircraft operator agreement and the said aircraft component having a suitable release certificate but otherwise in compliance with all applicable maintenance and operational requirements. Such aircraft components shall be removed by the above prescribed time limit unless an appropriate release certificate has been obtained in the meantime under paragraph (a) and HKAR 145.42.

HKAR 145.55 Maintenance records

(See AMC 145.55 & GM 145.55)

- (a) The HKAR-145 approved maintenance organisation shall record all details of maintenance work carried out. As a minimum, the HKAR-145 approved maintenance organisation shall retain records necessary to prove that all requirements have been met for issuance of the Certificate of Release to Service, including sub-contractor's release documents.
- (b) The HKAR-145 approved maintenance organisation shall provide a copy of each Certificate of Release to Service to the aircraft operator, together with a copy of any specific approved repair/modification data used for repairs/modifications carried out.
- (c) The HKAR-145 approved maintenance organisation shall retain a copy of all detailed maintenance records and any associated maintenance data for three years from the date the aircraft or aircraft component to which the work relates was released from the HKAR-145 approved maintenance organisation.

Note: Where an aircraft operator contracts a HKAR-145 approved maintenance organisation to keep the aircraft operator's Certificates of Release to Service and any associated approved repair/modification data, the retention period will be that required by the Air Navigation (Hong Kong) Order 1995 and not that specified in HKAR 145.55(c).

- (1) Records under this paragraph shall be stored in a manner that ensures protection from damage, alteration and theft.
- (2) Computer backup discs, tapes etc. shall be stored in a different location from that containing the working discs, tapes etc., in an environment that ensures they remain in good condition.
- (3) Where a HKAR-145 approved maintenance organisation terminates its operation, all retained maintenance records covering the last three years shall be distributed to the last owner or customer of the respective aircraft or aircraft component or shall be stored as specified by the Director-General.

HKAR 145.60 Occurrence reporting

(See AMC 145.60 & GM 145.60)

- (a) The HKAR-145 approved maintenance organisation shall report to the Director-General and the organisation responsible for the design of the aircraft or aircraft component any condition of the aircraft or aircraft component identified by the HKAR-145 approved maintenance organisation that has resulted or may result in an unsafe condition that hazards seriously the flight safety.
- (b) The HKAR-145 approved maintenance organisation shall establish an internal occurrence reporting system as detailed in the maintenance organisation exposition to enable the collection and evaluation of such reports, including the assessment and extraction of those occurrences to be reported under paragraph (a) above. The procedure shall identify adverse trends, corrective actions taken or to be taken by the organisation to address deficiencies and include evaluation of all known relevant information relating to such occurrences and a method to circulate the information as necessary.
- (c) The HKAR-145 approved maintenance organisation shall make such reports in a form and manner acceptable to the Director-General and ensure that they contain all pertinent information about the condition and evaluation results known to the HKAR-145 approved maintenance organisation.
- (d) Where the HKAR-145 approved maintenance organisation is contracted by an operator to carry out maintenance, the HKAR-145 approved maintenance organisation shall also report to the operator any such condition affecting the operator's aircraft or aircraft component. In the case of an aircraft, where the State of Registry is not Hong Kong, then the national aviation authority of the State of Registry must also be informed.
- (e) The HKAR-145 approved maintenance organisation shall produce and submit such reports as soon as practicable but in any case within 72 hours of the HKAR-145 approved maintenance organisation identifying the condition to which the report relates.

HKAR 145.65 Safety and quality policy, maintenance procedures and quality system

(See AMC 145.65 & GM 145.65)

- (a) The HKAR-145 approved maintenance organisation shall establish a safety and quality policy for the organisation to be included in the maintenance organisation exposition under HKAR 145.70.
- (b) The HKAR-145 approved maintenance organisation shall establish procedures acceptable to the Director-General taking into account human factors and human performance to ensure good maintenance practices and compliance with the applicable requirements established in HKAR 145.25 to 145.95. The procedures under this paragraph shall:

- (1) ensure that a clear work order or contract has been agreed between the organisation and the organisation requesting maintenance to clearly establish the maintenance to be carried out so that aircraft and aircraft components may be released to service in accordance with HKAR 145.50; and
 - (2) cover all aspects of carrying out maintenance, including the provision and control of specialised services and lay down the standards to which the organisation intends to work.
- (c) The HKAR-145 approved maintenance organisation shall establish a quality system that includes the following:
- (1) Independent audits in order to monitor compliance with required aircraft/aircraft component standards and adequacy of the procedures to ensure that such procedures invoke good maintenance practices and airworthy aircraft/aircraft components. In the smallest organisations the independent audit part of the quality system may be contracted to another HKAR-145 approved maintenance organisation or a person with appropriate technical knowledge and proven satisfactory audit experience, and;
 - (2) A quality feedback reporting system to the person or group of persons specified in HKAR 145.30(b) and ultimately to the accountable manager that ensures proper and timely corrective action is taken in response to reports resulting from the independent audits established to meet sub-paragraph (1) above.
- (d) The HKAR-145 approved maintenance organisation shall establish a safety management system meeting the relevant CAD 712 Requirements.

HKAR 145.70 Maintenance organisation exposition

(See AMC 145.70 & GM 145.70)

- (a) The HKAR-145 approved maintenance organisation shall provide the Director-General with a maintenance organisation exposition, containing the following information:
- (1) A statement signed by the accountable manager confirming that the maintenance organisation exposition and any referenced associated manuals define the HKAR-145 approved maintenance organisation's compliance with HKAR-145 requirements and will be complied with at all times. When the accountable manager is not the chief executive officer of the HKAR-145 approved maintenance organisation then such chief executive officer shall countersign the statement;
 - (2) the organisation's safety and quality policy as specified by HKAR 145.65;
 - (3) the title(s) and name(s) of the persons nominated under HKAR 145.30(b);

- (4) the duties and responsibilities of the persons nominated under HKAR 145.30(b), including matters on which they may deal directly with the Director-General on behalf of the HKAR-145 approved maintenance organisation;
 - (5) an organisation chart showing associated chains of responsibility between the persons nominated under HKAR 145.30(b);
 - (6) a list of certifying staff and support staff with their scope of approval;
 - (7) a general description of manpower resources;
 - (8) a general description of the facilities located at each address specified in the HKAR-145 approved maintenance organisation's approval certificate;
 - (9) a specification of the HKAR-145 approved maintenance organisation's scope of work relevant to the extent of approval;
 - (10) the notification procedure of HKAR 145.85 for organisation changes;
 - (11) the maintenance organisation exposition amendment procedure;
 - (12) the procedures and quality system established by the HKAR-145 approved maintenance organisation under HKAR 145.25 to HKAR 145.90;
 - (13) a lists of aircraft operators, where applicable, to which the HKAR-145 approved maintenance organisation provides an aircraft maintenance service;
 - (14) a list of subcontracted organisations, where applicable, as specified in HKAR 145.75(b);
 - (15) a list of line stations, where applicable, as specified in HKAR 145.75(d);
 - (16) a list of contracted organisations, where applicable.
- (b) The maintenance organisation exposition shall be amended as necessary to remain an up-to-date description of the HKAR-145 approved maintenance organisation. The maintenance organisation exposition and any subsequent amendments shall be approved by the Director-General.
- (c) Notwithstanding paragraph (b) minor amendments to the maintenance organisation exposition may be approved through an exposition procedure (hereinafter referred to as 'indirect approval').
- (d) Copies of all amendments to the maintenance organisation exposition shall be furnished promptly to all organisations or persons to whom the exposition has been issued.

HKAR 145.75 Privileges of the HKAR-145 approved maintenance organisation
(See AMC 145.75)

In accordance with the maintenance organisation exposition, the HKAR-145 approved maintenance organisation shall be entitled to carry out the following tasks:

- (a) Maintain any aircraft and/or aircraft component for which it is approved at the locations identified in the approval certificate and in the maintenance organisation exposition.
- (b) Arrange for maintenance of any aircraft or aircraft component for which it is approved at another organisation that is working under the quality system of the HKAR-145 approved maintenance organisation. This refers to work being carried out by an organisation not itself appropriately approved to carry out such maintenance under HKAR-145 and is limited to the work scope permitted under HKAR 145.65(b) procedures. This work scope shall not include a base maintenance check of an aircraft or a complete workshop maintenance check or overhaul of an engine or engine module.
- (c) Maintain any aircraft or any aircraft component for which it is approved at any location subject to the need for such maintenance arising either from the unserviceability of the aircraft or from the necessity of supporting occasional line maintenance, subject to the conditions specified in the maintenance organisation exposition.
- (d) Maintain any aircraft and/or aircraft component for which it is approved at a location identified as a line maintenance location capable of supporting minor maintenance and only if the maintenance organisation exposition both permits such activity and lists such locations.
- (e) Issue Certificates of Release to Service in respect of completion of maintenance in accordance with HKAR 145.50.

HKAR 145.80 Limitations on the HKAR-145 approved maintenance organisation
(See AMC 145.80)

The HKAR-145 approved maintenance organisation shall only maintain an aircraft or aircraft component for which it is approved when all necessary facilities, equipment, tooling, material, maintenance data and certifying staff are available.

HKAR 145.85 Changes to the HKAR-145 approved maintenance organisation
(See AMC 145.85)

- (a) The HKAR-145 approved maintenance organisation shall notify the Director-General of any proposal to carry out any of the following changes before such changes take place to enable the Director-General to determine continued compliance with HKAR-145 requirements and to amend, if necessary, the approval certificate, except that in the case of proposed changes in personnel not known to the management beforehand, these changes must be notified at the earliest opportunity:
- (1) the name of the organisation;
 - (2) the main location of the organisation;
 - (3) additional locations of the organisation;
 - (4) the accountable manager;
 - (5) any of the persons nominated under HKAR 145.30(b);
 - (6) the facilities, equipment, tools, material, procedures, work scope or certifying staff that could affect the approval.

HKAR 145.90 Continued validity of approval

- (a) Unless it has previously been surrendered, superseded, suspended, revoked or expired by virtue of exceeding any expiry date that may be specified in the approval certificate, the HKAR-145 approval shall remain valid subject to:
- (1) the HKAR-145 approved maintenance organisation remaining in compliance with HKAR-145 requirements, in accordance with the provisions related to the handling of findings as specified under HKAR 145.95; and
 - (2) the Director-General being granted access to the HKAR-145 approved maintenance organisation to determine continued compliance with HKAR-145 requirements; and
 - (3) the payment of any charges prescribed by the Director-General. Failure to pay entitles the Director-General to suspend the approval, but does not automatically render the approval invalid.
- (b) Upon surrender or revocation, the approval certificate shall be returned to the Director-General.

HKAR 145.95 Findings

- (a) A level 1 finding is any significant non-compliance with HKAR-145 requirements which lowers the safety standard and hazards seriously the flight safety.
- (b) A level 2 finding is any non-compliance with HKAR-145 requirements which could lower the safety standard and possibly hazard the flight safety.
- (c) After receipt of notification of findings, the HKAR-145 approved maintenance organisation shall define a corrective action plan and demonstrate corrective action to the satisfaction of the Director-General within a period agreed with the Director-General.

HKAR 145.97 Equivalent safety case

- (a) The Director-General may exempt an organisation from a requirement in HKAR-145 when satisfied that a situation exists not envisaged by a HKAR-145 requirement and subject to compliance with any supplementary condition(s) the Director-General considers necessary to ensure equivalent safety. Such supplementary condition(s) shall be agreed by the Director-General to ensure continued recognition of the approval.
- (b) The Director-General may exempt an organisation from a requirement in HKAR-145 on an individual case by case permission basis only subject to compliance with any supplementary condition(s) the Director-General considers necessary to ensure equivalent safety.

HKAR 145.100 Revocation, suspension, limitation or refusal to renew the approval certificate

The Director-General may, on reasonable grounds after due enquiry, revoke, suspend, limit or refuse to renew the approval certificate if the Director-General is not satisfied that the holder of the approval certificate continues to meet the HKAR-145 requirements subject to the conditions of paragraph (a) or (b) as appropriate.

- (a) Except as specified in paragraph (b), before revoking, suspending, limiting or refusing to renew an approval certificate, the Director-General must first give at least 28 days notice to the holder in writing of his intention so to do and the reasons for his proposal and must offer the holder an opportunity to make representations and the Director-General will consider those representations.
- (b) In the case where the Director-General has determined that the safe operation of an aircraft could be adversely affected the Director-General may in addition to paragraph (a) provisionally suspend, in part or in whole, the HKAR-145 approval certificate without prior notice until the paragraph (a) procedure is complete.

SECTION 2 - ACCEPTABLE MEANS OF COMPLIANCE (AMC)**1 GENERAL**

- 1.1 This Section contains Acceptable Means of Compliance that has been agreed by the Director-General for inclusion in HKAR-145.
- 1.2 Where a particular HKAR paragraph does not have an Acceptable Means of Compliance, it is considered that no supplementary material is required.

2 PRESENTATION

- 2.1 Each page being identified by the date of issue and Issue/Revision number under which it is amended or reissued.
- 2.2 A numbering system has been used in which the Acceptable Means of Compliance uses the same number as the HKAR paragraph to which it refers. The number is introduced by the letters AMC to distinguish the material from the HKAR itself.
- 2.3 For this purpose the AMC is defined as follows:

Acceptable Means of Compliance (AMC) illustrate a means, or several alternative means, but not necessarily the only possible means by which a requirement can be met. It should however be noted that where a new AMC is developed, any such AMC (which may be additional to an existing AMC) will be amended into the document.

- 2.4 Explanatory Notes not forming part of the AMC text appear in a smaller typeface.
- 2.5 New, amended or corrected text is indicated by a marginal line.

3 BACKGROUND

- 3.1 CAD aircraft maintenance policy is to require any aircraft with a Certificate of Airworthiness in either the Transport Category (Passenger) or Transport Category (Cargo) and used for Commercial Air Transport purposes to be maintained by a HKAR-145 organisation approved for the type of aircraft.
- 3.2 A HKAR-145 organisation within the following limitations may also carry out maintenance on an aircraft type in any other Certificate of Airworthiness category.
 - 3.2.1 Approval for aircraft maintenance may be either an approval for the aircraft type covering base maintenance or line maintenance or both.

- 3.2.2 For the purpose of the AMC, line maintenance, sometimes referred to as light maintenance, generally consists of pre-flight, daily, weekly, A Check and B Check.
- 3.2.3 Base maintenance, sometimes referred to as heavy maintenance generally consists of the C Check and D Check.
- 3.2.4 Where a particular aircraft type maintenance programme does not follow the above philosophy, the Director-General will decide which checks need to be classified as base maintenance.
- 3.2.5 CAD aircraft component maintenance policy is to require aircraft components, when removed from the aircraft, to be maintained by a HKAR-145 maintenance organisation approved for the type of aircraft component.

AMC 145.10(a)**Scope and applicability****See HKAR 145.10(a)**

- 1 "Line Maintenance" should be understood as any maintenance that is carried out before flight to ensure that the aircraft is fit for the intended flight.
 - (a) "Line Maintenance" may include:
 - Trouble shooting.
 - Defect rectification.
 - Aircraft component replacement with use of external test equipment if required. Aircraft component replacement may include aircraft components such as engines and propellers.
 - Scheduled maintenance and/or checks including visual inspections that will detect obvious unsatisfactory conditions/discrepancies but do not require extensive in depth inspection. It may also include internal structure, systems and powerplant items which are visible through quick opening access panels/doors.
 - Minor repairs and modifications which do not require extensive disassembly and can be accomplished by simple means.
 - (b) For temporary or occasional cases (airworthiness directives, service bulletins) the quality manager may accept base maintenance tasks to be performed by a line maintenance organisation provided all requirements are fulfilled as defined by the Director-General.
 - (c) Maintenance tasks falling outside these criteria are considered to be "Base Maintenance".
 - (d) Aircraft maintained in accordance with "progressive" type programmes should be individually assessed in relation to this paragraph. In principle, the decision to allow some "progressive" checks to be carried out should be determined by the assessment that all tasks within the particular check can be carried out safely to the required standards at the designated line maintenance station.

AMC 145.10(b)**Applicability****See HKAR 145.10(b)**

- 1 For an organisation to be approved in accordance with HKAR 145.10(b) as an organisation located within the territories of Hong Kong means that the management as specified in HKAR 145.30(a) and (b) should be located in the territories of Hong Kong.
- 2 Where the organisation uses facilities both inside and outside the territories of Hong

Kong such as satellite facilities, sub-contractors, line stations etc., such facilities may be included in the approval without being identified on the approval certificate subject to the maintenance organisation exposition identifying the facilities and containing procedures to control such facilities and the Director-General being satisfied that they form an integral part of the HKAR-145 approved maintenance organisation.

AMC 145.20

Terms of approval

See HKAR 145.20

The following table identifies the ATA specification 2200 chapter for the category C component rating. If the maintenance manual (or equivalent document) does not follow the ATA Chapters, the corresponding subjects still apply to the applicable C rating.

CLASS	RATING	ATA CHAPTERS
COMPONENTS OTHER THAN COMPLETE ENGINES OR APUs	C1 Air Cond & Press	21
	C2 Auto Flight	22
	C3 Comms and Nav	23 – 34
	C4 Doors – Hatches	52
	C5 Electrical Power & Lights	24 – 33 – 85
	C6 Equipment	25 – 38 – 44 – 45 – 50
	C7 Engine - APU	49 – 71 – 72 – 73 – 74 – 75 – 76 – 77 – 78 – 79 – 80 – 81 – 82 – 83
	C8 Flight Controls	27 – 55 – 57.40 – 57.50 – 57.60 – 57.70
	C9 Fuel	28– 47
	C10 Helicopter - Rotors	62 – 64 – 66 – 67
	C11 Helicopter - Trans	63 – 65
	C12 Hydraulic Power	29
	C13 Indicating/Recording Systems	31 – 42 – 46
	C14 Landing Gear	32
	C15 Oxygen	35
	C16 Propellers	61
	C17 Pneumatic & Vacuum	36 – 37
	C18 Protection ice/rain/fire	26 – 30
	C19 Windows	56
	C20 Structural	53 – 54 – 57.10 – 57.20 – 57.30
	C21 Water Ballast	41
	C22 Propulsion Augmentation	84

AMC 145.25(a)**Facility requirements****See HKAR 145.25(a)**

- 1 Where the hangar is not owned by the HKAR-145 approved maintenance organisation, it may be necessary to establish proof of tenancy. In addition, sufficiency of hangar space to carry out planned base maintenance should be demonstrated by the preparation of a projected aircraft hangar visit plan relative to the maintenance programme. The aircraft hangar visit plan should be updated on a regular basis.
- 2 Protection from the weather elements relates to the normal prevailing local weather elements that are expected throughout any twelve month period. Aircraft hangar and aircraft component workshop structures should prevent the ingress of rain, hail, ice, snow, wind and dust etc. Aircraft hangar and aircraft component workshop floors should be sealed to minimise dust generation.
- 3 For line maintenance of aircraft, hangars are not essential but it is recommended that access to hangar accommodation be demonstrated for usage during inclement weather for minor scheduled work and lengthy defect rectification.
- 4 Aircraft maintenance staff should be provided with an area where they may study maintenance instructions and complete maintenance records in a proper manner.

AMC 145.25(b)**Facility requirements****See HKAR 145.25(b)**

It is acceptable to combine any or all of the office accommodation requirements into one office subject to the staff having sufficient room to carry out assigned tasks.

In addition, as part of the office accommodation, aircraft maintenance staff should be provided with an area where they may study maintenance instructions and complete maintenance records in a proper manner.

AMC 145.25(d)**Facility requirements****See HKAR 145.25(d)**

- 1 Storage facilities for serviceable aircraft components should be clean, well ventilated and maintained at a constant dry temperature to minimise the effects of condensation. Manufacturer's storage recommendations should be followed for those aircraft components identified in such published recommendations.
- 2 Storage racks should be strong enough to hold aircraft components and provide

sufficient support for large aircraft components such that the component is not distorted during storage.

- 3 All aircraft components, wherever practicable, should remain packaged in protective material to minimise damage and corrosion during storage.

AMC 145.30(a)

Personnel requirements

See HKAR 145.30(a)

- 1 With regard to the accountable manager, it is normally intended to mean the chief executive officer of the HKAR-145 approved maintenance organisation, who by virtue of position has overall (including in particular financial) responsibility for running the organisation. The accountable manager may be the accountable manager for more than one organisation and is not required to be necessarily knowledgeable on technical matters as the maintenance organisation exposition defines the maintenance standards. When the accountable manager is not the chief executive officer the Director-General will need to be assured that such an accountable manager has direct access to chief executive officer and has a sufficiency of 'maintenance funding' allocation.
- 2 The minimum requirements for the accountable manager should be referred to Section 4 Appendix 10.

AMC 145.30(b)

Personnel requirements

See HKAR 145.30(b)

- 1 Dependent upon the size of the HKAR-145 approved maintenance organisation, the HKAR-145 functions may be subdivided under individual managers or combined in any number of ways.
- 2 The HKAR-145 approved maintenance organisation should have, dependent upon the extent of approval, a base maintenance manager, a line maintenance manager, a workshop manager, a safety manager and a quality manager, all of whom should report to the accountable manager except in small HKAR-145 approved maintenance organisations where any one manager may also be the accountable manager, as determined by the Director-General, he/she may also be the line maintenance manager or the workshop manager. The length of absence to justify deputising is the period beyond which the organisation cannot function properly due to such absence.
- 3 The base maintenance manager is responsible for ensuring that all maintenance required to be carried out in the hangar, plus any defect rectification carried out during base maintenance, is carried out to the design and quality standards specified in HKAR 145.65(b). The base maintenance manager is also responsible for any corrective action resulting from the quality compliance monitoring of HKAR 145.65(c).

- 4 The line maintenance manager is responsible for ensuring that all maintenance required to be carried out on the line including line defect rectification is carried out to the standards specified in HKAR 145.65(b) and also responsible for any corrective action resulting from the quality compliance monitoring of HKAR 145.65(c).
- 5 The workshop manager is responsible for ensuring that all work on aircraft components is carried out to the standards specified in HKAR 145.65(b) and also responsible for any corrective action resulting from the quality compliance monitoring of HKAR 145.65(c).
- 6 The quality manager's responsibility is specified in HKAR 145.30(c). The safety manager's responsibility is specified in Chapter 5 of CAD 712.
- 7 Notwithstanding the example paragraphs 2 - 6 titles, the HKAR-145 approved maintenance organisation may adopt any title for the foregoing managerial positions but should identify to the Director-General the titles and persons chosen to carry out these functions.
- 8 Where a HKAR-145 approved maintenance organisation chooses to appoint managers for all or any combination of the identified HKAR-145 functions because of the size of the undertaking, it is necessary that these managers report ultimately through either the base maintenance manager or line maintenance manager or workshop manager or quality manager, as appropriate, to the accountable manager.
- 9 The minimum requirements for the nominated person(s) should be referred to Section 4 Appendix 10.

Note: Certifying staff may report to any of the managers specified depending upon which type of control the HKAR-145 approved maintenance organisation uses (for example - licensed engineers/independent inspection/dual function supervisors etc.) so long as the quality compliance monitoring staff specified in HKAR 145.65(c)(1) remain independent. Section 4 Appendix 3 gives some organisation examples.

AMC 145.30(c)

Personnel requirements

See HKAR 145.30(c)

Monitoring the quality system includes requesting remedial action as necessary by the accountable manager and the nominated persons referred to in HKAR 145.30(b).

AMC 145.30(d)

Personnel requirements

See HKAR 145.30(d)

- 1 Has sufficient staff means that the HKAR-145 approved maintenance organisation

employs or contracts competent staff, as detailed in the manhour plan, of which at least half the staff that perform maintenance in each workshop, hangar or flight line on any shift should be employed to ensure organisational stability. For the purpose of meeting a specific operational necessity, a temporary increase of the proportion of contracted staff may be permitted to the organisation by the Director-General, in accordance with an approved procedure which should describe the extent, specific duties, and responsibilities for ensuring adequate organisation stability. Contract staff, being part time or full time should be made aware that when working for the HKAR-145 approved maintenance organisation they are subjected to compliance with the organisation's procedures specified in the maintenance organisation exposition relevant to their duties. For the purpose of this paragraph, employed means the person is directly employed as an individual by the HKAR-145 approved maintenance organisation, whereas contracted means the person is employed by another organisation and contracted by that organisation to the HKAR-145 approved maintenance organisation.

- 2 The maintenance manhour plan should take into account all work carried out outside the scope of the HKAR-145 approval. The planned absence (for training, vacations, etc.) should be considered when developing the manhour plan.
- 3 The maintenance manhour plan should relate to the anticipated maintenance workload except that when the HKAR-145 approved maintenance organisation cannot predict such workload, due to the short term nature of its contracts, then such plan should be based upon the minimum maintenance workload needed for commercial viability. Maintenance workload includes all necessary work such as, but not limited to, planning, maintenance record checks, production of worksheets/cards in paper or electronic form, accomplishment of maintenance, inspection and the completion of maintenance records.
- 4 In the case of aircraft base maintenance, the maintenance manhour plan should relate to the aircraft hangar visit plan as specified in AMC 145.25(a).
- 5 In the case of aircraft component maintenance, the maintenance manhour plan should relate to the aircraft component planned maintenance as specified in HKAR 145.25(a)(2).
- 6 The quality monitoring compliance function manhours should be sufficient to meet the requirement of HKAR 145.65(c) which means taking into account AMC 145.65(c). Where quality monitoring staff perform other functions, the time allocated to such functions needs to be taken into account in determining quality monitoring staff numbers.
- 7 The maintenance manhour plan should be reviewed at least every 3 months and updated when necessary.
- 8 Significant deviation from the maintenance manhour plan should be reported through the departmental manager to the quality manager and the accountable manager for review. Significant deviation means more than a 25% shortfall in available manhours during a calendar month for any one of the functions specified in HKAR 145.30(d).

AMC 145.30(e)**Personnel requirements****See HKAR 145.30(e)**

- 1 Competence should be defined as a measurable skill or standard of performance, knowledge and understanding, taking into consideration attitude and behaviour.

The referenced procedure requires amongst others that planners, mechanics, specialised services staff, supervisors, certifying staff and support staff, whether employed or contracted, are assessed for competence before unsupervised work commences and competence is controlled on a continuous basis.

Competence should be assessed by evaluation of:

- on-the-job performance and/or testing of knowledge by appropriately qualified personnel, and
- records for basic, organisational, and/or product type and differences training, and
- experience records.

Validation of the above could include a confirmation check with the organisation(s) that issued such document(s). For that purpose, experience/training may be recorded in a document such as a log book or based on the suggested template in GM 145.30(e).

As a result of this assessment, an individual's qualification should determine:

- which level of ongoing supervision would be required or whether unsupervised work could be permitted, and
- whether there is a need for additional training.

A record of such qualification and competence assessment should be kept.

This should include copies of all documents that attest to qualification, such as the licence and/or any authorisation held, as applicable.

For a proper competence assessment of its personnel, the HKAR-145 approved maintenance organisation should consider that:

- (a) In accordance with the job function, adequate initial and recurrent training should be provided and recorded to ensure continued competence so that it is maintained throughout the duration of employment/contract.
- (b) All staff should be able to demonstrate knowledge of and compliance with the maintenance organisation procedures, as applicable to their duties.
- (c) All staff should be able to demonstrate an understanding of human factors and

human performance issues in relation with their job function and be trained as per AMC145.30(e).

- (d) To assist in the assessment of competence and to establish the training needs analysis, job descriptions are recommended for each job function in the HKAR-145 approved maintenance organisation. Job descriptions should contain sufficient criteria to enable the required competence assessment.
- (e) Criteria should allow the assessment to establish that, among others (titles might be different in each organisation):
 - (i) Managers are able to properly manage the work output, processes, resources and priorities described in their assigned duties and responsibilities in a safe compliant manner in accordance with regulations and organisation procedures.
 - (ii) Planners are able to interpret maintenance requirements into maintenance tasks, and have an understanding that they have no authority to deviate from the maintenance data.
 - (iii) Supervisors are able to ensure that all required maintenance tasks are carried out and where not completed or where it is evident that a particular maintenance task cannot be carried out to the maintenance data, then such problems will be reported to the HKAR 145.30(c) person for appropriate action. In addition, for those supervisors who also carry out maintenance tasks, that they understand such tasks should not be undertaken when incompatible with their management responsibilities.
 - (iv) Mechanics are able to carry out maintenance tasks to any standard specified in the maintenance data and will notify supervisors of defects or mistakes requiring rectification to re-establish required maintenance standards.
 - (v) Specialised services staff are able to carry out specialised maintenance tasks to the standard specified in the maintenance data. They should be able to communicate with supervisors and report accurately when necessary.
 - (vi) Support staff are able to determine that relevant tasks or inspections have been carried out to the required standard.
 - (vii) Certifying staff are able to determine when the aircraft or aircraft component is ready to release to service and when it should not be released to service.
 - (viii) Quality audit staff are able to monitor compliance with HKAR-145 requirements identifying non-compliance in an effective and timely manner so that the HKAR-145 approved maintenance organisation may remain in compliance with HKAR-145 requirements.

Competence assessment should be based upon the procedure specified in GM to 145.30(e).

- 2 In respect to the understanding of the application of human factors and human performance issues, all HKAR-145 approved maintenance organisation personnel should have received an initial and continuation human factors training. This should concern to a minimum:
- (a) Post-holders, managers, supervisors;
 - (b) Certifying staff, support staff, and mechanics;
 - (c) Technical support personnel such as planners, engineers, technical record staff;
 - (d) Quality control /assurance staff;
 - (e) Specialised services staff;
 - (f) Human factors staff / human factors trainers;
 - (g) Store department staff, purchasing department staff;
 - (h) Ground equipment operators.
- 3 Initial human factors training should cover all the topics of the training syllabus specified in GM 145.30(e) either as a dedicated course or else integrated within other training. The syllabus may be adjusted to reflect the particular nature of the HKAR-145 approved maintenance organisation. The syllabus may also be adjusted to meet the particular nature of work for each function within the organisation. For example:
- (a) small organisations not working in shifts may cover in less depth subjects related to teamwork and communication,
 - (b) planners may cover in more depth the scheduling and planning objective of the syllabus and in less depth the objective of developing skills for shift working.

All personnel, including personnel being recruited from any other organisation should receive initial human factors training compliant with the organisation's training standards prior to commencing actual job function, unless their competence assessment justifies that there is no need for such training. Newly directly employed personnel working under direct supervision may receive training within 6 months after joining the HKAR-145 approved maintenance organisation but temporary staff may need be trained shortly after joining the HKAR-145 approved maintenance organisation to cope with the duration of employment.

- 4 The purpose of human factors continuation training is primarily to ensure that staff remain current in terms of human factors and also to collect feedback on human factors issues. Consideration should be given to the possibility that such training has the involvement of the quality department. There should be a procedure to ensure that feedback is formally passed from the trainers to the quality department to initiate action where necessary.

Human factors continuation training should be of an appropriate duration in each two year period in relation to relevant quality audit findings and other internal/external sources of information on human errors in maintenance available to the HKAR-145

approved maintenance organisation.

- 5 Human factors training may be conducted by the HKAR-145 approved maintenance organisation itself, or independent trainers or any training organisations acceptable to the Director-General.
- 6 The human factors training procedure should be specified in the maintenance organisation exposition.
- 7 Additional training in fuel tank safety as well as associated inspection standards and maintenance procedures should be required for HKAR-145 approved maintenance organisations' technical personnel, especially technical personnel involved in the compliance of CDCCL tasks. Guidance is provided for training to HKAR-145 approved maintenance organisation personnel in Section 4 Appendix 4.
- 8 Competence assessment should include the verification for the need of additional EWIS training when relevant. Guidance is provided for EWIS training programme to HKAR-145 approved maintenance organisation personnel in EASA AMC 20-22, 'Aeroplane Electrical Wiring Interconnection System Training Programme'. Staff should have received EWIS training within 12 months of joining the organisation, which comes later.

AMC 145.30(f)

Personnel requirements

See HKAR 145.30(f)

- 1 Continued airworthiness non-destructive testing (NDT) means such testing specified by the type certificate holder / aircraft or engine or propeller manufacturer in accordance with the maintenance data as specified in HKAR 145.45 for in service aircraft / aircraft components for the purpose of determining the continued fitness of the product to operate safely.
- 2 Appropriately qualified means to Level 1, 2 or 3 as defined by the standards acceptable to the Director-General, dependent upon the NDT function to be carried out.
- 3 Notwithstanding the fact that Level 3 personnel may be qualified via the standards acceptable to the Director-General to establish and authorise methods, techniques, etc., this does not permit such personnel to deviate from methods and techniques published in the maintenance data, unless the maintenance data expressly permits such deviation.
- 4 All examinations should be conducted by personnel or organisations under the general control of a National Aerospace NDT Board outside Hong Kong being recognised by the Director-General.
- 5 Particular non-destructive test means any one or more of the following: Dye penetrant, magnetic particle, eddy current, ultrasonic and radiographic methods including X ray

and gamma ray.

- 6 It should be noted that new methods are and will be developed, such as, but not limited to thermography and shearography, which are not specifically addressed by the standards acceptable to the Director-General. Until such time as an agreed standard is established such methods should be carried out in accordance with the particular equipment manufacturer's recommendations including any training and examination process to ensure competence of the personnel with the process.
- 7 Any HKAR-145 approved maintenance organisation that carries out NDT should establish qualification procedures detailed in the maintenance organisation exposition for NDT personnel and NDT Level 3 who is responsible for the technical supervision of NDT.
- 8 Boroscopy and other techniques such as delamination coin tapping are non-destructive inspections rather than NDT. Notwithstanding such differentiation, the HKAR-145 approved maintenance organisation should establish a maintenance organisation exposition procedure accepted by the Director-General to ensure that personnel who carry out and interpret such inspections are properly trained and assessed for their competence with the process. Non-destructive inspections, not being considered as NDT by HKAR-145 are not listed in Section 4 Appendix 2 under class rating D1.
- 9 The referenced standards, methods, training and procedures should be specified in the maintenance organisation exposition.
- 10 In this context, 'standards acceptable to the Director-General' means those standards established or published by an official body whether having legal personality or not, which are widely recognised by the air transport sector as constituting good practice, including the Civil Aviation Maintenance Association of China (CAMAC) Standard T/CAMAC0001, the European Standard EN 4179 and the National Aerospace Standard NAS 410.
- 11 Organisations which employ welders to weld aeronautical parts should establish their procedures to qualify and approve the welders in accordance with MOE accepted by the Director-General. Section 4 Appendix 12 contains guidelines on developing such MOE procedures.

AMC 145.30(g)**Personnel requirements****See HKAR 145.30(g)**

- 1 Certifying staff qualified in accordance with HKAR-66 category B1 and/or B2/B2* includes those personnel holding protected rights under HKAR-66.
- 2 For the purposes of HKAR-66.20(a)1 and HKAR-66.20(a)3(ii) personnel minor scheduled line maintenance means any minor scheduled inspection/check up to and including a weekly check specified in the operator's approved aircraft maintenance programme. For aircraft maintenance programmes that do not specify a weekly check, the Director-General will determine the most significant check that is considered equivalent to a weekly check.
- 3 Typical tasks permitted after appropriate task training to be carried out by the HKAR-66.20(a)1 and HKAR-66.20(a)3(ii) personnel for the purpose of these personnel issuing an aircraft Certificate of Release to Service as specified in HKAR 145.50 as part of minor scheduled line maintenance or simple defect rectification are contained in the following list:
 - (a) Replacement of wheel assemblies.
 - (b) Replacement of wheel brake units.
 - (c) Replacement of emergency equipment.
 - (d) Replacement of ovens, boilers and beverage makers.
 - (e) Replacement of internal and external lights, filaments and flash tubes.
 - (f) Replacement of windscreen wiper blades.
 - (g) Replacement of passenger and cabin crew seats, seat belts and harnesses.
 - (h) Closing of cowlings and refitment of quick access inspection panels.
 - (i) Replacement of toilet system components but excluding gate valves.
 - (j) Simple repairs and replacement of internal compartment doors and placards but excluding doors forming part of a pressure structure.
 - (k) Simple repairs and replacement of overhead storage compartment doors and cabin furnishing items.
 - (l) Replacement of static wicks.
 - (m) Replacement of aircraft main and APU aircraft batteries.
 - (n) Replacement of in-flight entertainment system simple components other than public address.
 - (o) Routine lubrication and replenishment of all system fluids and gases.
 - (p) The de-activation only of sub-systems and aircraft components as permitted by the operator's minimum equipment list where such de-activation is agreed by the Director-General as a simple task.

- (q) Inspection for and removal of de-icing/anti-icing fluid residues, including removal/closure of panels, cowls or covers or the use of special tools.
- (r) Any other task agreed by the Director-General as a simple task for a particular aircraft type. This may include defect deferment when all the following conditions are met:
 - There is no need for troubleshooting; and
 - The task is in the MEL; and
 - The maintenance action required by the MEL is agreed by the Director-General to be simple.

In the particular case of helicopters, and in addition to the items above, the following:

- (s) removal and installation of Helicopter Emergency Medical Service (HEMS) simple internal medical equipment.
- (t) removal and installation of external cargo provisions (i.e., external hook, mirrors) other than the hoist.
- (u) removal and installation of quick release external cameras and search lights.
- (v) removal and installation of emergency float bags, not including the bottles.
- (w) removal and installation of external doors fitted with quick release attachments.
- (x) removal and installation of snow pads/skid wear shoes/slump protection pads.

No task which requires troubleshooting should be part of the authorised maintenance actions. Release to service after rectification of deferred defects should be permitted as long as the task is listed above.

Note: This list will be periodically updated in the light of ongoing experience and technological changes.

- 4 The requirement of having appropriate aircraft rated certifying staff qualified as category B1, B2/B2*, B3, as appropriate, in the case of aircraft line maintenance does not imply that the organisation must have B1, B2/B2* and B3 personnel at every line station. The maintenance organisation exposition should have a procedure on how to deal with defects requiring B1, B2/B2* or B3 certifying staff.
- 5 The Director-General may accept that in the case of aircraft line maintenance an organisation has only B1, B2/B2* or B3 certifying staff, as appropriate, provided that the Director-General is satisfied that the scope of work, as defined in the maintenance organisation exposition, does not need the availability of all B1, B2/B2* and B3 certifying staff. Special attention should be taken to clearly limit the scope of scheduled and non-scheduled line maintenance (defect rectification) to only those tasks that can be certified by the available certifying staff category.

AMC 145.30(h)(1)**Personnel requirements****See HKAR 145.30(h)(1)**

- 1 The support staff need not hold a certifying authorisation in accordance with HKAR 145.35(b) but the HKAR-145 approved maintenance organisation may use such appropriately authorised certifying staff to satisfy the requirement.
- 2 Certifying staff qualified in accordance with HKAR-66 category C includes those personnel holding protected rights under HKAR-66.
- 3 In accordance with 145.30(h) and 145.35, the qualification requirements (basic licence, aircraft ratings, recent experience and continuation training) are identical for certifying staff and for support staff. The only difference is that support staff cannot hold certification privileges when performing this role since during base maintenance the release to service will be issued by category C certifying staff. Nevertheless, the organisation may use as support staff (for base maintenance) persons who already hold certification privileges for line maintenance.

AMC 145.30(j)(3)**Personnel requirements****See HKAR 145.30(j)(3)**

- 1 For the purposes of this paragraph "unforeseen" means that the aircraft grounding could not reasonably have been predicted by the operator because the defect was unexpected due to being part of a hitherto reliable system.
- 2 A one-off authorisation should only be considered for issue by the quality department of the contracted HKAR-145 approved maintenance organisation after it has made a reasoned judgement that such a requirement is appropriate under the circumstances and at the same time maintaining the required airworthiness standards. The organisation's quality department will need to assess each situation individually prior to the issuance of a one-off authorisation.
- 3 A one-off authorisation should not be issued where the level of certification required could exceed the knowledge and experience level of the person it is issued to. In all cases, due consideration should be given to the complexity of the work involved and the availability of required tooling and/or test equipment needed to complete the work.

AMC 145.30(j)(3)(i)**Personnel requirements****See HKAR 145.30(j)(3)(i)**

In those situations where the requirement for a one-off authorisation to issue a Certificate of

Release to Service for a task on an aircraft type for which certifying staff does not hold a type-rated authorisation has been identified, the following procedure is recommended:

- 1 Flight crew should communicate full details of the defect to the operator's supporting HKAR-145 approved maintenance organisation. If necessary, the supporting organisation will then request the use of a one-off authorisation from the quality department.
- 2 When issuing a one-off authorisation, the quality department of the HKAR-145 approved maintenance organisation should verify that:
 - (a) Full technical details relating to the work required to be carried out have been established and passed to the certifying staff.
 - (b) The organisation has an approved procedure in place for coordinating and controlling the total maintenance activity undertaken at the location under the authority of the one-off authorisation.
 - (c) The person to whom a one-off authorisation is issued has been provided with all the necessary information and guidance relating to maintenance data and any special technical instructions associated with the specific task undertaken. A detailed step by step worksheet has been defined by the organisation, communicated to the one-off authorisation holder.
 - (d) The person holds authorisations of equivalent level and scope on other aircraft type of similar technology, construction and systems.
- 3 The one-off authorisation holder should sign off the detailed step by step worksheet when completing the work steps. The completed tasks should be verified by visual examination and/or normal system operation upon return to an appropriately approved HKAR-145 maintenance facility.

AMC 145.30(j)(3)(ii)

Personnel requirements

See HKAR 145.30(j)(3)(ii)

This paragraph addresses staff not employed by the HKAR-145 approved maintenance organisation who meet the requirements of HKAR 145.30(j)(3). In addition to the items listed in AMC 145.30(j)(3)(i), paragraphs 1, 2(a), (b) and (c) and 3, the quality department of the organisation may issue such one-off authorisation providing full qualification details relating to the proposed certifying personnel are verified by the quality department and made available at the location.

AMC 145.30(j)(4)**Personnel requirements****See HKAR 145.30(j)(4)**

- 1 For the issue of a limited certification authorisation the commander should hold either a valid air transport pilots license (ATPL) or commercial pilots license (CPL) in accordance with CAD 54 on the aircraft type. In addition, the limited certification authorisation is subject to the maintenance organisation exposition containing procedures to address the personnel requirements of HKAR 145.30(e) and associated AMC and guidance material.

Such procedures should include as a minimum:

- (a) Completion of adequate maintenance airworthiness regulation training;
- (b) Completion of adequate task training for the specific task on the aircraft. The task training should be of sufficient duration to ensure that the individual has a thorough understanding of the task to be completed and will involve training in the use of associated maintenance data; and
- (c) Completion of the procedural training as specified in HKAR-145.

The above procedures should be specified in the maintenance organisation exposition and be accepted by the Director-General.

- 2 Typical tasks that may be certified and/or carried out by the commander holding an ATPL or CPL are minor maintenance or simple checks included in the following list:
 - (a) Replacement of internal lights, filaments and flash tubes.
 - (b) Closing of cowlings and refitment of quick access inspection panels.
 - (c) Role changes e.g. stretcher fit, dual controls, FLIR, doors, photographic equipment etc.
 - (d) Inspection for and removal of de-icing/anti-icing fluid residues, including removal/closure of panels, cowls or covers that are easily accessible but not requiring the use of special tools.
 - (e) Any check / replacement involving simple techniques consistent with this AMC and as agreed by the Director-General.
- 3 The authorisation should have a finite life of twelve months subject to satisfactory re-current training on the applicable aircraft type.

AMC 145.35(a)**Certifying staff and support staff****See HKAR 145.35(a)**

- 1 Holding a HKAR-66 licence with the relevant type/group rating, or accepted qualification in the case of aircraft components, does not mean by itself that the holder is qualified to be authorised as certifying staff and/or support staff. The organisation is responsible to assess the competence of the holder for the scope of maintenance to be authorised.
- 2 The sentence “the organisation shall ensure that certifying staff and support staff have an adequate understanding of the relevant aircraft and/or aircraft components to be maintained together with the associated organisation procedures” means that the person has received training and has been successfully assessed on:
 - the type of aircraft or aircraft component;
 - the differences on the particular model/variant and the particular configuration.

The organisation should specifically ensure that the individual competencies have been established with regard to:

- relevant knowledge, skills and experience in the product type and configuration to be maintained, taking into account the differences between the generic aircraft type rating training that the person received and the specific configuration of the aircraft to be maintained;
 - appropriate attitude towards safety and observance of procedures; and
 - knowledge of the associated organisation and operator procedures (i.e. handling and identification of aircraft components, MEL use, Technical Log use, independent checks, etc.).
- 3 Some special maintenance tasks may require additional specific training and experience, including but not limited to:
 - (a) in-depth troubleshooting;
 - (b) very specific adjustment or test procedures;
 - (c) rigging;
 - (d) engine run-up, starting and operating the engines, checking engine performance characteristics, normal and emergency engine operation, associated safety precautions and procedures;
 - (e) extensive structural/system inspection and repair;
 - (f) other specialised maintenance required by the approved maintenance schedule.

For engine run-up training, simulators and/or real aircraft should be used.

- 4 The satisfactory assessment of the competence should be conducted in accordance with

a procedure approved by the Director-General (item 3.4 of the maintenance organisation exposition, as described in AMC 145.70(a)).

- 5 The HKAR-145 approved maintenance organisation should hold copies of all documents that attest the competence and recent experience for the period described in HKAR 145.35(j).

Additional information is provided in AMC 66.20(b)3.

AMC 145.35(b)

Certifying staff and support staff

See HKAR 145.35(b)

The HKAR-145 approved maintenance organisation issues the HKAR-145 certification authorisation when satisfied that compliance has been established with the appropriate requirements of HKAR-145 and HKAR-66. In granting the certification authorisation the HKAR-145 approved maintenance organisation needs to be satisfied that the person holds a valid HKAR-66 aircraft maintenance licence and may need to confirm such fact with the Director-General.

AMC 145.35(c)

Certifying staff and support staff

See HKAR 145.35(c)

For the interpretation of ‘6 months of actual relevant aircraft maintenance experience in any consecutive 2-year period’, the provisions of AMC 66.20(b)2 are applicable.

AMC 145.35(d)

Certifying staff and support staff

See HKAR 145.35(d)

- 1 Continuation training is a two way process to ensure that certifying staff remain current in terms of procedures, human factors and technical knowledge and that the HKAR-145 approved maintenance organisation receives feedback on the adequacy of its procedures and maintenance instructions. Due to the interactive nature of this training, consideration should be given to the possibility that such training has the involvement of the quality department to ensure that feedback is actioned. Alternatively, there should be a procedure to ensure that feedback is formally passed from the training department to the quality department to initiate action.
- 2 Continuation training should cover changes in relevant requirements such as HKAR-145, changes in organisation procedures and the modification standard of the products being maintained plus human factors issues identified from any internal or external

analysis of incidents. It should also address instances where staff failed to follow procedures and the reasons why particular procedures are not always followed. In many cases the continuation training will reinforce the need to follow procedures and ensure that incomplete or incorrect procedures are identified to the company in order that they can be corrected. This does not preclude the possible need to carry out a quality audit of such procedures.

- 3 Continuation training should be of sufficient duration in each two year period to meet the intent of HKAR 145.35(d) and may be split into a number of separate elements. HKAR 145.35(d) requires such training to keep certifying staff updated in terms of relevant technology, procedures and human factors issues which means it is one part of ensuring quality. Therefore sufficient duration should be related to relevant quality audit findings and other internal / external sources of information available to the HKAR-145 approved maintenance organisation on human errors in maintenance. This means that in the case of a HKAR-145 approved maintenance organisation that maintains aircraft with few relevant quality audit findings, continuation training could be limited to days rather than weeks, whereas a similar organisation with a number of relevant quality audit findings, such training may take several weeks. For a HKAR-145 approved maintenance organisation that maintains aircraft components, the duration of continuation training would follow the same philosophy but should be scaled down to reflect the more limited nature of the activity. For example certifying staff who release hydraulic pumps may only require a few hours of continuation training whereas those who release turbine engines may only require a few days of such training. The content of continuation training should be related to relevant quality audit findings and it is recommended that such training is reviewed at least once in every 24 month period.
- 4 The method of training is intended to be a flexible process and could, for example, include a HKAR-147 continuation training course, aeronautical college courses, internal short duration courses, seminars etc. The elements, general content and length of such training should be specified in the maintenance organisation exposition unless such training is undertaken by an organisation approved under HKAR-147 when such details may be specified under the HKAR-147 approval and cross referenced in the HKAR-145 maintenance organisation exposition.

AMC 145.35(e)

Certifying staff and support staff

See HKAR 145.35(e)

The programme for continuation training should list all certifying staff and support staff and when training will take place, the elements of such training and an indication that it was carried out reasonably on time as planned. Such information should subsequently be transferred to the certifying staff and support staff record as required by HKAR 145.35(j).

AMC 145.35(f)**Certifying staff and support staff****See HKAR 145.35(f)**

As stated in HKAR 145.35(f), except where any of the unforeseen cases of HKAR 145.30(j)(3) applies, all prospective certifying staff and support staff should be assessed for competence related to their intended duties in accordance with AMC 145.30(e) as applicable.

AMC 145.35(j)**Certifying staff and support staff****See HKAR 145.35(j)**

- 1 The following minimum information as applicable should be kept on record in respect of each certifying staff and support staff:
 - (a) Name
 - (b) Date of Birth
 - (c) Basic Training
 - (d) Type Training
 - (e) Continuation Training
 - (f) Experience
 - (g) Qualifications relevant to the authorisation
 - (h) Scope of the authorisation
 - (i) Date of first issue of the authorisation
 - (j) If appropriate - expiry date of the authorisation
 - (k) Identification Number of the authorisation
- 2 The record may be kept in any format but should be controlled by the HKAR-145 approved maintenance organisation's quality department. This does not mean that the quality department should run the record system.
- 3 Persons authorised to access the system should be maintained at a minimum to ensure that records cannot be altered in an unauthorised manner or that such confidential records become accessible to unauthorised persons.
- 4 The Director-General is an authorised person when investigating the records system for initial and continued approval or when the Director-General has cause to doubt the competence of a particular person.

AMC 145.35(m)**Certifying staff and support staff****See HKAR 145.35(m)**

- 1 It is the responsibility of the HKAR-145 approved maintenance organisation issuing the category A certifying staff authorisation to ensure that the task training received by this person covers all the tasks to be authorised. This is particularly important in those cases where the task training has been provided by a HKAR-147 approved maintenance training organisation or by a HKAR-145 approved maintenance organisation different from the one issuing the authorisation.
- 2 “Appropriately approved in accordance with HKAR-147” means an organisation holding an approval to provide category A task training for the corresponding aircraft type.
- 3 “Appropriately approved in accordance with HKAR-145” means an organisation holding a maintenance organisation approval for the corresponding aircraft type.

AMC 145.35(n)**Certifying staff and support staff****See HKAR 145.35(n)**

- 1 The privilege for a B2* licence holder to release minor scheduled line maintenance and simple defect rectification in accordance with 66.20(a)(3)(ii) can only be granted by the HKAR-145 approved maintenance organisation where the licence holder is employed/contracted after meeting all the requirements specified in HKAR-145.35(n). This privilege cannot be transferred to another HKAR-145 approved organisation.
- 2 When a B2* licence holder already holds a certifying staff authorisation containing minor scheduled line maintenance and simple defect rectification for a particular aircraft type, new tasks relevant to category A can be added to that type without requiring another 6 months of experience. However, task training (theoretical plus practical hands-on) and examination/assessment for these additional tasks is still required.
- 3 When the certifying staff authorisation intends to cover several aircraft types, the experience may be combined within a single 6-month period.
- 4 For the addition of new types to the certifying staff authorisation, another 6 months should be required unless the aircraft is considered similar per AMC 66.20(b)2 to the one already held.
- 5 The term ‘6 months of experience’ may include full-time employment or part-time employment. The important aspect is that the person has been involved during a period of 6 months (not necessarily every day) in those tasks which are going to be part of the maintenance authorisation.

AMC 145.40(a)**Equipment and tools****See HKAR 145.40(a)**

Once the applicant for HKAR-145 approval has determined the intended scope of approval for consideration by the Director-General, it will be necessary to show that all tools and equipment as specified in the maintenance data can be made available when needed. All such tools and equipment that require to be controlled in terms of servicing or calibration by virtue of being necessary to measure specified dimensions and torque figures etc, should be clearly identified and listed in a control register including any personal tools and equipment that the HKAR-145 approved maintenance organisation agrees can be used.

AMC 145.40(b)**Equipment and tools****See HKAR 145.40(b)**

- 1 The control of these tools and equipment requires that the HKAR-145 approved maintenance organisation has a procedure to inspect/service and, where appropriate, calibrate such items on a regular basis and indicate to users that the item is within any inspection or service or calibration time-limit. A clear system of labelling all tooling, equipment and test equipment is therefore necessary giving information on when the next inspection or service or calibration is due and if the item is unserviceable for any other reason where it may not be obvious. A register should be maintained for all precision tooling and equipment together with a record of calibrations and standards used.
- 2 Inspection, service or calibration on a regular basis should be in accordance with the equipment manufacturer's instructions except where the HKAR-145 approved maintenance organisation can show by results that a different time period is appropriate in a particular case.
- 3 In this context, 'standards acceptable to the Director-General' means those standards established or published by an official body whether having legal personality or not, which are widely recognised by the air transport sector as constituting good practice.

AMC 145.42(a)(2)**Acceptance of aircraft components****See HKAR 145.42(a)(2)**

- 1 The HKAR-145 approved maintenance organisation should ensure the proper identification of any unserviceable aircraft components. The unserviceable status of the aircraft component should be clearly declared on a tag together with the component identification data and any information that is useful to define actions that are necessary to be taken. Such information should state, as applicable, in-service times, maintenance

status, preservation status, failures, defects or malfunctions reported or detected, exposure to adverse environmental conditions, and whether the aircraft component is installed on an aircraft that was involved in an accident or incident. Means should be provided to prevent unintentional separation of this tag from the component.

2. Unserviceable aircraft components should typically undergo maintenance due to:
 - (a) expiry of the service life limit as defined in the aircraft maintenance programme;
 - (b) non-compliance with the applicable airworthiness directives and other continuing airworthiness requirements mandated by the Director-General;
 - (c) absence of the necessary information to determine the airworthiness status or eligibility for installation;
 - (d) evidence of defects or malfunctions; or
 - (e) being installed on an aircraft that was involved in an incident or accident likely to affect the aircraft component's serviceability.

AMC 145.42(a)(3)

Acceptance of aircraft components

See HKAR 145.42(a)(3)

- 1 The following types of aircraft components should typically be classified as unsalvageable:
 - (a) Aircraft components with non-repairable defects, whether visible or not to the naked eye.
 - (b) Aircraft components that do not meet design specifications, and cannot be brought into conformity with such specifications.
 - (c) Aircraft components subjected to unacceptable modification or rework that is irreversible.
 - (d) Certified life-limited parts that have reached or exceeded their certified life limits, or have missing or incomplete records.
 - (e) Aircraft components whose airworthy condition cannot be restored due to exposure to extreme forces, heat or adverse environmental conditions.
 - (f) Aircraft components for which conformity with an applicable airworthiness directive cannot be accomplished.
 - (g) Aircraft components for which maintenance records and/or traceability to the manufacturer cannot be retrieved.
- 2 It is common practice for possessors of aircraft components to dispose of unsalvageable aircraft components by selling, discarding, or transferring such items. In some instances, these items have reappeared for sale and in the active parts inventories of the aviation community. Misrepresentation of the status of aircraft components and the practice of making such items appear serviceable have resulted in the use of

unsalvageable non-conforming aircraft components. Therefore HKAR-145 approved maintenance organisations disposing of unsalvageable aircraft components should consider the possibility of such aircraft components later being misrepresented and sold as serviceable aircraft components. Caution should be exercised to ensure that unsalvageable aircraft components are disposed of in a manner that does not allow them to be returned to service.

AMC 145.42(a)(4)

Acceptance of aircraft components

See HKAR 145.42(a)(4)

- 1 Standard parts are parts that are manufactured in complete compliance with an established industry, Agency, competent authority or other government specification which includes design, manufacturing, test and acceptance criteria, and uniform identification requirements. The specification should include all the information that is necessary to produce and verify conformity of the part. It should be published so that any party may manufacture the part. Examples of specifications are National Aerospace Standards (NAS), Army-Navy Aeronautical Standard (AN), Society of Automotive Engineers (SAE), SAE Sematec, Joint Electron Device Engineering Council, Joint Electron Tube Engineering Council, American National Standards Institute (ANSI), EN Specifications, and etc.
- 2 To designate a part as a standard part, the TC holder may issue a standard parts manual accepted by the competent authority of the original TC holder or may make reference in the parts catalogue to the specification to be met by the standard part. Documentation that accompanies standard parts should clearly relate to the particular parts and contain a conformity statement plus both the manufacturing and supplier source. Some materials are subject to special conditions, such as storage conditions or life limitation, etc., and this should be included in the documentation and/or the material's packaging.
- 3 An authorised release certificate or equivalent should not be issued for such materials and, therefore, none should be expected.

AMC 145.42(a)(5)

Acceptance of aircraft components

See HKAR 145.42(a)(5)

- 1 Consumable material is any material which is only used once, such as lubricants, cements, compounds, paints, chemical dyes and sealants, etc.
- 2 Raw material is any material that requires further work to make it into a component part of the aircraft, such as metal, plastic, wood, fabric, etc.
- 3 Material, both raw and consumable, should only be accepted when satisfied that it is to the required specification. To be satisfied, the material and/or its packaging should be

marked with the applicable specification and, where appropriate, the batch number.

- 4 Documentation that accompanies all materials should clearly relate to the particular material and contain a conformity statement plus both the manufacturing and supplier source. Some materials are subject to special conditions, such as storage conditions or life limitation, etc., and this should be included in the documentation and/or the material's packaging.
- 5 An authorised release certificate or equivalent should not be issued for such materials and, therefore, none should be expected. The material specification is normally identified in the (S)TC holder's data except in the case where the Director-General has agreed otherwise.

AMC 145.42(b)(1)

Acceptance of aircraft components

See HKAR 145.42(b)(1)

- 1 Acceptance of Aircraft Components for Installation:
 - (a) The procedures for the acceptance of aircraft components, standard parts and materials should have the objective of ensuring that the aircraft components, standard parts and materials are in satisfactory condition and meet the organisation's requirements. These procedures should be based upon incoming inspections which include:
 - (i) physical inspection of the aircraft components, standard parts and materials;
 - (ii) review of the accompanying documentation and data, which should be acceptable in accordance with HKAR 145.42(a).
 - (b) For the acceptance of aircraft components, standard parts and materials from suppliers, the above procedures should include supplier evaluation procedures.

AMC 145.42(b)(3)

Acceptance of aircraft components

See HKAR 145.42(b)(3)

- 1 Fabrication of parts for installation
 - (a) The agreement of the Director-General on the fabrication of parts by the HKAR-145 approved maintenance organisation should be formalised through the approval of a detailed procedure in the maintenance organisation exposition. This AMC contains principles and conditions to be taken into account for the preparation of an acceptable procedure.
 - (b) Fabrication, inspection, assembly and test should be clearly within the technical

and procedural capability of the organisation.

- (c) All necessary data to fabricate the part should be approved either by the Director-General or the type certificate (TC) holder, or HKAR-21 design organisation approval holder, or supplemental type certificate (STC) holder.
- (d) Items fabricated by a HKAR-145 approved maintenance organisation may only be used by that organisation in the course of overhaul, maintenance, modifications, or repair of aircraft or aircraft components undergoing work within its own facility. The permission to fabricate does not constitute approval for manufacture, or to supply externally and the parts do not qualify for certification on CAD Form One. This prohibition also applies to the bulk transfer of surplus inventory, in that locally fabricated parts are physically segregated and excluded from any delivery certification.
- (e) Fabrication of parts, modification kits etc. for onward supply and/or sale may not be conducted by a HKAR-145 approved maintenance organisation.
- (f) The data specified in sub-paragraph (c) above may include repair procedures involving the fabrication of parts. Where the data on such parts is sufficient to facilitate fabrication, the parts may be fabricated by a HKAR-145 approved maintenance organisation. Care should be taken to ensure that the data include details of part numbering, dimensions, materials, processes, and any special manufacturing techniques, special raw material specification or/and incoming inspection requirement and that the HKAR-145 approved maintenance organisation has the necessary capability. That capability should be defined by way of maintenance organisation exposition content. Where special processes or inspection procedures are defined in the approved data which are not available at the HKAR-145 approved maintenance organisation the organisation cannot fabricate the part unless the TC/STC holder gives an approved alternative.
- (g) Examples of fabrication under the scope of a HKAR-145 approval can include but are not limited to the following:
 - (i) Fabrication of bushes, sleeves and shims.
 - (ii) Fabrication of secondary structural elements and skin panels.
 - (iii) Fabrication of control cables.
 - (iv) Fabrication of flexible and rigid pipes.
 - (v) Fabrication of electrical cable looms and assemblies.
 - (vi) Formed or machined sheet metal panels for repairs.

All the above parts should be fabricated in accordance with data provided in the overhaul or repair manuals, modification schemes and service bulletins, drawings, or should be otherwise approved by the Director-General.

Note: It is not acceptable to fabricate any item to pattern unless an engineering drawing of the item is produced which includes any necessary fabrication process and which is acceptable to the Director-General.

- (h) Where a TC holder or an approved production organisation is prepared to make

available complete data which is not referred to in the aircraft manuals or service bulletins but provides manufacturing drawings for items specified in parts lists, the fabrication of these items is not considered to be within the scope of a HKAR-145 approval unless agreed otherwise by the Director-General in accordance with a procedure specified in the maintenance organisation exposition.

(i) Inspection and Identification.

Any locally fabricated part should be subject to inspection before, separately, and preferably independently from any inspection of its installation. The inspection should establish full compliance with the relevant manufacturing data, and the part should be unambiguously identified as fit for use by stating conformity to the approved data. Adequate records should be maintained of all such fabrication processes including heat treatment and final inspections. All parts, except those that do not have enough space, should carry a part number which clearly relates it to the manufacturing/inspection data. In addition to the part's number, the HKAR-145 approved maintenance organisation's identity should be marked on the part for traceability purposes.

AMC 145.42(c)

Acceptance of aircraft components

See HKAR 145.42(c)

1 Segregation of aircraft components:

- (a) Unserviceable aircraft components should be identified and stored in a secure location that is under the control of the HKAR-145 approved maintenance organisation until a decision is made on the future status of such components. The organisation that declared the aircraft component to be unserviceable may transfer its custody after identifying it as unserviceable to the aircraft owner provided that such transfer is reflected in the aircraft logbook, or engine logbook, or component logbook.
- (b) 'Secure location under the control of the HKAR-145 approved maintenance organisation' refers to a secure location whose security is the responsibility of the HKAR-145 approved maintenance organisation. This may include facilities that are established by the organisation at locations different from the main maintenance facilities. These locations should be identified in the relevant procedures of the organisation.
- (c) In the case of unsalvageable aircraft components, the organisation should:
 - (i) retain such component in the secure location referred to in paragraph (b);
 - (ii) arrange for the component to be mutilated in a manner that ensures that they are beyond economic salvage or repair before disposing it; or
 - (iii) mark the component indicating that it is unsalvageable, when in agreement with the component owner, the component is disposed of for

legitimate non-flight uses (such as training and education aids, research and development), or for non-aviation applications, mutilation is often not appropriate. Alternatively to marking, the original part number or data plate information can be removed or a record kept of the disposal of the components.

AMC 145.45(b)

Maintenance data

See HKAR 145.45(b)

- 1 Except as specified in paragraph 5, each HKAR-145 approved maintenance organisation should hold and use the following minimum maintenance data relevant to the organisation's approval class rating: all maintenance related Hong Kong Aviation Requirements and associated AMC, IEM and Guidance Material, all applicable JAA maintenance related temporary guidance leaflets, all applicable Hong Kong Airworthiness Notices, all applicable airworthiness directives plus any airworthiness directive supplied by a contracted non-Hong Kong operator or customer as well as Critical Design Configuration Control Limitations.
- 2 In addition to paragraph 1, a HKAR-145 approved maintenance organisation with an approval class rating in category A - Aircraft, should hold and use the following maintenance data where published: the appropriate sections of the operator's aircraft maintenance programme, aircraft maintenance manual, repair manual, supplementary structural inspection document, corrosion control document, service bulletins, service letters, service instructions, modification leaflets, NDT manual, parts catalogue, type certificate data sheet and any other specific document issued by the type certificate or supplementary type certificate holder as maintenance data,.
- 3 In addition to paragraph 1, a HKAR-145 approved maintenance organisation with an approval class rating in category B - Engines/APUs, should hold and use the following maintenance data where published: the appropriate sections of the engine/APU maintenance and repair manual, service bulletins, service letters, modification leaflets, NDT manual, parts catalogue, type certificate data sheet and any other specific document issued by the type certificate holder as maintenance data.
- 4 In addition to paragraph 1, a HKAR-145 approved maintenance organisation with an approval class rating in category C - Components other than complete engines/APUs, should hold and use the following maintenance data where published: the appropriate sections of the vendor maintenance and repair manual, service bulletins and service letters plus any document issued by the type certificate holder as maintenance data on whose product the aircraft component may be fitted when applicable.
- 5 Appropriate sections of the paragraphs 2 to 4 additional maintenance data means in relation to the maintenance work scope at each particular maintenance facility. For example, a base maintenance facility should have almost complete set(s) of the maintenance data whereas a line maintenance facility may need only the maintenance

manual and the parts catalogue.

- 6 A HKAR-145 approved maintenance organisation only approved in class rating category D - Specialised services, should hold and use all applicable specialised service(s) process specifications.

AMC 145.45(c)

Maintenance data

See HKAR 145.45(c)

- 1 The referenced procedure should ensure that when maintenance personnel discover inaccurate, incomplete or ambiguous information in the maintenance data they should record the details. The procedure should then ensure that the HKAR-145 approved maintenance organisation notifies the problem to the author of the maintenance data in a timely manner. A record of such communications to the author of the maintenance data should be retained by the HKAR-145 approved maintenance organisation until such time as the type certificate holder has clarified the issue by e.g. amending the maintenance data.
- 2 The referenced procedure should be specified in the maintenance organisation exposition.

AMC 145.45(d)

Maintenance data

See HKAR 145.45(d)

The referenced procedure should address the need for a practical demonstration by the mechanic to the quality personnel of the proposed modified maintenance instruction. When satisfied the quality personnel should approve the modified maintenance instruction and ensure that the type certificate or supplementary type certificate holder is informed of the modified maintenance instruction. The procedure should include a paper/electronic traceability of the complete process from start to finish and ensure that the relevant maintenance instruction clearly identifies the modification. Modified maintenance instructions should only be used in the following circumstances:

- (a) Where the type certificate/supplementary type certificate holders original intent can be carried out in a more practical or more efficient manner.
- (b) Where the type certificate/supplementary type certificate holders original intent cannot be achieved by following the maintenance instructions. For example, where an aircraft component cannot be replaced following the original maintenance instructions.
- (c) For the use of alternative tools/equipment

IMPORTANT NOTE: Critical Design Configuration Control Limitations (CDCCL) are airworthiness limitations. Any modification of the maintenance instructions linked to CDCCL constitutes an aircraft modification that should be approved in accordance with

HKAR-21.

AMC 145.45(e)**Maintenance data****See HKAR 145.45(e)**

- 1 The HKAR-145 approved maintenance organisation should:
 - transcribe accurately the maintenance data onto such work cards or worksheets, or
 - make precise reference to the particular maintenance task(s) contained in such maintenance data, which already identifies the task as a CDCCL where applicable.
- 2 Relevant parts of the organisation means with regard to aircraft base maintenance, aircraft line maintenance, engine workshops, mechanical workshops and avionic workshops. Therefore, engine workshops for example should have a common system throughout such engine workshops that may be different to that in aircraft base maintenance.
- 3 The workcards should differentiate and specify, when relevant, disassembly, accomplishment of task, reassembly and testing. In the case of a lengthy maintenance task involving a succession of personnel to complete such a task, it may be necessary to use supplementary workcards or worksheets to indicate what was actually accomplished by each individual person.

AMC 145.45(f)**Maintenance data****See HKAR 145.45(f)**

- 1 Data being made available to personnel maintaining aircraft means that the data should be available in close proximity to the aircraft being maintained for supervisors, mechanics and certifying staff to study.
- 2 Where computer systems are used, the number of computer terminals should be sufficient in relation to the size of the work programme to enable easy access, unless the computer system can produce paper copies. Where microfilm or microfiche readers/printers are used, a similar requirement is applicable.

AMC 145.45(g)**Maintenance data****See HKAR 145.45(g)**

- 1 To keep data up to date a procedure should be set up to monitor the amendment status of all data and maintain a check that all amendments are being received by being a subscriber to any document amendment scheme. Special attention should be given to TC related data such as certification life-limited parts, airworthiness limitations and Airworthiness Limitation Items (ALI), etc.

AMC 145.47(a)**Production planning****See HKAR 145.47(a)**

- 1 Depending on the amount and complexity of work generally performed by the HKAR-145 approved maintenance organisation, the planning system may range from a very simple procedure to a complex organisational set-up including a dedicated planning function in support of the production function.
- 2 For the purpose of HKAR-145 requirements, the production planning function includes two complementary elements:
 - (a) Scheduling the maintenance work ahead, to ensure that it will not adversely interfere with other work as regards the availability of all necessary personnel, tools, equipment, material, maintenance data and facilities.
 - (b) During maintenance work, organising maintenance teams and shifts and provide all necessary support to ensure the completion of maintenance without undue time pressure.
- 3 When establishing the production planning procedure, consideration should be given to the following:
 - (a) logistics,
 - (b) inventory control,
 - (c) square meters of accommodation,
 - (d) manhours estimation,
 - (e) manhours availability,
 - (f) preparation of work,
 - (g) hangar availability,
 - (h) environmental conditions (access, lighting standards and cleanliness),
 - (i) co-ordination with internal and external suppliers, etc,
 - (j) scheduling of safety-critical tasks during periods when staff are likely to be most alert.

AMC 145.47(b)**Production Planning****See HKAR 145.47(b)**

Limitations of human performance, in the context of planning safety related tasks, refers to the upper and lower limits, and variations, of certain aspects of human performance (Circadian rhythm / 24 hours body cycle) which personnel should be aware of when planning work and shifts.

AMC 145.47(c)**Production planning****See HKAR 145.47(c)**

The primary objective of the changeover / handover information is to ensure effective communication at the point of handing over the continuation or completion of maintenance actions. Effective task and shift handover depends on three basic elements:

- 1 The outgoing person's ability to understand and communicate the important elements of the job or task being passed over to the incoming person.
- 2 The incoming person's ability to understand and assimilate the information being provided by the outgoing person.
- 3 A formalised process for exchanging information between outgoing and incoming persons and a planned shift overlap and a place for such exchanges to take place.

AMC No. 1 to 145.48(b)**Performance of maintenance****See HKAR 145.48(b)**

The procedure should identify the error-capturing methods, the critical maintenance tasks, the training and qualification of staff applying error-capturing methods, and how the organisation ensures that its staff is familiar with critical maintenance tasks and error-capturing methods.

AMC No. 2 to 145.48(b)**Performance of maintenance****See HKAR 145.48(b)****Critical Maintenance Tasks**

- 1 The procedure should ensure that the following maintenance tasks are reviewed to assess their impact on flight safety:
 - (a) tasks that may affect the control of the aircraft flight path and attitude, such as

- installation, rigging and adjustments of flight controls;
 - (b) aircraft stability control systems (autopilot, fuel transfer);
 - (c) tasks that may affect the propulsive force of the aircraft, including installation of aircraft engines, propellers and rotors; and
 - (d) overhaul, calibration or rigging of engines, propellers, transmissions and gearboxes.
- 2 The procedure should describe which data sources are used to identify critical maintenance tasks. Several data sources may be used, such as:
- (a) information from the design approval holder;
 - (b) accident reports;
 - (c) investigation and follow-up of incidents;
 - (d) occurrence reporting;
 - (e) flight data analysis;
 - (f) results of audits;
 - (g) normal operations monitoring schemes; and
 - (h) feedback from training.

AMC No. 3 to 145.48(b)**Performance of maintenance****See HKAR 145.48(b)**

Error-capturing methods

- 1 Error-capturing methods are those actions defined by the organisation to detect maintenance errors made when performing maintenance.
- 2 The organisation should ensure that the error-capturing methods are adequate for the work and the disturbance of the system. A combination of several actions (visual inspection, operational check, functional test, rigging check) may be necessary in some cases.

AMC No. 4 to 145.48(b)**Performance of maintenance****See HKAR 145.48(b)**

Independent inspection

Independent inspection is one possible error-capturing method.

1 What is an independent inspection

An independent inspection is an inspection performed by an 'independent qualified person' of a task carried out by an 'authorised person', taking into account that:

- (a) the 'authorised person' is the person who performs the task or supervises the task and they assume the full responsibility for the completion of the task in accordance with the applicable maintenance data;
- (b) the 'independent qualified person' is the person who performs the independent inspection and attests the satisfactory completion of the task and that no deficiencies have been found. The 'independent qualified person' does not issue a certificate of release to service, therefore they are not required to hold certification privileges;
- (c) the 'authorised person' issues the certificate of release to service or signs off the completion of the task after the independent inspection has been carried out satisfactorily; and
- (d) the work card system used by the organisation should record the identification of both persons and the details of the independent inspection as necessary before the certificate of release to service or sign-off for the completion of the task is issued.

2 Qualifications of persons performing independent inspections

The organisation should have procedures to demonstrate that the 'independent qualified person' has been trained and has gained experience in the specific inspection to be performed. The organisation could consider making use of, for example:

- (a) the staff holding a certifying staff or support staff or sign-off authorisation or equivalent necessary to release or sign off the critical maintenance task;
- (b) staff holding a certifying staff or support staff or sign-off authorisation or equivalent necessary to release or sign off similar task in a product of similar category and having received specific practical training in the task to be inspected; or

Note 1: 'similar task in a product of similar category' means a task on one aircraft type under any subcategory and a similar task on another aircraft type under the same subcategory. For example, a certifying staff with only A320 under B1.1 subcategory endorsed on their HKAR-66 aircraft maintenance licence can be the independent qualified person for a similar task on a B737 under the same subcategory i.e. B1.1. Similar principles apply to other HKAR-66 licence subcategories e.g. B1.2 and B1.3 etc.

Note 2: 'specific practical training in the task to be inspected' will only apply where an aircraft type has a novel or unique system peculiar to that type only, or where specific specialist or special tooling is required.

- (c) a commander holding a limited certification authorisation in accordance with 145.30(j)(4) and having received adequate practical training and having enough

experience in the specific task to be inspected and on how to perform independent inspection.

3 How to perform an independent inspection

An independent inspection should ensure correct assembly, locking and sense of operation. When inspecting control systems that have undergone maintenance, the independent qualified person should consider the following points independently:

- (a) all those parts of the system that have actually been disconnected or disturbed should be inspected for correct assembly and locking;
- (b) the system as a whole should be inspected for full and free movement over the complete range;
- (c) cables should be tensioned correctly with adequate clearance at secondary stops;
- (d) the operation of the control system as a whole should be observed to ensure that the controls are operating in the correct sense;
- (e) if different control systems are interconnected so that they affect each other, all the interactions should be checked through the full range of the applicable controls; and
- (f) software that is part of the critical maintenance task should be checked, for example: version, compatibility with aircraft configuration.

4 What to do in unforeseen cases when only one person is available

Reinspection:

- (a) Reinspection is an error-capturing method subject to the same conditions as an independent inspection is, except that the 'authorised person' performing the maintenance task is also acting as 'independent qualified person' and performs the inspection.
- (b) Reinspection, as an error-capturing method, should only be performed in unforeseen circumstances when only one person is available to carry out the task and perform the independent inspection. The circumstances cannot be considered unforeseen if the person or organisation has not assigned a suitable 'independent qualified person' to that particular line station or shift.
- (c) The certificate of release to service is issued after the task has been performed by the 'authorised person' and the reinspection has been carried out satisfactorily. The work card system used by the organisation should record the identification and the details of the reinspection before the certificate of release to service for the task is issued.

AMC 145.48(c)**Performance of maintenance****See HKAR 145.48(c)**

The procedures should be aimed at:

- 1 minimising multiple errors and preventing omissions. Therefore, the procedures should specify:
 - (a) that every maintenance task is signed off only after completion;
 - (b) how the grouping of tasks for the purpose of sign-off allows critical steps to be clearly identified; and
 - (c) that work performed by personnel under supervision (i.e. temporary staff, trainees) is checked and signed off by an authorised person;
- 2 minimising the possibility of an error being repeated in identical tasks and, therefore, compromising more than one system or function. Thus, the procedures should ensure that no person is required to perform a maintenance task involving removal/installation or assembly/disassembly of several aircraft components of the same type fitted to more than one system, a failure of which could have an impact on safety, on the same aircraft or aircraft component during a particular maintenance check. However, in unforeseen circumstances when only one person is available, the organisation may make use of reinspection as described in AMC No. 4 to 145.48(b).

AMC 145.50(a)**Certification of maintenance****See HKAR 145.50(a)**

“Endangers the flight safety” means any instances where safe operation could not be assured or which could lead to an unsafe condition. It typically includes, but is not limited to, significant cracking, deformation, corrosion or failure of primary structure, any evidence of burning, electrical arcing, significant hydraulic fluid or fuel leakage and any emergency system or total system failure. An airworthiness directive overdue for compliance is also considered a hazard to flight safety.

AMC 145.50(b)**Certification of maintenance****See HKAR 145.50(b)**

- 1 The Certificate of Release to Service should contain the following statement:

'Certifies that the work specified except as otherwise specified was carried out in accordance with HKAR-145 and in respect to that work the aircraft/aircraft component

is considered ready for release to service'.

Reference should also be made to the HKAR-145 approval number.

- 2 It is acceptable to use an alternate abbreviated certificate of release to service consisting of the following statement 'HKAR-145 release to service' instead of the full certification statement specified in paragraph 1. When the alternate abbreviated certificate of release to service is used, the introductory section of the technical log should include an example of the full certification statement from paragraph 1.
- 3 The Certificate of Release to Service should relate to the task specified in the TC/STC holder's instruction, operator's instruction or the aircraft maintenance programme which itself may cross-refer to maintenance data.
- 4 Where such instructions include a requirement to ensure a dimension or test figure is within a specific tolerance as opposed to a general tolerance, the dimension or test figure should be recorded unless the instruction permits the use of GO/NO GO gauges. It is not normally sufficient to state that the dimension or the test figure is within tolerance.
- 5 The date such maintenance was carried out should include when the maintenance took place relative to any life or overhaul limitation in terms of date/flying hours/cycles/landings etc., as appropriate.
- 6 When extensive maintenance has been carried out, it is acceptable for the Certificate of Release to Service to summarise the maintenance so long as there is a unique cross-reference to the work package containing full details of maintenance carried out. Dimensional information should be retained in the work-pack record.
- 7 The person issuing the Certificate of Release to Service should use his/her normal signature except in the case where a computer release to service system is used. In this latter case the Director-General will need to be satisfied that only the particular person can electronically issue the release to service. One such method of compliance is the use of a magnetic or optical personal card in conjunction with a personal identity number (PIN) known only to the individual which is keyed into the computer. A certification stamp is optional.

AMC No. 1 to 145.50(d)

Certification of maintenance

See HKAR 145.50(d)

- 1 The purpose of the Certificate of Release to Service is to release assemblies/items/components/parts (hereafter referred to as 'item(s)') after maintenance and to release maintenance work carried out on such items under the HKAR-145 approval and to allow items removed from one aircraft/aircraft component to be fitted to another aircraft/aircraft component.

- 2 The certificate referenced CAD Form One is called the Authorised Release Certificate.
- 3 The certificate is to be used for export/import purposes, as well as for domestic purposes, and serves as an official certificate for items from the manufacturer/HKAR-145 approved maintenance organisation to users. The certificate is not a delivery or shipping note.
- 4 The certificate can only be issued by organisations approved by the Director-General within the scope of the approval.
- 5 The certificate may be used as a rotatable tag by utilising the available space on the reverse side of the certificate for any additional information and dispatching the item with two copies of the certificate so that one copy may be eventually returned with the item to the HKAR-145 approved maintenance organisation. The alternative solution is to use existing rotatable tags and also supply a copy of the certificate.
- 6 Under no circumstances may a certificate be issued for any item when it is known that the item has a defect considered a serious hazard to flight safety.
- 7 A certificate should not be issued for any item when it is known that the item is unserviceable except in the case of an item undergoing a series of maintenance processes at several HKAR-145 approved maintenance organisations and the item needs a certificate for the previous maintenance process carried out for the next HKAR-145 approved maintenance organisation to accept the item for subsequent maintenance processes. As mentioned for Block 12, a clear statement of limitation should be endorsed in Block 12.

Note: Aircraft may not be released using the certificate.

AMC No.2 to 145.50(d)
Certification of maintenance
See HKAR 145.50(d)

- 1 An aircraft component which has been maintained off the aircraft needs the issue of a certificate of release to service for such maintenance and another certificate of release to service in regard to being installed properly on the aircraft when such action occurs. In the case of base maintenance this takes the form of a separate task sign off for the maintenance and installation tasks.

When a HKAR-145 approved maintenance organisation maintains an aircraft component for use by the organisation, a CAD Form One may not be necessary depending upon the organisation's internal release procedures defined in the maintenance organisation exposition.

- 2 In the case of the issue of CAD Form One for aircraft components in storage before HKAR-145 and HKAR-21 became effective and not released on a CAD Form One or equivalent in accordance with HKAR 145.42(a); or removed serviceable from a

serviceable aircraft or an aircraft which have been withdrawn from service, the following applies:

- 2.1 A CAD Form One may be issued for an aircraft component which has been:
- (a) maintained before HKAR-145 became effective or manufactured before HKAR-21 became effective,
 - (b) used on an aircraft and removed in a serviceable condition. Examples include leased and loaned aircraft components,
 - (c) removed from aircraft which have been withdrawn from service, or from aircraft which have been involved in abnormal occurrences such as accidents, incidents, heavy landings or lightning strikes, or
 - (d) maintained by an unapproved organisation.
- 2.2 An appropriately rated HKAR-145 approved maintenance organisation may issue a CAD Form One as detailed in this AMC sub-paragraphs 2.5 to 2.9, as appropriate, in accordance with procedures detailed in the maintenance organisation exposition as approved by the Director-General. The appropriately rated organisation is responsible for ensuring that all reasonable measures have been taken to ensure that only approved and serviceable aircraft components are issued a CAD Form One under this sub-paragraph.
- 2.3 For the purposes of this paragraph 2 only, appropriately rated means a HKAR-145 approved maintenance organisation with an approval class rating for the type of aircraft component or for the product in which it may be installed.
- 2.4 A CAD Form One issued in accordance with this paragraph 2 should be issued by signing in Block 14b and stating "Inspected" in Block 11. In addition, Block 12 should specify:
- (a) when the last maintenance was carried out and by whom,
 - (b) if the aircraft component is unused, when the aircraft component was manufactured and by whom with a cross reference to any original documentation which should be included with the CAD Form One,
 - (c) a list of all airworthiness directives, repairs and modifications known to have been incorporated. If no airworthiness directives or repairs or modifications are known to be incorporated then this should be so stated,
 - (d) details of life used for service life limited parts being any combination of fatigue, overhaul or storage life, and
 - (e) for any aircraft component having its own maintenance history record, reference to the particular maintenance history record as long as the record contains the details that would otherwise be required in Block 12. The maintenance history record and acceptance test report or statement, if applicable, should be attached to the CAD Form One.
- 2.5 New / unused aircraft components
- 2.5.1 Any unused aircraft component in storage without a CAD Form One up

to the effective date for HKAR-21 that was manufactured by an organisation acceptable to the Director-General at the time may be issued a CAD Form One by an appropriately rated HKAR-145 approved maintenance organisation. The CAD Form One should be issued in accordance with the following sub-paragraphs which should be included in a procedure within the maintenance organisation exposition.

Note: It should be understood that the release of a stored but unused aircraft component in accordance with this sub-paragraph represents a maintenance release under HKAR-145 and not a production release under HKAR-21.

- (a) An acceptance test report or statement should be available for all used and unused aircraft components that are subjected to acceptance testing after manufacturing or maintenance as appropriate.
- (b) The aircraft component should be inspected for compliance with the manufacturer's instructions and limitations for storage and condition including any requirement for limited storage life, inhibitors, controlled climate and special storage containers. In addition or in the absence of specific storage instructions the aircraft component should be inspected for damage, corrosion and leakage to ensure good condition.
- (c) The storage life used of any storage life limited parts should be established.

2.5.2 If it is not possible to establish satisfactory compliance with all applicable conditions specified in sub-paragraphs 2.5.1(a) to (c) inclusive the aircraft component should be disassembled by an appropriately rated HKAR-145 approved maintenance organisation and subjected to a check for incorporated airworthiness directives, repairs and modifications and inspected/tested in accordance with the manufacturer's maintenance instructions to establish satisfactory condition and, if relevant, all seals, lubricants and life limited parts replaced. On satisfactory completion after reassembly a CAD Form One may be issued stating what was carried out and the reference of the manufacturer's maintenance instructions included.

2.6 Used aircraft components removed from a serviceable aircraft

2.6.1 Serviceable aircraft components removed from a Hong Kong registered aircraft may be issued a CAD Form One by an appropriately rated HKAR-145 approved maintenance organisation subject to compliance with this sub-paragraph.

- (a) The HKAR-145 approved maintenance organisation should ensure that the aircraft component was removed from the aircraft by an appropriately qualified person.

- (b) The aircraft component may only be deemed serviceable if the last flight operation with the aircraft component fitted revealed no faults on that aircraft component/related system.
- (c) The aircraft component should be inspected for satisfactory condition including in particular damage, corrosion or leakage and compliance with any additional manufacturer's maintenance instructions.
- (d) The aircraft record should be researched for any unusual events that could affect the serviceability of the aircraft component such as involvement in accidents, incidents, heavy landings or lightning strikes. Under no circumstances may a CAD Form One be issued in accordance with this sub-paragraph 2.6 if it is suspected that the aircraft component has been subjected to extremes of stress, temperatures or immersion which could effect its operation.
- (e) A maintenance history record should be available for all used serialised aircraft components.
- (f) Compliance with known modifications and repairs should be established.
- (g) The flight hours/cycles/landings as applicable of any service life limited parts including time since overhaul should be established.
- (h) Compliance with known applicable airworthiness directives should be established.
- (i) Subject to satisfactory compliance with this sub-paragraph 2.6.1 a CAD Form One may be issued and should contain the information as specified in sub-paragraph 2.4 including the aircraft from which the aircraft component was removed.

2.6.2 Serviceable aircraft components removed from an aircraft not registered in Hong Kong may only be issued a CAD Form One if the aircraft components are leased or loaned from the HKAR-145 approved maintenance organisation who retains control of the airworthiness status of the aircraft components. A CAD Form One may be issued and should contain the information as specified in sub-paragraph 2.4 including the aircraft from which the aircraft component was removed.

2.7 Used aircraft components removed from an aircraft withdrawn from service

Serviceable aircraft components removed from a Hong Kong registered aircraft withdrawn from service may be issued a CAD Form One by a HKAR-145 approved maintenance organisation subject to compliance with this sub-paragraph.

- (a) Aircraft withdrawn from service are sometimes dismantled for spares. This is considered to be a maintenance activity and should be

accomplished under the control of a HKAR-145 approved maintenance organisation, employing procedures approved by the Director-General.

- (b) To be eligible for installation, aircraft components removed from such aircraft may be issued with a CAD Form One by an appropriately rated HKAR-145 approved maintenance organisation following a satisfactory assessment.
- (c) As a minimum the assessment will need to satisfy the standards set out in sub-paragraphs 2.5 and 2.6 as appropriate. This should where known, include the possible need for the alignment of scheduled maintenance that may be necessary to comply with the maintenance programme applicable to the aircraft on which the aircraft component is to be installed.
- (d) Irrespective of whether the aircraft holds a certificate of airworthiness or not, the HKAR-145 approved maintenance organisation responsible for certifying any removed aircraft component should satisfy itself that the manner in which the aircraft components were removed and stored are compatible with the standards required by HKAR-145.
- (e) A structured plan should be formulated to control the aircraft disassembly process. The disassembly is to be carried out by an appropriately rated HKAR-145 approved maintenance organisation under the supervision of certifying staff, who will ensure that the aircraft components are removed and documented in a structured manner in accordance with the appropriate maintenance data and disassembly plan.
- (f) All recorded aircraft defects should be reviewed and the possible effects these defects may have on both normal and standby functions of removed aircraft components are to be considered.
- (g) Dedicated control documentation is to be used as detailed by the disassembly plan, to facilitate the recording of all maintenance actions and aircraft component removals performed during the disassembly process. Aircraft components found to be unserviceable are to be identified as such and quarantined pending a decision on the actions to be taken. Records of the maintenance accomplished to establish serviceability are to form part of the component maintenance history.
- (h) Suitable HKAR-145 facilities for the removal and storage of removed aircraft components are to be used which include suitable environmental conditions, lighting, access equipment, aircraft tooling and storage facilities for the work to be undertaken. While it may be acceptable for aircraft components to be removed, given local environmental conditions, without the benefit of an enclosed facility subsequent disassembly (if required) and storage of the aircraft components should be in accordance with manufacturer's recommendations.

- 2.8 Used aircraft components maintained by organisations not approved in accordance with HKAR-145

For used aircraft components maintained by a maintenance organisation unapproved under HKAR-145, due care should be exercised before acceptance of such components. In such cases an appropriately rated HKAR-145 approved maintenance organisation should establish satisfactory conditions by:

- (a) dismantling the aircraft component for sufficient inspection in accordance with the appropriate maintenance data,
- (b) replacing of all service life limit components when no satisfactory evidence of life used is available and/or the aircraft components are in an unsatisfactory condition,
- (c) reassembling and testing as necessary the aircraft component,
- (d) completing all certification requirements as specified in HKAR 145.50.

2.9 Used aircraft components removed from an aircraft involved in an accident or incident

Such aircraft components should only be issued with a CAD Form One when processed in accordance with sub-paragraph 2.7 and a specific work order including all additional necessary tests and inspections made necessary by the accident or incident. Such a work order may require input from the type certificate holder or original manufacturer as appropriate. This work order should be referenced in Block 12.

AMC 145.50(e)

Certification of maintenance

See HKAR 145.50(e)

- 1 Being unable to establish full compliance with HKAR 145.50(a) means that the maintenance required by the aircraft operator could not be completed due either to running out of available aircraft maintenance downtime for the scheduled check or by virtue of the condition of the aircraft requiring additional maintenance downtime.
- 2 The aircraft operator is responsible for ensuring that all required maintenance has been carried out before flight and therefore HKAR 145.50(e) requires such operator to be informed in the case where full compliance with HKAR 145.50(a) cannot be achieved within the operator's limitations. If the operator agrees to the deferment of full compliance, then the Certificate of Release to Service may be issued subject to details of the deferment, including the operator's authority, being endorsed on the certificate.

Note: Whether or not the aircraft operator does have the authority to defer maintenance is an issue between the aircraft operator and the Director-General. In case of doubt concerning such a decision of the operator, the HKAR-145 approved maintenance organisation should inform the Director-General of such doubt, before issuing the Certificate of Release to Service. This will allow the Director-General to investigate the matter with the State of Registry or the State of the Operator as appropriate.

- 3 The procedure should draw attention to the fact that HKAR 145.50(a) does not normally permit the issue of a Certificate of Release to Service in the case of non-compliance and should state what action the mechanic, supervisor and certifying staff should take to bring the matter to the attention of the relevant department or person responsible for technical co-ordination with the aircraft operator so that the issue may be discussed and resolved with the aircraft operator. In addition, the appropriate person(s) as specified in HKAR 145.30(b) should be kept informed in writing of such possible non-compliance situations and this should be included in the procedure.

AMC 145.50(f)**Certification of maintenance****See HKAR 145.50(f)**

- 1 Suitable release certificate means a certificate which clearly states that the aircraft component is serviceable; that clearly specifies the organisation releasing said aircraft component together with details of the authority under whose approval the organisation works including the approval or authorisation reference.
- 2 Compliance with all applicable maintenance and operational requirements means making an appropriate entry in the aircraft technical log, checking for compliance with type design standards, modifications, repairs, airworthiness directives, life limitations and condition of the aircraft component plus information on where, when and why the aircraft was grounded.

AMC 145.55(c)**Maintenance records****See HKAR 145.55(c)**

Associated maintenance data is specific information such as repair and modification data. This does not necessarily require the retention of all Aircraft Maintenance Manual, Component Maintenance Manual, IPC etc issued by the type certificate holder or supplementary type certificate holder. Maintenance records should refer to the revision status of the data used.

AMC 145.60(b)**Occurrence reporting****See HKAR 145.60(b)**

- 1 The aim of occurrence reporting is to identify the factors contributing to incidents, and to make the system resistant to similar errors.
- 2 An occurrence reporting system should enable and encourage free and frank reporting of any (potentially) safety related occurrence. This will be facilitated by the establishment of a just culture. An organisation should ensure that personnel are not inappropriately punished for reporting or co-operating with occurrence investigations.
- 3 The internal reporting process should be closed-loop, ensuring that actions are taken internally to address safety hazards.
- 4 Feedback to reportees, both on an individual and more general basis, is important to ensure their continued support for the scheme.

AMC 145.65(a)**Safety and quality policy, maintenance procedures and quality system****See HKAR 145.65(a)**

The safety and quality policy should as a minimum include a statement committing the HKAR-145 approved maintenance organisation to:

- (a) recognise safety as a prime consideration at all times,
- (b) apply human factors principles,
- (c) encourage personnel to report maintenance related errors/incidents,
- (d) recognise that compliance with procedures, quality standards, safety standards and regulations is the duty of all personnel,
- (e) recognise the need for all personnel to cooperate with the quality auditors.

AMC 145.65(b)**Safety and quality policy, maintenance procedures and quality system****See HKAR 145.65(b)**

- 1 Maintenance procedures should be held current such that they reflect best practice within the HKAR-145 approved maintenance organisation. It is the responsibility of all organisation's employees to report any differences via their organisation's internal occurrence reporting mechanisms.
- 2 All procedures, and changes to those procedures, should be verified and validated before use where practicable.

- 3 All technical procedures should be designed and presented in accordance with good human factors principles.

AMC 145.65(b)(2)**Safety and quality policy, maintenance procedures and quality system****See HKAR 145.65(b)(2)**

Specialised services include any specialised activity, such as, but not limited to Non-Destructive Testing requiring particular skills and/or qualification. HKAR 145.30(f) covers the qualification of personnel but, in addition, there is a need to establish maintenance procedures that cover the control of any specialised process.

AMC 145.65(c)(1)**Safety and quality policy, maintenance procedures and quality system****See HKAR 145.65(c)(1)**

- 1 The primary objectives of the quality system are to enable the HKAR-145 approved maintenance organisation to ensure that it can deliver a safe product and that organisation remains in compliance with the requirements.
- 2 An essential element of the quality system is the independent audit.
- 3 The independent audit is an objective process of routine sample checks of all aspects of the HKAR-145 approved maintenance organisation's ability to carry out all maintenance to the required standards and includes some product sampling as this is the end result of the maintenance process. It represents an objective overview of the complete maintenance related activities and is intended to complement the HKAR 145.50(a) requirement for certifying staff to be satisfied that all required maintenance has been properly carried out before issue of the Certificate of Release to Service. Independent audits should include a percentage of random audits carried out on a sample basis when maintenance is being carried out. This means some audits during the night for those organisations that work at night.
- 4 Except as specified in paragraphs 7 and 9, the independent audit should ensure that all aspects of HKAR-145 compliance are checked every 12 months and may be carried out as a complete single exercise or subdivided over the 12 month period in accordance with a scheduled plan. The independent audit does not require each procedure to be checked against each product line when it can be shown that the particular procedure is common to more than one product line and the procedure has been checked every 12 months without resultant findings. Where findings have been identified, the particular procedure should be rechecked against other product lines until the findings have been rectified after which the independent audit procedure may revert back to 12 monthly for the particular procedure.

- 5 Except as specified otherwise in paragraph 7, the independent audit should sample check one product on each product line every 12 months as a demonstration of the effectiveness of maintenance procedures compliance. It is recommended that procedures and product audits be combined by selecting a specific product example, such as an aircraft or engine or instrument and sample checking all the procedures and requirements associated with the specific product example to ensure that the end result should be an airworthy product.

For the purpose of the independent audit a product line includes any product under an Section 4 Appendix 2 approval class rating as specified in the HKAR-145 approval schedule issued to the particular organisation.

It therefore follows for example that a HKAR-145 approved maintenance organisation with a capability to maintain aircraft, repair engines, brakes and autopilots would need to carry out four complete audit sample checks each year except as specified otherwise in paragraphs 5, 7 or 9. GM 145.65(c)(1) contains some examples of audit subjects and plans.

- 6 The sample check of a product means to witness any relevant testing and visually inspect the product and associated documentation. The sample check should not involve repeat disassembly or testing unless the sample check identifies findings requiring such action.
- 7 Except as specified otherwise in paragraph 9, where the smallest HKAR-145 approved maintenance organisation, that is an organisation with a maximum of 10 personnel actively engaged in maintenance, chooses to contract the independent audit element of the quality system in accordance with HKAR 145.65(c)(1) it is conditional on the audit being carried out twice in every 12 month period.
- 8 Except as specified otherwise in paragraph 9, where the HKAR-145 approved maintenance organisation has line stations listed as per HKAR 145.75(d) the quality system should describe how these are integrated into the system and include a plan to audit each listed line station at a frequency consistent with the extent of flight activity at the particular line station. Except as specified otherwise in paragraph 9 the maximum period between audits of a particular line station should not exceed 24 months.
- 9 Except as specified otherwise in paragraph 5, the Director-General may agree to increase any of the audit time periods specified in this AMC 145.65(c)(1) by up to 100% provided that there are no safety related findings and subject to being satisfied that the HKAR-145 approved maintenance organisation has a good record of rectifying findings in a timely manner.
- 10 A report should be raised each time an audit is carried out describing what was checked and the resulting findings against applicable requirements, procedures and products.
- 11 The independence of the audit should be established by always ensuring that audits are carried out by personnel not responsible for the function, procedure or products being checked. It therefore follows that a large HKAR-145 approved maintenance

organisation, being an organisation with more than about 500 maintenance staff should have a dedicated quality audit group whose sole function is to conduct audits, raise finding reports and follow up to check that findings are being rectified. For the medium sized HKAR-145 approved maintenance organisation, being an organisation with less than about 500 maintenance staff, it is acceptable to use competent personnel from one section/department not responsible for the production function, procedure or product to audit the section/department that is responsible subject to the overall planning and implementation being under the control of the quality manager. HKAR-145 approved maintenance organisations with a maximum of 10 maintenance staff actively engaged in carrying out maintenance may contract the independent audit element of the quality system to another HKAR-145 approved maintenance organisation or a qualified and competent person acceptable to the Director-General.

AMC 145.65(c)(2)

Safety and quality policy, maintenance procedures and quality system

See HKAR 145.65(c)(2)

- 1 An essential element of the quality system is the quality feedback system.
- 2 The quality feedback system may not be contracted to outside persons. The principal function of the quality feedback system is to ensure that all findings resulting from the independent quality audits of the organisation are properly investigated and corrected in a timely manner and to enable the accountable manager to be kept informed of any safety issues and the extent of compliance with HKAR-145.
- 3 The independent quality audit reports referenced in AMC 145.65(c)(1) paragraph 10 should be sent to the relevant department(s) for rectification action giving target rectification dates. Rectification dates should be discussed with such department(s) before the quality department or nominated quality auditor confirms such dates in the report. The relevant department(s) are required by HKAR 145.65(c)(2) to rectify findings and inform the quality department or nominated quality auditor of such rectification.
- 4 The accountable manager should hold regular meetings with staff to check progress on rectification except that in the large organisations such meetings may be delegated on a day to day basis to the quality manager subject to the accountable manager meeting at least twice per year with the senior staff involved to review the overall performance and receiving at least a half yearly summary report on findings of non-compliance.
- 5 All records pertaining to the independent quality audit and the quality feedback system should be retained for at least two years after the date of clearance of the finding to which they refer or for such periods as to support changes to the AMC 145.65(c)(1) paragraph 9 audit time periods, whichever is the longer.

AMC 145.70(a)**Maintenance organisation exposition****See HKAR 145.70(a)**

The following information should be included in the maintenance organisation exposition:

The information specified in HKAR 145.70(a) sub-paragraphs (6) and (12) to (16) inclusive, whilst a part of the maintenance organisation exposition, may be kept as separate documents or on separate electronic data files subject to the management part of said maintenance organisation exposition containing a clear cross reference to such documents or electronic data files.

The maintenance organisation exposition should contain the information, as applicable, specified in this AMC. The information, may be presented in any subject order so long as all applicable subjects are covered. Where a HKAR-145 approved maintenance organisation uses a different format, for example, to allow the maintenance organisation exposition to serve for more than one approval, then the maintenance organisation exposition should contain a cross reference Annex using this list as an index with an explanation as to where in the maintenance organisation exposition the subject matter can be found.

The exposition should contain information, as applicable, on how the maintenance organisation complies with Critical Design Configuration Control Limitations (CDCCL) instructions.

Small HKAR-145 approved maintenance organisations may combine the various items to form a simple maintenance organisation exposition more relevant to their needs.

The operator may use electronic data processing (EDP) for publication of the maintenance organisation exposition. The maintenance organisation exposition should be made available to the CAD in a form acceptable to the Director-General. Attention should be paid to the compatibility of EDP publication systems with the necessary dissemination of the maintenance organisation exposition, both internally and externally.

PART 0**GENERAL ORGANISATION**

This section is reserved for those HKAR-145 approved maintenance organisations who are also holders of Hong Kong Air Operator's Certificate.

PART 1**MANAGEMENT**

- 1.1 Corporate commitment by the accountable manager
- 1.2 Safety and quality policy
- 1.3 Management personnel
- 1.4 Duties and responsibilities of the management personnel
- 1.5 Management organisation chart
- 1.6 List of certifying staff and support staff

- 1.7 Manpower resources
- 1.8 General description of the facilities at each address intended to be approved
- 1.9 Organisations intended scope of work
- 1.10 Notification procedure to the Director-General regarding changes to the organisation's activities/approval/location/personnel
- 1.11 Exposition amendment procedures including, if applicable, delegated procedures

PART 2 MAINTENANCE PROCEDURES

- 2.1 Supplier evaluation and sub-contract control procedure
- 2.2 Acceptance/inspection of aircraft components and material from outside contractors
- 2.3 Storage, tagging and release of aircraft components and material to aircraft maintenance
- 2.4 Acceptance of tools and equipment
- 2.5 Calibration of tools and equipment
- 2.6 Use of tooling and equipment by staff (including alternate tools)
- 2.7 Cleanliness standards of maintenance facilities
- 2.8 Maintenance instructions and relationship to aircraft / aircraft component manufacturers' instructions including updating and availability to staff
- 2.9 Repair procedure
- 2.10 Aircraft maintenance programme compliance
- 2.11 Airworthiness Directives procedure
- 2.12 Optional modification procedure
- 2.13 Maintenance documentation in use and completion of same
- 2.14 Technical record control
- 2.15 Rectification of defects arising during base maintenance
- 2.16 Release to service procedure
- 2.17 Records for the operator
- 2.18 Reporting of defects to the Director-General / operator / manufacturer
- 2.19 Return of defective aircraft components to store
- 2.20 Defective components to outside contractors
- 2.21 Control of computer maintenance record systems
- 2.22 Control of manhour planning versus scheduled maintenance work
- 2.23 Critical maintenance tasks and error-capturing methods
- 2.24 Reference to specific maintenance procedures such as:
 - Engine running procedures

- Aircraft pressure run procedures
- Aircraft towing procedures
- Aircraft taxiing procedures
- 2.25 Procedures to detect and rectify maintenance errors
- 2.26 Shift/task handover procedures
- 2.27 Procedures for notification of maintenance data inaccuracies and ambiguities, to the type certificate holder
- 2.28 Production planning procedures

PART L2 ADDITIONAL LINE MAINTENANCE PROCEDURES

- L2.1 Line maintenance control of aircraft components, tools, equipment etc
- L2.2 Line maintenance procedures related to servicing/fuelling/de-icing including inspection for/removal of de-icing/anti-icing residues, etc.
- L2.3 Line maintenance control of defects and repetitive defects
- L2.4 Line procedure for completion of technical log
- L2.5 Line procedure for pooled parts and loan parts
- L2.6 Line procedure for return of defective parts removed from aircraft
- L2.7 Line procedure for critical maintenance tasks and error-capturing methods

PART 3 QUALITY SYSTEM PROCEDURES

- 3.1 Quality audit of organisation procedures
- 3.2 Quality audit of aircraft/aircraft components
- 3.3 Quality audit remedial action procedure
- 3.4 Certifying staff and support staff qualification and training procedures
- 3.5 Certifying staff and support staff records
- 3.6 Quality audit personnel
- 3.7 Qualifying inspectors
- 3.8 Qualifying mechanics
- 3.9 Aircraft or aircraft component maintenance tasks exemption process control
- 3.10 Concession control for deviation from organisation's procedures
- 3.11 Qualification procedure for specialised activities such as NDT welding etc
- 3.12 Control of manufacturers' and other maintenance working teams
- 3.13 Human factors training procedure
- 3.14 Competence assessment of personnel
- 3.15 Training procedures for on-the-job training as per paragraph 6 of Section 4 Appendix

III to HKAR-66

PART 4

- 4.1 Contracted operators
- 4.2 Operator procedures and paperwork
- 4.3 Operator record completion

PART 5

- 5.1 Sample of documents
- 5.2 List of Sub-contractors as per HKAR 145.75(b)
- 5.3 List of line maintenance locations as per HKAR 145.75(d)
- 5.4 List of contracted organisations as per HKAR 145.70(a)(16)

PART 6 OPERATORS MAINTENANCE PROCEDURES

This section is reserved for those HKAR-145 approved maintenance organisations who are also operators. The details of such procedures can be found in Appendix A to Chapter 7, Part Two of the CAD 360 Air Operators' Certificates Requirements Document.

PART 7 RESERVED**PART 8 TRANSPORT CANADA, CIVIL AVIATION (TCCA)
SUPPLEMENTARY PROCEDURES FOR A HKAR-145 APPROVED
MAINTENANCE ORGANISATION**

This section is reserved for those HKAR-145 approved maintenance organisations who are also recognised organisations under the Technical Arrangement on Aircraft Maintenance between the Civil Aviation Department, Hong Kong and the Transport Canada Civil Aviation Directorate.

**PART 9 CIVIL AVIATION AUTHORITY OF SINGAPORE (CAAS)
SUPPLEMENTARY PROCEDURES FOR A HKAR-145 APPROVED
MAINTENANCE ORGANISATION**

This section is reserved for those HKAR-145 approved maintenance organisations who are also recognised organisations under the Technical Arrangement on Aviation Maintenance between the Civil Aviation Department, Hong Kong and the Civil Aviation Authority of Singapore.

AMC 145.75(b)**Privileges of the HKAR-145 approved maintenance organisation****See HKAR 145.75(b)**

- 1 Working under the quality system of a HKAR-145 approved maintenance organisation (sub-contracting) refers to the case of one organisation, not itself appropriately approved to HKAR-145 that carries out aircraft line maintenance or minor engine maintenance or maintenance of other aircraft components or a specialised service as a sub-contractor for a HKAR-145 approved maintenance organisation. To be appropriately approved to sub-contract, the HKAR-145 approved maintenance organisation should have a procedure for the control of such sub-contractors as described below. Any HKAR-145 approved maintenance organisation that carries out maintenance for another HKAR-145 approved maintenance organisation within its own approval scope is not considered to be sub-contracting for the purpose of this paragraph.
- 2 Maintenance of engines or engine modules other than a complete workshop maintenance check or overhaul is intended to mean any maintenance that can be carried out without disassembly of the core engine or, in the case of modular engines, without disassembly of any core module.
- 3 **FUNDAMENTALS OF SUB-CONTRACTING UNDER HKAR-145**
 - 3.1 The fundamental reasons for allowing a HKAR-145 approved maintenance organisation to sub-contract certain maintenance tasks are:
 - (a) To permit the acceptance of specialised maintenance services, such as, but not limited to, plating, heat treatment, plasma spray, fabrication of specified parts for minor repairs / modifications, etc., without the need for direct approval by the Director-General in such cases.
 - (b) To permit the acceptance of aircraft maintenance up to but not including a base maintenance check as specified in HKAR 145.75(b) by organisations not appropriately approved under HKAR-145 when it is unrealistic to expect direct approval by the Director-General. The Director-General will determine when it is unrealistic but in general it is considered unrealistic if only one or two organisations intend to use the sub-contract organisation.
 - (c) To permit the acceptance of aircraft component maintenance.
 - (d) To permit the acceptance of engine maintenance up to but not including a workshop maintenance check or overhaul of an engine or engine module as specified in HKAR 145.75(b) by organisations not appropriately approved under HKAR-145 when it is unrealistic to expect direct approval by the Director-General. The determination of unrealistic is as per sub-paragraph (b).

- 3.2 When maintenance is carried out under the sub-contract control system it means that for the duration of such maintenance, the HKAR-145 approval has been temporarily extended to include the sub-contractor. It therefore follows that those parts of the sub-contractor's facilities, personnel and procedures involved with the maintenance organisation's products undergoing maintenance should meet HKAR-145 requirements for the duration of that maintenance and it remains the responsibility of the HKAR-145 approved maintenance organisation to ensure such requirements are satisfied.
- 3.3 For the criteria specified in sub-paragraph 3.1 the HKAR-145 approved maintenance organisation is not required to have complete facilities for maintenance that it needs to sub-contract but it should have its own expertise to determine that the sub-contractor meets the necessary standards. However a maintenance organisation cannot be approved under HKAR-145 unless it has the in-house facilities, procedures and expertise to carry out the majority of maintenance for which it wishes to be approved in terms of the number of class ratings.
- 3.4 The HKAR-145 approved maintenance organisation may find it necessary to include several specialist sub-contractors to enable it to be approved to completely certify the release to service of a particular product. Examples could be specialist welding, electro-plating, painting etc. To authorise the use of such sub-contractors, the Director-General will need to be satisfied that the HKAR-145 approved maintenance organisation has the necessary expertise and procedures to control such sub-contractors.
- 3.5 A HKAR-145 approved maintenance organisation working outside the scope of its approval schedule is deemed to be not approved. Such an organisation may in this circumstance operate only under the sub-contract control of another HKAR-145 approved maintenance organisation.
- 3.6 Authorisation to sub-contract is indicated by the Director-General accepting the maintenance organisation exposition containing a specific procedure on the control of sub-contractors.
- 4 **PRINCIPAL HKAR-145 PROCEDURES FOR THE CONTROL OF SUB-CONTRACTORS NOT APPROVED UNDER HKAR-145**
- 4.1 A pre audit procedure should be established whereby the HKAR-145 approved maintenance organisation's subcontract control section, which may also be the HKAR 145.65(c) quality system independent audit section, should audit a prospective sub-contractor to determine whether those services of the sub-contractor that it wishes to use meets the intent of HKAR-145.
- 4.2 The HKAR-145 approved maintenance organisation needs to assess to what extent it will use the sub-contractor's facilities. As a general rule the HKAR-145 approved maintenance organisation should require its own paperwork, approved data and material / spare parts to be used, but it could permit the use

of tools, equipment and personnel from the sub-contractor as long as such tools, equipment and personnel meet the requirement of HKAR-145. In the case of sub-contractors who provide specialised services it may for practical reasons be necessary to use their specialised services personnel, approved data and material subject to acceptance by the HKAR-145 approved maintenance organisation.

- 4.3 Unless the sub-contracted maintenance work can be fully inspected on receipt by the HKAR-145 approved maintenance organisation it will be necessary for such HKAR-145 approved maintenance organisation to supervise the inspection and release from the sub-contractor. Such activities should be fully described in the organisation procedure. The HKAR-145 approved maintenance organisation will need to consider whether to use its own staff or authorise the sub-contractor's staff.
- 4.4 The certificate of release to service may be issued either at the sub-contractor or at the organisation facility by staff issued a certification authorisation in accordance with HKAR 145.30 as appropriate, by the HKAR-145 approved maintenance organisation. Such staff would normally come from the HKAR-145 approved maintenance organisation but may otherwise be a person from the sub-contractor who meets the HKAR-145 approved maintenance organisation certifying staff standard which itself is approved by the Director-General via the maintenance organisation exposition. The certificate of release to service and the CAD Form One will always be issued under the HKAR-145 approved maintenance organisation approval reference.
- 4.5 The sub-contract control procedure will need to record audits of the sub-contractor, to have a corrective action follow up plan and to know when sub-contractors are being used. The procedure should include a clear revocation process for sub-contractors who do not meet the HKAR-145 approved maintenance organisation's requirements.
- 4.6 The quality audit staff of the HKAR-145 approved maintenance organisation will need to audit the sub-contract control section and sample audit sub-contractors unless this task is already carried out by the quality audit staff as stated in sub-paragraph 4.1.
- 4.7 The contract between the HKAR-145 approved maintenance organisation and the sub-contractor should contain a provision for the Director-General to have right of access to the sub-contractor.

AMC 145.80**Limitations on the HKAR-145 approved maintenance organisation****See HKAR 145.80**

This paragraph is intended to cover the situation where the larger HKAR-145 approved maintenance organisation may temporarily not hold all the necessary tools, equipment etc., for an aircraft type or variant specified in the organisation's approval. This paragraph means that the Director-General need not amend the approval to delete the aircraft type or variants on the basis that it is a temporary situation and there is a commitment from the organisation to re-acquire tools, equipment etc. before maintenance on the type may recommence.

AMC 145.85**Changes to the HKAR-145 approved maintenance organisation****See HKAR 145.85**

The primary purpose of this paragraph is to enable the HKAR-145 approved maintenance organisation to remain approved if agreed by the Director-General during negotiations about any of the specified changes. Without this paragraph the approval would automatically be suspended in all cases.

SECTION 3 - GUIDANCE MATERIAL (GM)1 *GENERAL*

- 1.1 This Section contains Guidance Material that has been agreed by the Director-General for inclusion in HKAR-145.
- 1.2 Where a particular HKAR paragraph does not have a Guidance Material, it is considered that no supplementary material is required.

2 *PRESENTATION*

- 2.1 Each page being identified by the date of issue and Issue/Revision number under which it is amended or re-issued.
- 2.2 A numbering system has been used in which the Guidance Material uses the same number as the HKAR paragraph to which it refers. The number is introduced by the letters GM to distinguish the material from the HKAR itself.
- 2.3 For this purpose the GM is defined as follows:

Guidance Material (GM) helps to illustrate the meaning of a requirement.
- 2.4 Explanatory Notes not forming part of the GM text appear in a smaller typeface.
- 2.5 New, amended or corrected text is indicated by a marginal line.

GM 145.1**General****See HKAR 145.1**

- 1 A HKAR-145 approved maintenance organisation may also carry out maintenance on any aircraft and/or aircraft component used for any purpose other than commercial air transport within the limitations of the particular approval.
- 2 A HKAR-145 approved maintenance organisation may be approved to maintain aircraft/aircraft components not type certificated by the Director-General.

GM 145.10**Scope and applicability****See HKAR 145.10**

This Guidance Material provides guidance on how the smallest HKAR-145 approved maintenance organisations satisfy the intent of HKAR-145:

- 1 By inference, the smallest HKAR-145 approved maintenance organisation would only be involved with a limited number of light aircraft, or aircraft components, used for commercial air transport. It is therefore a matter of scale, light aircraft do not demand the same level of resources, facilities or complex maintenance procedures as the large organisation.
- 2 It is recognised that a HKAR-145 approval may be required by two quite different types of small HKAR-145 approved maintenance organisations, the first being the light aircraft maintenance hangar, the second being the aircraft component maintenance workshop, e.g. small piston engines, radio equipment etc.
- 3 Where only one person is employed (in fact having the certifying function and others), this HKAR-145 approved maintenance organisation may use the alternatives provided in sub-paragraph 3.1 limited to the following:

Class A2	Base and Line maintenance of aeroplanes of 5700 kg and below (piston engines only)
Class A3	Base and Line maintenance of single engined helicopters of less than 3175 kg.
Class A4	Aircraft other than A1, A2 and A3
Class B2	Piston engines with maximum output of less than 450 HP
Class C	Components
Class D1	Non Destructive Testing

Note: The following paragraphs only include the relevant paragraphs of HKAR-145 for which the alternative applies. When paragraphs of HKAR-145 not listed means full compliance needs to be demonstrated.

3.1 HKAR 145.30(b): The minimum requirement is for one full time person who meets the HKAR-66 requirements for certifying staff and holds the position of "accountable manager, maintenance engineer and is also certifying staff". No other person may issue a certificate of release to service and therefore if absent, no maintenance may be released during such absence.

- (a) The quality monitoring function of HKAR 145.65(c) may be contracted to an appropriate HKAR-145 approved maintenance organisation or to a person with appropriate technical knowledge and extensive experience of quality audits employed on a part time basis, with the agreement of the Director-General.

Note: Full time for the purpose of HKAR-145 means not less than 35 hrs per week except during vacation periods.

- (b) HKAR 145.35: In the case of a HKAR-145 approval based on one person using a sub-contracted quality monitoring arrangement, the requirement for a record of certifying staff is satisfied by the submission to and acceptance by the Director-General of the CAD Form Four. With only one person the requirement for a separate record of authorisation is unnecessary because the CAD Form Three approval schedule defines the authorisation. An appropriate statement, to reflect this situation, should be included in the maintenance organisation exposition.

- (c) HKAR 145.65(c): It is the responsibility of the contracted quality monitoring organisation or person to make a minimum of two visits per 12 months and it is the responsibility of this organisation or person to carry out such monitoring on the basis of one visit pre-announced and one visit unannounced to the HKAR-145 approved maintenance organisation.

It is the responsibility of the HKAR-145 approved maintenance organisation to comply with the findings of the contracted quality monitoring organisation or the person.

CAUTION: It should be understood that if the contracted organisation or the above-mentioned person loses or gives up its approval, then the HKAR-145 approved maintenance organisation's approval will be suspended.

4 Recommended operating procedure for a HKAR-145 approved maintenance organisation based upon up to 10 persons involved in maintenance.

4.1 HKAR 145.30(b): The normal minimum requirement is for the employment on a full-time basis of two persons who meet the HKAR-145 requirements for certifying staff, whereby one holds the position of "maintenance engineer" and the other holds the position of "quality audit engineer".

Either person can assume the responsibilities of the accountable manager providing that they can comply in full with the applicable elements of HKAR 145.30(a), but the "maintenance engineer" should be the certifying person to retain the independence of the "quality audit engineer" to carry out audits. Nothing prevents either engineer from undertaking maintenance tasks providing that the "maintenance engineer" issues the certificate of release to service.

The "quality audit engineer" should have similar qualifications and status to the "maintenance engineer" for reasons of credibility, unless he/she has a proven track record in aircraft quality assurance, in which case some reduction in the extent of maintenance qualifications may be permitted.

In cases where the Director-General agrees that it is not practical for the HKAR-145 approved maintenance organisation to nominate a post-holder for the quality monitoring function, this function may be contracted in accordance to paragraph 3.1.a.

GM 145.30(a)

Personnel requirements

To demonstrate a basic understanding of HKAR-145 requirements, the accountable manager may complete a HKAR-145 Training Course.

GM 145.30(b)

Personnel requirements

See AMC 145.30(b)

Quality manager should complete the Hong Kong Airworthiness Course[^] whilst other nominated person(s) may complete a HKAR-145 Training Course.

[^]: For organisations located outside Hong Kong, equivalent course may be acceptable to the Director-General.

GM 145.30(e)

Personnel requirements

See AMC 145.30(e)

1 Training syllabus for initial human factors training

The training syllabus below identifies the topics and subtopics to be addressed during the human factors training.

The HKAR-145 approved maintenance organisation may combine, divide, change the order of any subject of the syllabus to suit its own needs, so long as all subjects are covered to a level

of detail appropriate to the organisation and its personnel.

Some of the topics may be covered in separate training (health and safety, management, supervisory skills, etc.) in which case duplication of training is not necessary.

Where possible practical illustrations and examples should be used, especially accident and incident reports.

Topics should be related to existing Hong Kong aviation legislation and requirements, where relevant. Topics should be related to existing guidance/advisory material, where relevant (e.g. ICAO Human Factors Digests and Training Manual).

Topics should be related to maintenance engineering where possible; too much unrelated theory should be avoided.

- 1 General / Introduction to Human Factors
 - 1.1 Need to address human factors
 - 1.2 Statistics
 - 1.3 Incidents

- 2 Safety Culture / Organisational Factors

- 3 Human Error
 - 3.1 Error models and theories
 - 3.2 Types of errors in maintenance tasks
 - 3.3 Violations
 - 3.4 Implications of errors
 - 3.5 Avoiding and managing errors
 - 3.6 Human reliability

- 4 Human Performance & Limitations
 - 4.1 Vision
 - 4.2 Hearing
 - 4.3 Information processing
 - 4.4 Attention and perception
 - 4.5 Situational awareness
 - 4.6 Memory
 - 4.7 Claustrophobia and physical access
 - 4.8 Motivation
 - 4.9 Fitness/health
 - 4.10 Stress
 - 4.11 Workload management
 - 4.12 Fatigue
 - 4.13 Alcohol, medication, drugs
 - 4.14 Physical work
 - 4.15 Repetitive tasks / complacency

- 5 Environment

- 5.1 Peer pressure
- 5.2 Stressors
- 5.3 Time pressure and deadlines
- 5.4 Workload
- 5.5 Shift work
- 5.6 Noise and fumes
- 5.7 Illumination
- 5.8 Climate and temperature
- 5.9 Motion and vibration
- 5.10 Complex systems
- 5.11 Hazards in the workplace
- 5.12 Lack of manpower
- 5.13 Distractions and interruptions

- 6 Procedures, Information, Tools and Practices
 - 6.1 Visual inspection
 - 6.2 Work logging and recording
 - 6.3 Procedure – practice / mismatch / norms
 - 6.4 Technical documentation – access and quality
 - 6.5 Critical maintenance tasks and error-capturing methods (independent inspection, re-inspection, etc.)

- 7 Communication
 - 7.1 Shift / Task handover
 - 7.2 Dissemination of information
 - 7.3 Cultural differences

- 8 Teamwork
 - 8.1 Responsibility
 - 8.2 Management, supervision and leadership
 - 8.3 Decision making

- 9 Professionalism and Integrity
 - 9.1 Keeping up to date; currency
 - 9.2 Error provoking behaviour
 - 9.3 Assertiveness

- 10 Organisation's HF Program
 - 10.1 Reporting errors
 - 10.2 Disciplinary policy
 - 10.3 Error investigation
 - 10.4 Action to address problems
 - 10.5 Feedback

- 2 Competence assessment procedure

The organisation should develop a procedure describing the process of competence assessment of personnel. The procedure should specify:

- persons responsible for this process,
- when the assessment should take place,
- credits from previous assessments,
- validation of qualification records,
- means and methods for the initial assessment,
- means and methods for the continuous control of competence including feedback on personnel performance,
- competences to be observed during the assessment in relation with each job function,
- actions to be taken when assessment is not satisfactory,
- recording of assessment results.

For example, according to the job functions and the scope, size and complexity of the organisation, the assessment may consider the following (the table is not exhaustive):

	Managers	Planners	Supervisor	Certifying staff and support staff	Mechanics	Specialised service staff	Quality audit staff
Knowledge of applicable officially recognised standards						X	X
Knowledge of auditing techniques: planning, conducting and reporting							X
Knowledge of human factors, human performance and limitations	X	X	X	X	X	X	X
Knowledge of logistics processes	X	X	X				
Knowledge of organisation capabilities, privileges and limitations	X	X	X	X		X	X
Knowledge of CAD 360 Part Two, HKAR-145 and any other relevant regulations	X	X	X	X			X
Knowledge of relevant parts of the maintenance organisation exposition and procedures	X	X	X	X	X	X	X
Knowledge of occurrence reporting system and understanding of the importance of reporting occurrences, incorrect maintenance data and existing or potential defects		X	X	X	X	X	
Knowledge of safety risks linked to the working environment	X	X	X	X	X	X	X
Knowledge on CDCCL when relevant	X	X	X	X	X	X	X
Knowledge on EWIS when relevant	X	X	X	X	X	X	X

	Managers	Planners	Supervisor	Certifying staff and support staff	Mechanics	Specialised service staff	Quality audit staff
Understanding of professional integrity, behaviour and attitude towards safety	X	X	X	X	X	X	X
Understanding of conditions for ensuring continuing airworthiness of aircraft and aircraft components				X			X
Understanding of his/her own human performance and limitations	X	X	X	X	X	X	X
Understanding of personnel authorisations and limitations	X	X	X	X	X	X	X
Understanding critical maintenance task		X	X	X	X		X
Ability to compile and control completed work cards		X	X	X			
Ability to consider human performance and limitations	X	X	X	X			X
Ability to determine required qualifications for task performance		X	X	X			
Ability to identify and rectify existing and potential unsafe conditions			X	X	X	X	X
Ability to manage third parties involved in maintenance activity		X	X				
Ability to confirm proper accomplishment of maintenance tasks			X	X	X	X	
Ability to identify and properly plan performance of critical maintenance task		X	X	X			
Ability to prioritise tasks and report discrepancies		X	X	X	X		
Ability to process the work requested by the operator		X	X	X			
Ability to promote the safety and quality policy	X		X				
Ability to properly process removed, uninstalled and rejected parts			X	X	X	X	
Ability to properly record and sign for work accomplished			X	X	X	X	
Ability to recognise the acceptability of parts to be installed prior to fitment				X	X		
Ability to split complex maintenance tasks into clear stages		X					
Ability to understand work orders, work cards and refer to and use applicable		X	X	X	X	X	X

	Managers	Planners	Supervisor	Certifying staff and support staff	Mechanics	Specialised service staff	Quality audit staff
maintenance data							
Ability to use information systems	X	X	X	X	X	X	X
Ability to use, control and be familiar with required tooling and/or equipment			X	X	X	X	
Adequate communication and literacy skills	X	X	X	X	X	X	X
Analytical and proven auditing skills (for example, objectivity, fairness, open-mindedness, determination, ...)							X
Maintenance error investigation skills							X
Resources management and production planning skills	X	X	X				
Teamwork, decision-making and leadership skills	X		X				

3 Template for recording experience/training

The following template may be used to record the professional experience gained in an organisation and the training received and be considered during the competence assessment of the individual in another organisation.

Aviation Maintenance personnel experience credential		
Name		Given name
Address		
Telephone		E-mail
Independent worker <input type="checkbox"/>		
Trade Group: airframe <input type="checkbox"/> engine <input type="checkbox"/> electric <input type="checkbox"/> avionics <input type="checkbox"/> other (specify) <input type="checkbox"/>		
Employer's details (when applicable)		
Name		
Address		
Telephone		
Maintenance organisation details		
Name		
Address		
Telephone		
Approval Number		
Period of employment		To:
From:		
Domain of employment		
<input type="checkbox"/> Planning	<input type="checkbox"/> Engineering	<input type="checkbox"/> Technical records
<input type="checkbox"/> Store department	<input type="checkbox"/> Purchasing	
Mechanics/Technician		
<input type="checkbox"/> Line Maintenance	<input type="checkbox"/> Base Maintenance	<input type="checkbox"/> Component Maintenance
<input type="checkbox"/> Servicing	<input type="checkbox"/> Removal/installation	<input type="checkbox"/> Testing / inspection
<input type="checkbox"/> Scheduled Maintenance	<input type="checkbox"/> Inspection	<input type="checkbox"/> Repair
<input type="checkbox"/> Trouble-shooting	<input type="checkbox"/> Trouble-shooting	<input type="checkbox"/> Overhaul
	<input type="checkbox"/> Repair	<input type="checkbox"/> Re-treatment
		<input type="checkbox"/> Reassembly
A/C type	A/C type	Component type
Certifying staff and support staff		
<input type="checkbox"/> Cat.	<input type="checkbox"/> Cat.	<input type="checkbox"/> Cat. <input type="checkbox"/> Cat. C <input type="checkbox"/> Component <input type="checkbox"/> Other (e.g.

A A/C Type	B1 A/C Type	B2/B2* A/C Type	A/C Type	Type Component Type	NDT) Specify
Certification Privileges: Yes <input type="checkbox"/> / No <input type="checkbox"/>					
<input type="checkbox"/> Specialised Services Speciality (NDT, composites, welding, etc.):					
<input type="checkbox"/> Skilled personnel Speciality (sheet metal, structure, wireman, upholstery, etc.):					
<input type="checkbox"/> Ground equipment operation					
<input type="checkbox"/> Quality control <input type="checkbox"/> Quality assurance <input type="checkbox"/> Training					
Total number of check boxes ticked:					<input style="width: 100%;" type="text"/>
Details of employment					
Training received from contracting organisation					
Date		Nature of training			
Certified by: Name: _____ Date: _____ Position: _____ Signature: _____ Contact details: _____					
Advisory note: A copy of the present credential will be kept for at least 3 years from its issuance by the maintenance organisation					

GM 145.30(j)(4)

Personnel requirements (Flight crew)

See HKAR 145.30(j)(4)

- 1 For the holder of an ATPL or CPL issued in accordance with AN(HK)O, the theoretical knowledge and examination subjects are detailed in the CAD 54 and include the following subjects:

- Air law
 - Airframe/systems/powerplant
 - Instruments/electronics
 - Mass and balance
 - Performance
 - Flight planning and monitoring
 - Human performance and limitations
 - Meteorology
 - General navigation
 - Radio Navigation
 - Operational Procedures
 - Principles of Flight
 - VFR Communications
 - IFR Communications
- 2 Familiarisation with basic maintenance procedures, to give additional technical background knowledge, especially with respect to the implication of systems malfunctions, and to train the applicant in maintenance related to the Minimum Equipment List (MEL).

The theoretical knowledge instruction consists of 100 hours and includes the following elements:

- (a) Airframe and systems
- (b) Electrics
- (c) Powerplant and emergency equipment
- (d) Flight instruments and automatic flight control systems

Practical skills training provided by an organisation approved under HKAR-145 is given which includes 35 hours practical experience in the following subjects:

- (a) Fuselage and flight controls,
- (b) Engines,
- (c) Instruments,
- (d) Landing gear and brakes,
- (e) Cabin/cockpit/emergency equipment,
- (f) De-icing/anti-icing related maintenance activities,
- (g) Ground handling and servicing,
- (h) Certificate of completion.

Following successful completion of the technical training, the training organisation carrying out the theoretical knowledge instruction and/or the practical skill training should provide the applicant with a certificate of satisfactory completion of the course, or part thereof.

GM 145.42(b)(1)**Acceptance of aircraft components****See AMC 145.42(b)(1)****1 Incoming physical inspection**

- 1.1 To ensure that components, standard parts and materials are in satisfactory condition, the HKAR-145 approved maintenance organisation should perform incoming physical inspections.
- 1.2 The incoming physical inspection should be performed before the component is installed on the aircraft.
- 1.3 The following list, although not exhaustive, contains typical checks to be performed:
 - (a) verify the general condition of the components and their packaging in relation to damages that could affect their integrity;
 - (b) verify that the shelf life of the component has not expired;
 - (c) verify that items are received in the appropriate package in respect of the type of the component: e.g. correct ATA 300 or electrostatic sensitive devices packaging, when necessary; and
 - (d) verify that the aircraft component has all plugs and caps appropriately installed to prevent damage or internal contamination. Care should be taken when tape is used to cover electrical connections or fluid fittings/openings because adhesive residues can insulate electrical connections and contaminate hydraulic or fuel units.
- 1.4 Items (fasteners, etc.) purchased in batches should be supplied in a package. The packaging should state the applicable specification/standard, part number, batch number, and the quantity of the items. The documentation that accompanies the material should contain the applicable specification/standard, part number, batch number, supplied quantity, and the manufacturing sources. If the material is acquired from different batches, acceptance documentation for each batch should be provided.

2 Examples of Supplier

A supplier could be any source that provides components, standard parts or materials to be used for maintenance. Possible sources could be: HKAR-145 approved maintenance organisations, HKAR-21 Subpart G approved production organisations, operators, stockist, distributors, brokers, aircraft owners/lessees, etc.

3 Supplier evaluation

- 3.1 The following elements should be considered for the initial and recurrent evaluation of a supplier's quality system to ensure that the component and/or

material is supplied in satisfactory condition:

- (a) availability of appropriate up-to-date regulations, specifications (such as component handling/storage data) and standards;
- (b) standards and procedures for the training of personnel and competency assessment;
- (c) procedures for shelf-life control;
- (d) procedures for handling of electrostatic sensitive devices;
- (e) procedures for identifying the source from which components and materials were received;
- (f) purchasing procedures that identify documentation to accompany components and materials for subsequent use by HKAR-145 approved maintenance organisations;
- (g) procedures for incoming inspection of components and materials;
- (h) procedures for control of measuring equipment that provide for appropriate storage, usage, and for calibration when such equipment is required;
- (i) procedures to ensure appropriate storage conditions for components and materials that are adequate to protect the components and materials from damage and/or deterioration. Such procedures should comply with the manufacturers' recommendations and relevant standards;
- (j) procedures for adequate packing and shipping of components and materials to protect them from damage and deterioration, including procedures for proper shipping of dangerous goods (e.g. ICAO and ATA specifications);
- (k) procedures for detecting and reporting of suspected unapproved components;
- (l) procedures for handling unsalvageable components in accordance with applicable regulations and standards;
- (m) procedures for batch splitting or redistribution of lots and handling of the related documents;
- (n) procedures for notifying purchasers of any components that have been shipped and have later been identified as not conforming to the applicable technical data or standard;
- (o) procedures for recall control to ensure that components and materials shipped can be traced and recalled if necessary;
- (p) procedures for monitoring the effectiveness of the quality system.

3.2 Suppliers which are certified to officially recognised standards that have a quality system that includes the elements specified in 3.1 may be acceptable; such standards include:

- (a) EN/AS9120 and listed in the OASIS database;
- (b) ASA-100;
- (c) EASO 2012;
- (d) FAA AC 00-56.

The use of such suppliers does not exempt the organisation from its obligations under HKAR 145.42 to ensure that supplied components and materials are in satisfactory condition and meet the applicable criteria of HKAR 145.42.

- 3.3 Supplier evaluation may depend on different factors, such as the type of component, whether or not the supplier is the manufacturer of the component, the TC holder or a maintenance organisation, or even specific circumstances such as aircraft on ground. This evaluation may be limited to a questionnaire from the HKAR-145 approved maintenance organisation to its suppliers, a desktop evaluation of the supplier's procedures or an on-site audit, if deemed necessary.

GM 145.42(b)(2)

Acceptance of aircraft components

See HKAR 145.42(b)(2)

1 Installation of aircraft components

Aircraft components, standard parts and materials should only be installed when they are specified in the applicable maintenance data as specified in HKAR 145.45(b). So, the installation of an aircraft component, standard part or material can only be done after checking the applicable maintenance data.

This check should ensure that the part number, modification status, limitations, etc., of the aircraft component, standard part or material are the ones specified in the applicable maintenance data of the particular aircraft or aircraft component where the aircraft component, standard part or material is going to be installed. The HKAR-145 approved maintenance organisation should establish procedures to ensure that this check is performed before installation.

GM 145.42(c)**Acceptance of aircraft components****See AMC 145.42(c)**

1 Mutilation of aircraft components

- 1.1 Mutilation should be accomplished in such a manner that the components become permanently unusable for their originally intended use. Mutilated components should not be able to be reworked or camouflaged to provide the appearance of being serviceable, such as by replating, shortening and rethreading long bolts, welding, straightening, machining, cleaning, polishing, or repainting.
- 1.2 Mutilation may be accomplished by one or a combination of the following procedures:
 - (a) grinding;
 - (b) burning;
 - (c) removal of a major lug or other integral feature;
 - (d) permanent distortion of parts;
 - (e) cutting a hole with cutting torch or saw;
 - (f) melting;
 - (g) sawing into many small pieces; and
 - (h) any other method accepted by the competent authority.
- 1.3 The following procedures are examples of mutilation that are often less successful because they may not be consistently effective:
 - (a) stamping or vibro-etching;
 - (b) spraying with paint;
 - (c) small distortions, incisions, or hammer marks;
 - (d) identification by tags or markings;
 - (e) drilling small holes; and
 - (f) sawing in two pieces only.

GM 145.48**Performance of maintenance****See HKAR 145.48**

Authorised person

An ‘authorised person’ is a person formally authorised by the HKAR-145 approved maintenance organisation to perform or supervise a maintenance task. An ‘authorised person’ is not necessarily ‘certifying staff’.

Sign-off

A ‘sign-off’ is a statement issued by the ‘authorised person’ which indicates that the task or group of tasks has been correctly performed. A ‘sign-off’ relates to one step in the maintenance process and is, therefore, different to a certificate of release to service.

GM 145.48(c)**Performance of maintenance****See HKAR 145.48(c)**

To minimise the risk of multiple errors or errors being repeated, the organisation may implement:

- procedures to plan the performance by different persons of the same task in different systems;
- independent inspection or re-inspection procedures.

GM 145.48(d)**Performance of maintenance — critical design configuration control limitations (CDCCL)****See HKAR 145.48(d)**

The HKAR-145 approved maintenance organisation should ensure that when performing maintenance the CDCCL are not compromised. The organisation should pay particular attention to possible adverse effects of any change to the wiring of the aircraft, even of a change not specifically associated with the fuel tank system. For example, it should be common practice to identify segregation of fuel gauging system wiring as a CDCCL. The organisation can prevent adverse effects associated with changes to the wiring by standardising maintenance practices through training, and not through periodic inspections. Training should be provided to avoid indiscriminate routing and splicing of wire and to provide comprehensive knowledge of critical design features of fuel tank systems that would be controlled by a CDCCL. Guidance on the training of maintenance organisation personnel is provided in Appendix 4.

GM 145.55(a)**Maintenance records****See HKAR 145.55(a)**

- 1 Properly executed and retained records provide owners, operators and maintenance personnel with information essential in controlling unscheduled and scheduled maintenance, and troubleshooting to eliminate the need for re-inspection and rework to establish airworthiness.

The prime objective is to have secure and easily retrievable records with comprehensive and legible contents. The aircraft records should contain basic details of all serialised aircraft components and all other significant aircraft components installed, to ensure traceability to such installed aircraft component documentation, associated maintenance data and data for modifications and repairs.

- 2 Some gas turbine engines are assembled from modules and a true total time in service for a total engine is not kept. When owners and operators wish to take advantage of the modular design, then total time in service and maintenance records for each module is to be maintained. The maintenance records as specified are to be kept with the module and should show compliance with any mandatory requirements pertaining to that module.
- 3 Reconstruction of lost or destroyed records can be done by reference to other records which reflect the time in service, research of records maintained by repair facilities and reference to records maintained by individual mechanics etc. When these things have been done and the record is still incomplete, the owner/operator may make a statement in the new record describing the loss and establishing the time in service based on the research and the best estimate of time in service. The reconstructed records should be submitted to the Director-General for acceptance.

Note: Additional maintenance may be required.

- 4 The maintenance record can be either a paper or computer system or any combination of both.
- 5 Paper systems should use robust material which can withstand normal handling and filing. The record should remain legible throughout the required retention period.
- 6 Computer systems may be used to control maintenance and/or record details of maintenance work carried out. Computer systems used for maintenance should have at least one backup system which should be updated at least within 24 hours of any maintenance. Each terminal is required to contain programme safeguards against the ability of unauthorised personnel to alter the database. Electronic maintenance records should meet the following criteria:

- 6.1 A sole access right on maintenance records granted by another organisation to the HKAR-145 approved maintenance organisation cannot fulfil the requirements that the organisation retains the records. The records shall be

under its total control.

- 6.2 The HKAR-145 approved maintenance organisation needs to demonstrate how it secures its own maintenance records under its total control and can reproduce the records in a legible format.
- 6.3 Provided sub-paragraph 6.2 can be satisfied, the HKAR-145 approved maintenance organisation can contract another organisation to store its own maintenance records.
- 6.4 The HKAR-145 approved maintenance organisation shall produce a satisfactory risk assessment on the electronic maintenance records.

GM 145.60(a)

Occurrence reporting

See HKAR 145.60(a)

The organisation responsible for the design is normally the type certificate (TC) holder of the aircraft, engine or propeller and/or if known the supplemental type certificate (STC) holder.

GM 145.60(c)

Occurrence reporting

See HKAR 145.60(c)

Each report should contain at least the following information:

- (a) Organisation name and approval reference.
- (b) Information necessary to identify the subject aircraft and / or aircraft component.
- (c) Date and time relative to any life or overhaul limitation in terms of flying hours / cycles / landings etc. as appropriate.
- (d) Details of the condition as required by HKAR 145.60(b).
- (e) Any other relevant information found during the evaluation or rectification of the condition.

GM 145.65(b)(2)

Safety and quality policy, maintenance procedures and quality system

See HKAR 145.65(b)(2)

Specialised maintenance activities, such as, but not limited to welding of aeronautical products

and Non-Destructive Testing (NDT) should be carried out in accordance with the standards specified by Original Equipment Manufacturer (OEM) or Design Approval holders.

GM 145.65(c)(1)

Safety and quality policy, maintenance procedures and quality system

See HKAR 145.65(c)(1)

- 1 The purpose of this GM is to give guidance on just one acceptable working audit plan to meet part of the needs of HKAR 145.65(c)(1). There are many other acceptable working audit plans.
- 2 The proposed plan lists the subject matter that should be covered by the audit and attempts to indicate applicability in the various types of workshops and aircraft facilities. The list should therefore be tailored for the particular situation and more than one list may be necessary. Each list should be shown against a timetable to indicate when the particular item is scheduled for audit and when the audit was completed.

REF	COMMENT	HANGAR	ENGINE Workshop	MECH Workshop	AVIONIC Workshop
145.25		yes	yes	yes	yes
145.30		yes	yes	yes	yes
145.35		yes	yes	yes	yes
145.40		yes	yes	yes	yes
145.42		yes	yes	yes	yes
145.45		yes	yes	yes	yes
145.47		yes	yes	yes	yes
145.48		yes	yes	if applicable	if applicable
145.50		yes	yes	yes	yes
145.55		yes	yes	yes	yes
145.60		yes	yes	yes	yes
145.65		yes	yes	yes	yes
2.1	MOE	yes	yes	yes	yes
2.2	MOE	yes	yes	yes	yes
2.3	MOE	yes	yes	yes	yes
2.4	MOE	yes	yes	yes	yes
2.5	MOE	yes	yes	yes	yes
2.6	MOE	yes	yes	yes	yes
2.7	MOE	yes	yes	yes	yes
2.8	MOE	yes	yes	yes	yes
2.9	MOE	yes	yes	yes	yes
2.10	MOE	yes	no	no	no
2.11	MOE	yes	yes	yes	yes
2.12	MOE	yes	yes	yes	yes
2.13	MOE	yes	yes	yes	yes
2.14	MOE	yes	yes	yes	yes

REF	COMMENT	HANGAR	ENGINE Workshop	MECH Workshop	AVIONIC Workshop
2.15	MOE	yes	no	no	no
2.16	MOE	yes	yes	yes	yes
2.17	MOE	If applicable	If applicable	If applicable	If applicable
2.18	MOE	yes	yes	yes	yes
2.19	MOE	yes	yes	yes	yes
2.20	MOE	yes	yes	yes	yes
2.21	MOE	If applicable	If applicable	If applicable	If applicable
2.22	MOE	yes	yes	no	no
2.23	MOE	yes	no	no	no
2.24	MOE	yes	yes	yes	yes
2.25	MOE	yes	yes	yes	yes
2.26	MOE	yes	yes	yes	yes
2.27	MOE	yes	yes	yes	yes
2.28	MOE	yes	yes	yes	yes
L2.1	MOE	If applicable	no	no	no
L2.2	MOE	If applicable	no	no	no
L2.3	MOE	If applicable	no	no	no
L2.4	MOE	If applicable	no	no	no
L2.5	MOE	If applicable	no	no	no
L2.6	MOE	If applicable	no	no	no
L2.7	MOE	If applicable	no	no	no
3.9	MOE	If applicable	If applicable	If applicable	If applicable
3.10	MOE	If applicable	If applicable	If applicable	If applicable
3.11	MOE	If applicable	If applicable	If applicable	If applicable
3.12	MOE	yes	yes	no	no
3.13	MOE	yes	yes	yes	yes
3.14	MOE	yes	yes	yes	yes
145.70		yes	yes	yes	yes
145.75		yes	yes	yes	yes
145.80		yes	yes	yes	yes
145.85		yes	yes	yes	yes
145.95		If applicable	If applicable	If applicable	If applicable

Note 1: In the line station case all line stations should be audited at the frequency agreed by the Director-General within the limits of AMC 145.65(c).

Note 2: The reference system used for this example working audit plan relates either to the HKAR-145 paragraphs or the maintenance organisation exposition (MOE) items. Where a MOE item has been omitted it is due to the existence of a clear HKAR-145 paragraph covering the same issue. HKAR-145 paragraphs have priority due to being the primary requirement.

Note 3: 'If applicable' means if applicable or relevant.

GM 145.70(a)**Maintenance organisation exposition****See HKAR 145.70(a)**

- 1 The purpose of the maintenance organisation exposition (MOE) is to set forth the procedures, means and methods of the organisation.
- 2 Compliance with its contents will assure compliance with the HKAR-145 requirements, which is a pre-requisite to obtaining and retaining a HKAR-145 approval certificate.
- 3 HKAR 145.70(a)(1) to (a)(11) constitutes the 'management' part of the MOE and therefore could be produced as one document and made available to the person(s) specified under HKAR 145.30(b) who should be reasonably familiar with its contents. HKAR 145.70(a)(6) list of certifying staff and support staff may be produced as a separate document.
- 4 HKAR 145.70(a)(12) constitutes the working procedures of the HKAR-145 approved maintenance organisation and therefore as stated in the requirement may be produced as any number of separate procedures manuals. It should be remembered that these documents should be cross-referenced from the management MOE.
- 5 Personnel are expected to be familiar with those parts of the manuals that are relevant to the maintenance work they carry out.
- 6 The HKAR-145 approved maintenance organisation should specify in the MOE who should amend the manual particularly in the case where there are several parts.
- 7 The quality manager should be responsible for monitoring the amendment of the MOE, unless otherwise agreed by the Director-General, including associated procedures manuals and submission of the proposed amendments to the Director-General. However the Director-General may agree via a procedure stated in the amendment section of the MOE that some defined class of amendments may be incorporated without prior approval by the Director-General.
- 8 The MOE should cover four main parts:
 - (a) The management MOE covering the parts specified earlier.
 - (b) The maintenance procedures covering all aspects of how aircraft components may be accepted from outside sources and how aircraft will be maintained to the required standard.
 - (c) The quality system procedures including the methods of qualifying mechanics, inspection, certifying staff and quality audit personnel.
 - (d) Contracting operator procedures and paperwork.

- 9 The accountable manager's exposition statement as specified under HKAR 145.70(a)(1) should embrace the intent of the following paragraph and in fact this statement may be used without amendment. Any modification to the statement should not alter the intent.

"This exposition and any associated referenced manuals define the organisation and procedures upon which the Air Navigation (Hong Kong) Order 1995 HKAR-145 approval is based as required by HKAR 145.70. These procedures are approved by the undersigned and should be complied with, as applicable, when work/orders are being progressed under the terms of the HKAR-145 approval.

It is accepted that these procedures do not override the necessity of complying with the Air Navigation (Hong Kong) Order 1995 [AN(HK)O] or any new or amended requirements published or adopted by the Director-General of Civil Aviation (the Director-General) from time to time where the AN(HK)O or these new or amended requirements are in conflict with these procedures.

It is understood that the Director-General will approve this organisation whilst the Director-General is satisfied that the procedures are being followed and work standards maintained. It is further understood that the Director-General reserves the right to suspend, limit or revoke the HKAR-145 approval of the organisation if the Director-General has evidence that procedures are not followed or standards not upheld.

Signed

Dated

Accountable Manager and(quote position).....

For and on behalf of(quote organisation's name).....

Note: Whenever the accountable manager changes, it is important to ensure that the new accountable manager signs the paragraph 9 statement at the earliest opportunity. Failure to carry out this action could invalidate the HKAR-145 approval.

- 10 When a HKAR-145 approved maintenance organisation is approved against any other Hong Kong Aviation Requirement containing a requirement for an exposition, a supplement covering the differences will suffice to meet the requirements except that the supplement should have an index showing where those parts missing from the supplement are covered.

APPENDIX 1

Reserved.

APPENDIX 2

Organisations Approval Class and Rating System

- 1 Except as stated otherwise for the smallest HKAR-145 approved maintenance organisation in paragraph 12, Table 1 outlines the full extent of approval possible under HKAR-145 in a standardised form. An organisation may be granted an approval ranging from a single class and rating with limitations to all classes and ratings with limitations.
- 2 In addition to Table 1 the HKAR-145 approved maintenance organisation is required by HKAR 145.20 to indicate scope of work in the maintenance organisation exposition. See also paragraph 11.
- 3 Within the approval class(es) and rating(s) granted by the Director-General, the scope of work specified in the maintenance organisation exposition defines the exact limits of approval. It is therefore essential that the organisation's scope of work matches with the approval class(es) and rating(s).
- 4 A category A class rating means that the HKAR-145 approved maintenance organisation may carry out maintenance on the aircraft and any aircraft component (including engines and/or Auxiliary Power Units (APUs), in accordance with aircraft maintenance data or, if agreed by the Director-General, in accordance with component maintenance data, only whilst such components are fitted to the aircraft. Nevertheless, such A-rated approved maintenance organisation may temporarily remove a component for maintenance, in order to improve access to that component, except when such removal generates the need for additional maintenance not eligible for the provisions of this paragraph. This will be subject to a control procedure in the maintenance organisation exposition to be approved by the Director-General. The limitation section will specify the scope of such maintenance thereby indicating the extent of approval.
- 5 A category B class rating means that the HKAR-145 approved maintenance organisation may carry out maintenance on the uninstalled engine and/or APU and engine and/or APU components, in accordance with engine and/or APU maintenance data or, if agreed by the Director-General, in accordance with component maintenance data, only whilst such components are fitted to the engine and/or APU. Nevertheless, such B-rated approved maintenance organisation may temporarily remove a component for maintenance, in order to improve access to that component, except when such removal generates the need for additional maintenance not eligible for the provisions of this paragraph. The limitation section will specify the scope of such maintenance thereby indicating the extent of approval. A HKAR-145 approved maintenance organisation with a category B class rating may also carry out maintenance on an installed engine during base and line maintenance subject to a control procedure in the maintenance organisation exposition acceptable to the Director-General. The maintenance organisation exposition scope of work shall reflect such activity where permitted by the Director-General.

- 6 A category C class rating means that the HKAR-145 approved maintenance organisation may carry out maintenance on uninstalled components (excluding engines and APUs) intended for fitment to the aircraft or engine/APU. The limitation section will specify the scope of such maintenance thereby indicating the extent of approval. A HKAR-145 approved maintenance organisation with a category C class rating may also carry out maintenance on an installed component during base and line maintenance or at an engine/APU maintenance facility subject to a control procedure in the maintenance organisation exposition acceptable to the Director-General. The maintenance organisation exposition scope of work shall reflect such activity where permitted by the Director-General.
- 7 A category D class rating is a self contained class rating not necessarily related to a specific aircraft, engine or other component. The D1 – Non Destructive Testing (NDT) rating is only necessary for a HKAR-145 approved maintenance organisation that carries out NDT as a particular task for another organisation. A HKAR-145 approved maintenance organisation with a class rating in A or B or C category may carry out NDT on products it is maintaining subject to the maintenance organisation exposition containing NDT procedures, without the need for a D1 class rating.
- 8 Category A class ratings are subdivided into 'Base' or 'Line' maintenance. A HKAR-145 approved maintenance organisation may be approved for either 'Base' or 'Line' maintenance or both. It should be noted that a 'Line' facility located at a main base facility requires a 'Line' maintenance approval.
- 9 The 'limitation' section is intended to give the Director-General the flexibility to customise the approval to any particular organisation. Ratings shall be mentioned on the approval only when appropriately limited. Table 1 specifies the types of limitation possible and whilst maintenance is listed last in each class rating it is acceptable to stress the maintenance task rather than the aircraft or engine type or manufacturer, if this is more appropriate to the organisation. An example could be avionics systems installations and related maintenance. Such mention in the limitation section indicates the HKAR-145 approved maintenance organisation is approved to carry out maintenance up to and including this particular type/task.
- 10 Table 1 makes reference to series, type and group in the limitation section of class A and B. Series means a specific type series such as Airbus 330 or 320 or 321 or Boeing 747-400 series or RB211-524 series etc. Type means a specific type or model such as Airbus 330-342 type or RB211-524 B4 type etc. Any number of series or types may be quoted. Group means for example Cessna single piston engined aircraft or Lycoming non-supercharged piston engines etc.
- 11 When a lengthy capability list is used which could be subject to frequent amendment, then such amendment may be in accordance with a procedure acceptable to the Director-General and included in the maintenance organisation exposition. The procedure shall address the issues of who is responsible for capability list amendment control and the actions that need to be taken for amendment. Such actions include ensuring compliance with HKAR-145 for products or services added to the list.

SECTION 4**HKAR-145**

- 12 A HKAR-145 approved maintenance organisation which employs only one person to both plan and carry out all maintenance can only hold a limited scope of approval rating. The maximum permissible limits are:-

CLASS	RATING	LIMITATION
AIRCRAFT	A2 AEROPLANES 5700 KG AND BELOW	PISTON ENGINED 5700 KG AND BELOW
AIRCRAFT	A3 HELICOPTERS	SINGLE PISTON ENGINED 3175 KG AND BELOW
AIRCRAFT	A4 AIRCRAFT OTHER THAN A1, A2 AND A3	NO LIMITATION
ENGINES	B2 PISTON	LESS THAN 450 HP
COMPONENTS OTHER THAN COMPLETE ENGINE OR APUs	C1 TO C22	AS PER CAPABILITY LIST
SPECIALISED SERVICES	D1 NDT	NDT METHOD(S) TO BE SPECIFIED

It should be noted that such an organisation may be further limited by the Director-General in the scope of approval dependent upon the capability of the particular organisation.

Table 1

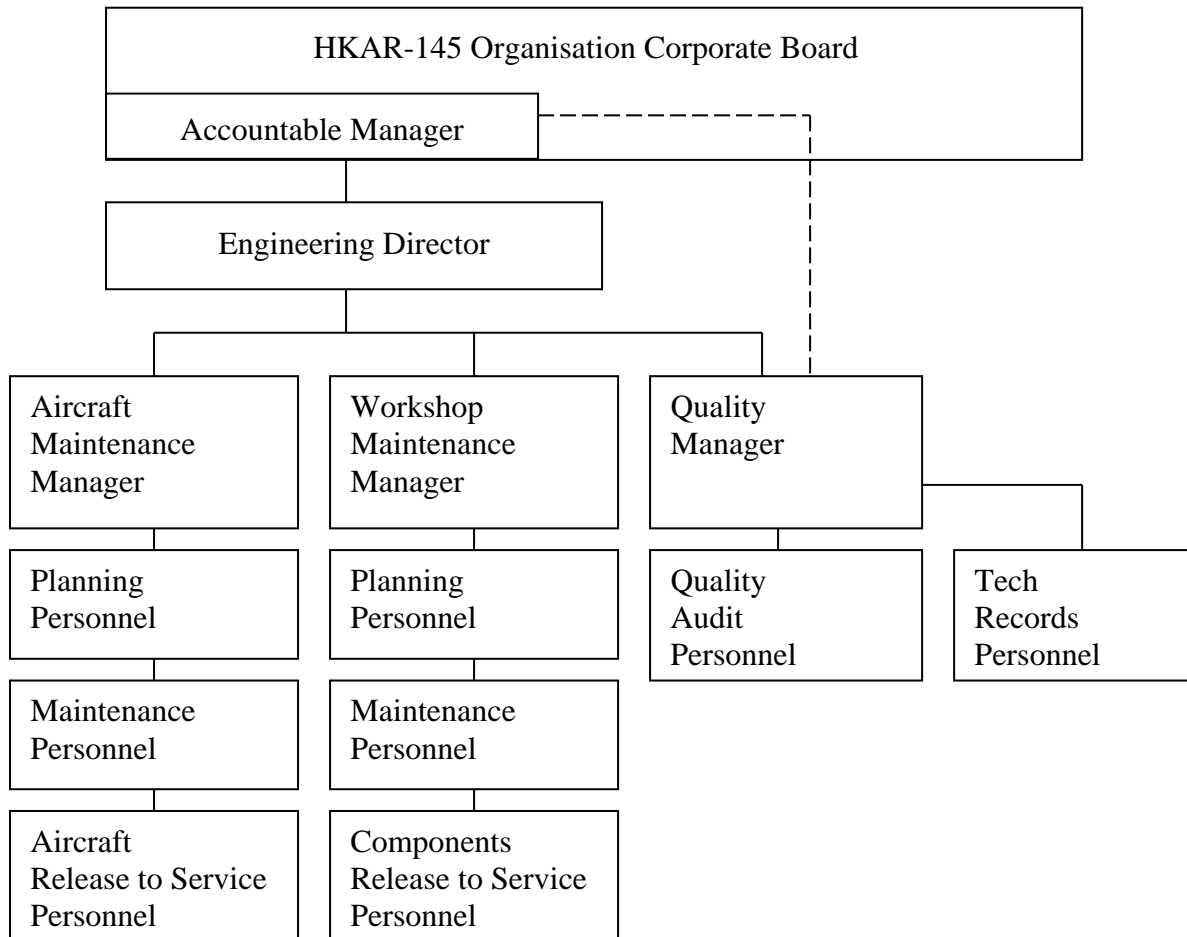
CLASS	RATING	LIMITATION	BASE	LINE
AIRCRAFT	A1 Aeroplanes above 5700 kg	Shall state aeroplane manufacturer or group or series or type and/or the maintenance task(s)		
	A2 Aeroplanes 5700 kg and below	Shall state aeroplane manufacturer or group or series or type and/or the maintenance task(s)		
	A3 Helicopters	Shall state helicopter manufacturer or group or series or type and/or the maintenance task(s)		
	A4 Aircraft other than A1, A2 and A3	Shall state aircraft series or type and/or the maintenance task(s)		
ENGINES	B1 Turbine	Shall state engine series or type and/or the maintenance task(s)		
	B2 Piston	Shall state engine manufacturer or group or series or type and/or the maintenance task(s)		
	B3 APU	Shall state engine manufacturer or series or type and/or the maintenance task(s)		
COMPONENTS OTHER THAN COMPLETE ENGINES OR APUs	C1 Air Cond & Press	Shall state aircraft type or aircraft manufacturer or component manufacturer or the particular component and/or cross refer to a capability list in the exposition and/or the maintenance task(s).		
	C2 Auto Flight			
	C3 Comms and Nav			
	C4 Doors – Hatches			
	C5 Electrical Power & Lights			
	C6 Equipment			
	C7 Engine – APU			
	C8 Flight Controls			
	C9 Fuel			
	C10 Helicopter – Rotors			
	C11 Helicopter – Trans			
	C12 Hydraulic Power			
	C13 Indicating/Recording Systems			
	C14 Landing Gear			
	C15 Oxygen			
	C16 Propellers			
	C17 Pneumatic & Vacuum			
	C18 Protection ice/rain/fire			
	C19 Windows			
	C20 Structural			
	C21 Water Ballast			

	C22 Propulsion Augmentation	
SPECIALISED SERVICES	D1 Non Destructive Testing	Shall state particular NDT method(s)

APPENDIX 3

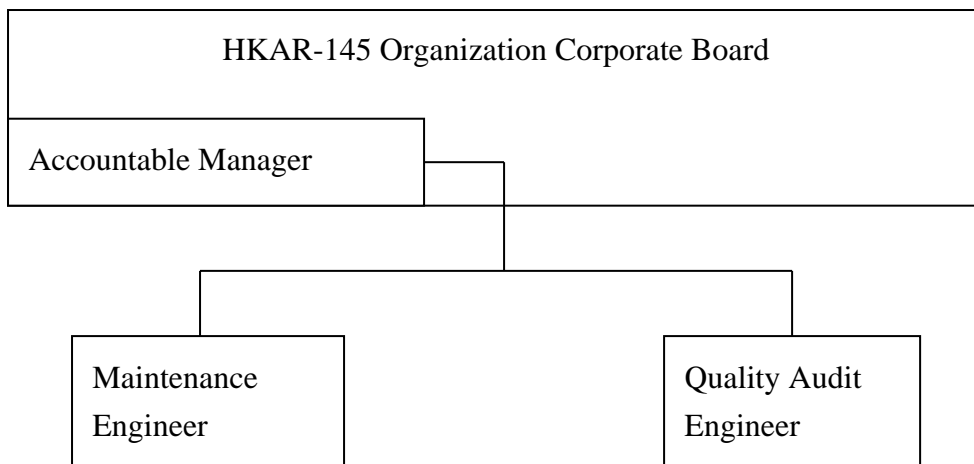
Some Outline Examples of Organisational Structures Possible Under HKAR-145

A. TYPICAL LARGE ORGANISATION



1. The Engineering Director may be the accountable manager if it is a Corporate Board position and meets the other requirements for accountable manager. Typically such a position is entitled Vice President (Engineering).
2. Quality Audit personnel must remain independent of the Maintenance Manager. Release to Service personnel may report instead to the Quality Manager position.
3. Technical records personnel may report instead to the Aircraft (Workshop) Manager.

B. TYPICAL SMALL ORGANISATION



APPENDIX 4

Fuel Tank Safety Training

This appendix includes general instructions for providing training on Fuel Tank Safety issues.

A. Effectivity

Hong Kong registered turbine powered large aeroplanes certificated after 1 January 1958 in the Transport or Private Categories with a maximum type certificated passenger capacity of 30 or more, or a maximum payload of 3,402 kg (7,500 lbs) or more.

B. Affected organisations

HKAR-145 approved maintenance organisations involved in the maintenance of aeroplanes specified in paragraph A and fuel system components installed on such aeroplanes when the maintenance data are affected by Critical Design Configuration Control Limitations (CDCCL).

C. Persons from affected organisations who should receive trainingPhase 1 only

The group of persons representing the maintenance management structure of the organisation, the quality manager and the staff required to quality monitor the organisation.

Phase 1 + Phase 2 + Continuation training

Personnel of the HKAR-145 approved maintenance organisation required to plan, perform, supervise, inspect and certify the maintenance of aircraft and fuel system components specified in paragraph A.

D. General requirements of the training coursesPhase 1- Awareness

The training should be carried out before the person starts to work without supervision but not later than 6 months after joining the organisation.

Type

Should be an awareness course with the principal elements of the subject. It may take the form of a training bulletin, or other self-study or informative session. Signature of the reader is required to ensure that the person has passed the training.

Level

It should be a course at the level of familiarisation with the principal elements of the subject.

Objectives

The trainee should, after the completion of the training:

1. be familiar with the basic elements of the fuel tank safety issues,
2. be able to give a simple description of the historical background and the elements requiring a safety consideration, using common words and showing examples of non-conformities, and
3. be able to use typical terms.

Content

The course should include:

1. a short background showing examples of Fuel Tank Safety (FTS) accidents or incidents,
2. the description of concept of fuel tank safety and CDCCL,
3. some examples of manufacturers documents showing CDCCL items,
4. typical examples of FTS defects,
5. some examples of TC holders repair data, and
6. some examples of maintenance instructions for inspection.

Phase 2 – Detailed training

Staff should have received Phase 2 training within 12 months after joining the organisation.

Type

Should be an in-depth internal or external course. It should not take the form of a training bulletin, or other self-study. An examination should be required at the end, which should be in the form of a multiple choice question, and the pass mark of the examination should be 75%.

Level

It should be a detailed course on the theoretical and practical elements of the subject.

The training may be made either:

1. in appropriate facilities containing examples of components, systems and parts affected by FTS issues. The use of films, pictures and practical examples on FTS is recommended; or
2. by attending a distance course (e-learning or computer based training) including a film when such film meets the intent of the objectives and content here below. An e-learning or computer based training should meet the following criteria:
 - (a) A continuous evaluation process should ensure the effectiveness of the training and its relevance;
 - (b) Some questions at intermediate steps of the training should be proposed to ensure that the trainee is authorised to move to the next step;
 - (c) The content and results of examinations should be recorded;
 - (d) Access to an instructor in person or at distance should be possible in case support is needed.

A duration of 8 hours for phase 2 is an acceptable compliance.

When the course is provided in a classroom, the instructor should be very familiar with the data in Objectives and Guidelines. To be familiar, an instructor should have attended himself a similar course in a classroom and made additionally some lecture of related subjects.

Objectives

The attendant should, after the completion of the training:

1. have knowledge of the history of events related to fuel tank safety issues and the theoretical and practical elements of the subject, have an overview of the FAA regulations known as SFAR (Special FAR) 88 of the FAA and of JAA Temporary Guidance Leaflet TGL 47, be able to give a detailed description of the concept of fuel tank system Airworthiness Limitation Items (ALI) including CDCCL, and using theoretical fundamentals and specific examples;
2. have the capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner;
3. have knowledge on how the above items affect the aircraft;
4. be able to identify the components or parts or the aircraft subject to FTS from the manufacturer's documentation,
5. be able to plan the action or apply a Service Bulletin and an Airworthiness Directive.

Content

Following the guidelines described in paragraph E.

Continuation training

The organisation should ensure that the continuation training is required in each two years period. The syllabus of the training programme referred to in 3.4 of the maintenance organisation exposition (MOE) should include the additional syllabus for this continuation training.

The continuation training may be combined with the phase 2 training in a classroom or at distance. The continuing training should be updated when new instruction are issued which are related to the material, tools, documentation and manufacturer's or CAD's directives.

E. Guidelines for preparing the content of Phase 2 courses.

The following guidelines should be taken into consideration when the phase 2 training programme is being established:

1. understanding of the background and the concept of fuel tank safety,
2. how the mechanics can recognise, interpret and handle the improvements in the instruction for continuing airworthiness that have been made or are being made regarding the fuel tank system maintenance, and
3. awareness of any hazards especially when working on the fuel system, and when the Flammability Reduction System using nitrogen is installed.

Paragraphs 1, 2 and 3 above should be introduced in the training programme addressing the following issues:

- (a) The theoretical background behind the risk of fuel tank safety: the explosions of mixtures of fuel and air, the behaviour of those mixtures in an aviation environment, the effects of temperature and pressure, energy needed for ignition etc, the 'fire triangle', – Explain 2 concepts to prevent explosions:
 - (i) ignition source prevention and
 - (ii) flammability reduction,
- (b) The major accidents related to fuel tank systems, the accident investigations and their conclusions,
- (c) SFAR 88 of the FAA and JAA Interim Policy INT POL 25/12: ignition prevention program initiatives and goals, to identify unsafe conditions and to correct them, to systematically improve fuel tank maintenance,
- (d) Explain the briefly concepts that are being used: the results of SFAR 88 of the FAA and JAA INT/ POL 25/12: modifications, airworthiness limitations items and CDCCL,
- (e) Where relevant information can be found and how to use and interpret this information in the applicable maintenance data as defined in HKAR 145.45(b),

- (f) Fuel Tank Safety during maintenance: fuel tank entry and exit procedures, clean working environment, what is meant by configuration control, wire separation, bonding of components etc,
- (g) Flammability Reduction Systems (FRS) when installed: reason for their presence, their effects, the hazards of an FRS using nitrogen for maintenance, safety precautions in maintenance/working with an FRS, and
- (h) Recording maintenance actions, recording measures and results of inspections.

The training should include a representative number of examples of defects and the associated repairs as required by the TC / STC holders' maintenance data.

F. Approval of training

For HKAR-145 approved organisations, the approval of the initial and continuation training programme and the content of the examination can be achieved by the change to the MOE exposition. The necessary changes to the MOE to meet the content of this decision should be made and implemented at the time requested by the Director-General.

APPENDIX 5

Procedures for the Grant and Variation of HKAR-145 Approval

1 Grant of a HKAR-145 Approval

- 1.1 The Director-General must receive an application for HKAR-145 approval from the organisation that needs approval. The application should be made on Form DCA 190 (CAD Form Two).
- 1.2 When the applicant is located, in whole or in part, outside the territories of Hong Kong and applying for HKAR-145 approval in respect of any such location outside the territories of Hong Kong, the applicant must demonstrate that there is a need for approval to maintain aircraft/aircraft components at such location, with the provision of:
 - a. a letter from an organisation based in Hong Kong, e.g. a Hong Kong operator, giving reasons for the need of maintenance support at such location; and
 - b. a technical assessment by the organisation mentioned in sub-paragraph a demonstrating that the applicant is readily in compliance with HKAR-145 requirements.
- 1.3 A meeting will be arranged between the applicant and the CAD Airworthiness Office to determine if the applicant's business activities justify the grant of HKAR-145 approval. This is not to establish compliance but rather to see if the activity is a HKAR-145 activity.
- 1.4 The latest amendment of HKAR-145 requirements is to be used as the basis for the investigation and grant of approval.
- 1.5 The Director-General will conduct an audit of the applicant's facility requiring HKAR-145 approval and examine the proposed maintenance organisation exposition (MOE).
- 1.6 The Director-General will determine who and how the audit shall be conducted. If the applicant is a large organisation, the audit may be one large team audit or a short series of small team audits or a long series of single man audits, whichever appropriate for the particular situation.
- 1.7 The CAD Form Six is to be used as a summary checklist for the completion of the audit.

- 1.8 Reserved.
- 1.9 Form DCA 192 (CAD Form Four) must be completed for the accountable manager and each person nominated to hold a position required by HKAR 145.30(a) and 145.30(b) respectively. CAD Form Four should be treated as a confidential document because it contains personal information.
- 1.10 Apart from needing to ensure that the MOE addresses the subject headings listed in AMC 145.70(a), the organisation should write the MOE to reflect the preferred procedures. The Director-General will investigate and establish that the procedures specified in the MOE are in compliance with the intent of HKAR-145 requirements and then to establish if these are the same procedures to be used within the facility.
- 1.11 The Director-General will establish a clear procedure to indicate acceptance of the MOE because subsequent to the initial approval of the organisation to HKAR-145 there will be a need for the organisation to amend the MOE without affecting the HKAR-145 approval. A simple MOE status sheet is to be maintained which contains information on when an amendment was received by the Director-General and when it was approved. For large organisation a delegated approval system may be established for the MOE for all minor changes but under no circumstances will the MOE chapter dealing with scope of work/approval be delegated to the organisation.
- 1.12 The audit of the applicant's facilities is to be carried out on a product line type basis in that, for example, if application has been made for, say, Airbus A330 and A320, the audit be concentrated on one type only for a full compliance check and dependent upon the result, the second type may only require a sample check against those activities seen to be weak on compliance for the first type. The point being that the Director-General always checks the weaknesses and not the strengths of an organisation.
- 1.13 The Director-General should be accompanied throughout the audit by a senior technical member of the organisation making application for HKAR-145 approval. Normally this is the proposed quality manager. The reason for being accompanied is to ensure the organisation is fully aware of any findings during the audit. In any case, the proposed quality manager or other senior technical member of the organisation will be debriefed at the end of the audit.
- 1.14 All findings identified during an audit visit will be recorded in CAD Form Six part 4. Such findings will be confirmed in writing to the applicant within two weeks of the audit visit without specifying the level of each finding.
- 1.15 Notwithstanding paragraph 1.14 there will be occasions when the Director-General may find situations in the applicant's organisation on which

he is unsure about compliance. In this case, the organisation will be informed about possible non-compliance at the time and the fact that the situation will be reviewed within the CAD before a decision is made. The organisation will be informed of the decision within two weeks of the audit visit in writing if the decision is a confirmation of non-compliance. If the decision is a finding of being in compliance then a verbal confirmation will be given to the organisation.

- 1.16 For initial approval, all findings must be corrected before approval can be granted.
- 1.17 When satisfied with the above, the Director-General will issue an approval certificate (CAD Form Three) which includes the approval ratings.

Note: The approval will be based only upon the organisational capability (including any associated subcontractors) relative to HKAR-145 and not limited by reference to for instance products type certificated in Hong Kong. For example, if the organisation is capable of maintaining within the limitation of HKAR-145 the Boeing 737-200 series aircraft the approval schedule should state A1 Boeing 737-200 series and not Boeing 737-2H6 which is a particular airline designator for one of many -200 series.

- 1.18 The HKAR-145 approval is normally granted for a period of two years.

2 Variation of a HKAR-145 Approval

- 2.1 A HKAR-145 approval requires variation, when Class or Ratings or Limitations are added or deleted from the approval certificate.
- 2.2 When the applicant is located, in whole or in part, outside the territories of Hong Kong and applying for varying the HKAR-145 approval in respect of any such location outside the territories of Hong Kong, the applicant must demonstrate that there is a need for approval to maintain aircraft/aircraft components at such location, with the provision of:
 - a. a letter from an organisation based in Hong Kong, e.g. a Hong Kong operator, giving reasons for the need of maintenance support at such location; and
 - b. a technical assessment by the organisation mentioned in sub-paragraph a demonstrating that, with respect to the variation, the applicant is readily in compliance with respective HKAR-145 requirements.

SECTION 4

HKAR-145

- 2.3 The Director-General must receive an application for the variation of a HKAR-145 approval from the organisation that needs the variation. The application should be made on CAD Form Two.
- 2.4 The request for variation of a HKAR-145 approval should be processed in accordance with paragraph 1 (except that sub-paragraphs 1.3, 1.8, 1.9 and 1.11 may not be necessary).
- 2.5 When the application for the variation consists a deletion of Class or Rating or Limitation from the HKAR-145 approval, no further investigation is needed, other than ensuring that the MOE reflects this change.
- 2.6 For the variation of an existing approval all findings relevant to the variation must be corrected before the variation may be approved.

APPENDIX 6**Procedures for the Renewal of HKAR-145 Approval****1 General**

The HKAR-145 approved maintenance organisation must apply for renewal five months prior to expiry of the existing approval to ensure there is no break in the approval.

2 Renewal of a time limited HKAR-145 Approval

- 2.1 The Director-General must receive an application for renewal of the HKAR-145 approval from the HKAR-145 approved maintenance organisation. The application should be on Form DCA 190 (CAD Form Two).
- 2.2 The latest amendment of HKAR-145 requirements is to be used as the basis for the renewal of approval.
- 2.3 The Director-General will conduct an audit of the HKAR-145 approved maintenance organisation's facility and examine the maintenance organisation exposition. The Director-General may take into consideration paragraph 3 'Exposition amendments' and paragraph 4 'Changes in senior personnel' of this Appendix when renewing the HKAR-145 approval.
- 2.4 The Director-General will determine who and how the audit shall be conducted. If the applicant is a large organisation, the audit may be one large team audit or a short series of small team audits or a long series of single man audits, whichever appropriate for the particular situation. Where a series of audit visits are necessary to arrive at a complete audit of a HKAR-145 approved maintenance organisation, the audit programme will indicate which aspects of the approval to be covered on each visit.
- 2.5 The CAD Form Six is to be used as a summary checklist for the completion of the audit.
- 2.6 Credit may be claimed by the Director-General for specific item audits completed during the preceding 23 month period subject to four conditions:
 - a. the specific item audit must be the same as that required by HKAR-145 latest amendment, and

- b. there must be satisfactory evidence on record that such specific item audits were carried out and that all corrective actions have been taken, and
 - c. the Director-General must be satisfied that there is no reason to believe standards have deteriorated in respect of those specific item audits being granted a back credit; and
 - d. the specific item audit being granted a back credit must be audited not later than 24 months after the last audit of the item.
- 2.7 The audit is to be carried out on a product line type basis in that, for example, if application has been made for, say, Airbus A330 and A320, the audit be concentrated on one type only for a full compliance check and dependent upon the result, the second type may only require a sample check against those activities seen to be weak on compliance for the first type. The point being that the Director-General always checks the weaknesses and not the strengths of an organisation.
- 2.8 A part of the audit concentrates on two ongoing aspects of the HKAR-145 approval, namely:
- a. the organisation's internal self monitoring quality reports produced by the quality monitoring personnel to determine if the organisation is identifying and correcting its problems; and
 - b. the number of concessions granted by the quality manager or the alternate agreed by the Director-General and why they were considered necessary.
- Note: The HKAR-145 approved maintenance organisation is normally required to work to applicable standards and stay within any authorised time limits for maintenance. A concession suggests otherwise.
- 2.9 In addition, where the HKAR-145 approved maintenance organisation is engaged in aircraft maintenance, a part of the audit concentrates on deferred line defect rectification performance and deferred base maintenance defect performance, both give some indication of the competence of the organisation.

- 2.10 The Director-General should be accompanied throughout the audit by a senior technical member of the organisation. Normally this is the quality manager. The reason for being accompanied is to ensure the organisation is fully aware of any findings during the audit. In any case, the quality manager or other senior technical member of the organisation will be debriefed at the end of the audit visit on the findings made during the audit.
- 2.11 All findings identified during an audit visit will be recorded in CAD Form Six part 4 together with a provisional categorisation as a Level 1 finding or Level 2 finding in accordance with Appendix No. 1 of Airworthiness Notice No. 28. Subsequent to the audit visit that identified the particular findings, the Director-General will review the provisional finding levels, adjusting them if necessary and change the categorisation from provisional to confirmed. If the findings made during the audit visit mean that approval renewal will not or cannot be made, then such findings are confirmed in writing to the organisation within two weeks of the audit visit.
- 2.12 Notwithstanding paragraph 2.11, there will be occasions when the Director-General may find situations on which he is unsure about compliance. In this case, the organisation will be informed about possible non-compliance at the time and the fact that the situation will be reviewed within the CAD before a decision is made. The organisation will be informed of the decision within two weeks of the audit visit in writing if the decision is a confirmation of non-compliance. If the decision is a finding of being in compliance then a verbal confirmation will be given to the organisation.
- 2.13 Except as specified in paragraph 2.14, all confirmed level 1 and 2 findings must have the corrective actions carried out to the satisfaction of the Director-General before a HKAR-145 approval can be renewed.
- 2.14 For large HKAR-145 approved maintenance organisations where a series of audit visits are necessary to arrive at a complete audit, a HKAR-145 approval will not be renewed if there are outstanding level 1 findings or time expired level 2 findings.
- All confirmed level 1 findings must have the corrective actions carried out to the satisfaction of the Director-General before the approval can be renewed and in fact revocation action may be necessary.
- All confirmed level 2 findings must be accepted by the organisation for action to the satisfaction of the Director-General within the level 2 time frame specified in Appendix No. 1 of Airworthiness Notice No. 28 before the approval can be renewed.
- 2.15 When satisfied, the Director-General will issue an approval certificate which

includes the approval ratings.

3 **Exposition amendments**

- 3.1 The HKAR-145 approved maintenance organisation will have reason on occasions to amend the maintenance organisation exposition and therefore as this document is an approved document forming one essential element of the HKAR-145 approval, the Director-General will ensure that he has an adequate control over the approval of any exposition amendments.
- 3.2 The method of exposition amendment approval is to require an approval status page at the front of the maintenance organisation exposition which lists each amendment and states against each amendment when it was approved by the Director-General and the document reference of that approval. For large organisations a delegated approval system may be provisioned for the exposition for all minor changes but under no circumstances should be the exposition chapter dealing with scope of work/approval be delegated to the organisation.
- 3.3 The HKAR-145 approved maintenance organisation must submit each exposition amendment to the Director-General whether it be an amendment for Director-General's approval or a delegated approval amendment. Where the amendment requires Director-General's approval, the Director-General, when satisfied, will indicate his approval in writing and the HKAR-145 approved maintenance organisation must make reference to the approval in the approval status page. Where the amendment has been submitted under the delegated approval procedure the Director-General will acknowledge receipt in writing and the HKAR-145 approved maintenance organisation must then make reference to the Director-General's acknowledgement in the approval status page.

4 **Changes in senior personnel**

- 4.1 The HKAR-145 approved maintenance organisation will have reason on occasions to change one or more of the personnel specified in HKAR 145.30(a) and/or HKAR 145.30(b) all of whom have to be acceptable to the Director-General. Such personnel form one essential element of the HKAR-145 approval and therefore the Director-General will ensure that he has adequate control over this process.

- 4.2 A change of accountable manager requires the HKAR-145 approved maintenance organisation to submit in writing such fact to the Director-General. The Form DCA 192 (CAD Form Four) must be used for this purpose. The Director-General will normally accept the accountable manager and will in the letter of acceptance request an urgent amendment to the HKAR 145.70(a)(1) accountable manager exposition statement. In other words, it is essential that the new accountable manager signs the statement of commitment to compliance with HKAR-145 as a matter of urgency. The only basis on which the Director-General may reject an accountable manager is where there is clear evidence that the person previously held a senior position in any Hong Kong approved organisation and abused that position by not complying with the particular Hong Kong aviation requirements.
- 4.3 A change of any of the personnel specified in HKAR 145.30(b) also requires the HKAR-145 approved maintenance organisation to submit a Form DCA 192 (CAD Form Four) in respect of the particular person to the Director-General. If satisfied with the qualifications and experience of the person in relation to the particular position the Director-General will indicate acceptance in writing to the HKAR-145 approved maintenance organisation.
- 4.4 Changes in senior personnel as specified in HKAR 145.30(a) and/or HKAR 145.30(b) will require an amendment to the maintenance organisation exposition.

APPENDIX 7**Acceptance Criteria for Organisations Working under the Provisions of HKAR 145.1(e)****1 Introduction**

Under HKAR 145.1(e), a non-HKAR-145 approved maintenance organisation may work under the quality system of an appropriate HKAR-145 approved maintenance organisation. The work scope of the non-HKAR-145 approved maintenance organisation is limited to that permitted by the HKAR 145.65(b) procedures and may not carry out a base maintenance check of an aircraft or a complete workshop maintenance check or overhaul of an engine or engine module.

The purpose of this appendix is to provide the acceptance criteria of the Director-General for the sub-contracting of aircraft line maintenance under HKAR 145.1(e). It should be read along with HKAR 145.1(e), HKAR145.30(j)(1), HKAR 145.75(b) and their respective Acceptable Means of Compliance.

2 Acceptance Criteria of the Director-General

For the Director-General to accept sub-contracting of maintenance under HKAR 145.1(e), the HKAR-145 approved maintenance organisation should meet the following criteria.

- a. The HKAR-145 approved maintenance organisation must have adequate experience on line maintenance at out-ports.
- b. The HKAR-145 approved maintenance organisation should submit formal application to the Director-General along with the maintenance management exposition (MME) or maintenance organisation exposition (MOE) amendment at least 4 weeks before the commencement of operation at the sub-contracted maintenance location. In any case, the HKAR-145 approved maintenance organisation should advise the Director-General at the earliest opportunity when the potential sub-contracted maintenance organisation is identified. This allows both parties to plan the necessary resources for the project.
- c. An operator should scrutinise the maintenance agreement signed between the HKAR-145 approved maintenance organisation and the sub-contracted maintenance organisation.
- d. Maintenance / ground handling / ground support agreement (or contract) should be ready before the commencement of operation at the sub-contracted maintenance location.

- e. The HKAR-145 approved maintenance organisation should establish procedures for the assessment and acceptance of the sub-contracted maintenance organisation in MME or MOE for the approval of the Director-General. The procedures should meet the intent of HKAR-145. An assessment must be done on the intended scope of work of the sub-contracted maintenance activities.
- f. A station procedure manual or equivalent procedure manual, approved by the quality manager of the HKAR-145 approved maintenance organisation, should be available at the sub-contracted maintenance organisation before the commencement of operation.
- g. Report raised by the HKAR-145 approved maintenance organisation for the assessment / audit on the sub-contracted maintenance organisation should be closed before the commencement of operation.
- h. The HKAR-145 approved maintenance organisation should demonstrate that the certifying staff of the sub-contracted maintenance organisation is qualified in accordance with HKAR 145.30(j)(1). In this regard, the following procedures should be followed:
 - (i) The HKAR-145 approved maintenance organisation should carry out an assessment on the licence to establish compatibility with HKAR-66. Any one of the aircraft maintenance licences issued by the aviation authorities prescribed in Appendix 8 is acceptable to the Director-General for the purpose.
 - (ii) If the licence is not issued by the aviation authorities prescribed in Appendix 8, the HKAR-145 approved maintenance organisation should demonstrate that the acceptance of the national licence as the basis for the issue of Certificate of Release to Service (CRS) is the best option at the said location. In such case, the HKAR-145 approved maintenance organisation should carry out an assessment on the national aviation regulations of the State of the location, subject to the Director-General being satisfied that such regulations result in a standard of qualification comparable with HKAR-66. The HKAR-145 approved maintenance organisation undertakes to conduct training to the certifying staff to bridge any discrepancy in standards between that of the HKAR-66 and the national licence.
- i. The licence, based upon which the sub-contracted maintenance organisation issues the CRS under the approval of the HKAR-145 approved maintenance organisation, should be stated in the MME or MOE.

- j. The HKAR-145 approved maintenance organisation must authorise the certifying staff of the sub-contracted maintenance organisation.
- k. The HKAR-145 approved maintenance organisation must maintain the list of certifying staff of the sub-contracted maintenance organisation and their records of training on aircraft type, Hong Kong aviation legislation, human factors, and company procedures of the HKAR-145 approved maintenance organisation and the Operator being supported.
- l. If a copy of item c), d), e), f) and h) is not submitted together with the MME or MOE amendment, the HKAR-145 approved maintenance organisation should provide the copy at least one week before the planned audit of or the acceptance by the Director-General when the audit is impractical.
- m. Under normal circumstances, the Director-General should carry out the audit before accepting the sub-contracted maintenance organisation. If manpower constraint or travel restriction makes this impractical, the audit should be accomplished within 6 months after accepting the sub-contracted maintenance organisation through approval of the MME or MOE amendment.
- n. All findings identified during the audit should be closed prior to the acceptance of the sub-contracted maintenance organisation. In case the initial audit is performed after acceptance, all the findings identified must be closed in accordance with the time-frame agreed between the HKAR-145 approved maintenance organisation and the Airworthiness Officer performing the audit, or the acceptance of the sub-contracted maintenance organisation may be suspended.
- o. After the acceptance by the Director-General, the HKAR-145 approved maintenance organisation should audit the sub-contracted maintenance organisation at a frequency agreed by the Director-General, subject to the condition that the sub-contracted maintenance organisation should be audited four times in the first year of operation. The format of the audit can be agreed with the Director-General. It is appreciated that the audit frequency imposed by a HKAR-145 approved maintenance organisation may vary between companies. Therefore, it is important that objective criteria are used when determining audit frequency in conjunction with the Director-General. In this regard, the following criteria can be used:
 - (i) Number of engineering related complaints lodged against the sub-contracted maintenance organisation.
 - (ii) Number and category of non-compliance findings established by the HKAR-145 approved maintenance organisation during the audit(s) within the past 12 months.

- (iii) Number of mandatory occurrence report or internal occurrence report accountable by the sub-contracted maintenance organisation.
- (iv) Scale of operation at sub-contracted maintenance location.

Based on the above-mentioned criteria (i) to (iv), the Director-General may demand more frequent audits on the sub-contracted maintenance organisation by the HKAR-145 approved maintenance organisation during the initial operation at the sub-contracted maintenance location until the Director-General is satisfied with the supervision of the HKAR-145 approved maintenance organisation.

If the quality standards of a sub-contracted maintenance organisation indicate a decline, the audit frequency should be increased accordingly. On the other hand, the audit frequency can be reduced on the basis of sound quality records.

- p. When the certifying staff of the HKAR-145 approved maintenance organisation is also required to issue CRS at the sub-contracted maintenance location, the MME or MOE should contain the relevant procedures approved by the Director-General.

APPENDIX 8

**Acceptance Criteria for Certifying Staff of Approved Maintenance Organisations
under the Provisions of HKAR 145.30(j)(5) and (6)**

- 1 Under sub-paragraphs (5) and (6) of HKAR 145.30(j), a HKAR-145 approved maintenance organisation may use suitably qualified staff for base maintenance and line maintenance, respectively, at a location other than Hong Kong in accordance with certain conditions.

The purpose of this Appendix is to provide the acceptance criteria of the Director-General for the HKAR-145 approved maintenance organisation to use qualified certifying staff.

- 2 The licensing requirements of certifying staff of the following aviation authorities are found comparable to those of HKAR-66 requirements and are therefore acceptable:
- a. Civil Aviation Administration of China (CAAC)
 - b. Civil Aviation Authority of Macao SAR (AACM)
 - c. Civil Aviation Authority of Malaysia (CAAM)
 - d. Civil Aviation Authority of New Zealand
 - e. Civil Aviation Authority of Singapore (CAAS)
 - f. Civil Aviation Safety Authority (CASA)
 - g. European Union Aviation Safety Agency (EASA)
 - h. Federal Aviation Administration (FAA)
 - i. Japan Civil Aviation Bureau (JCAB) (Class 1 Licence)
 - j. South African Civil Aviation Authority (SACAA)
 - k. Transport Canada Civil Aviation Directorate (TCCA)

APPENDIX 9**Training Programme and Facilities****1 General**

- 1.1 Training of personnel is considered by the Director-General as an integral part of the HKAR 145 approval. Separate organisations may be accepted by the Director-General to carry out specific training programmes, where an agreement exists between the HKAR-145 approved maintenance organisation and the training organisation.

Note: HKAR-147, the requirements for Approval of Maintenance Training Organisations, became effective on 1 January 2001. These cover the requirements for Type Training to support HKAR-66 Maintenance Certifying Staff requirements and organisation approval to HKAR-145. HKAR-147 Approvals will also be used to replace those approvals and training recognition issued under HKAR-AMEL. A HKAR-145 approved maintenance organisation will be required to hold a HKAR-147 Type Training Approval by 1 January 2003 where it wishes to conduct training in association with the certification authorisation to staff after that date.

- 1.2 Where all or part of the training programme is sub-contracted to an outside organisation which is not itself approved for the training, it is the responsibility of the HKAR-145 approved maintenance organisation to ensure that the standard of training is acceptable to the Director-General and continues to be so.
- a. The liaison procedure between the training organisation and the HKAR-145 approved maintenance organisation in respect of examination standards shall be to the satisfaction of the Director-General.

2 Organisation and Equipment

- 2.1 The experience and qualifications of the person in charge of the training and his deputy shall be such as to ensure that the training will be conducted in a satisfactory manner.
- 2.2 Staff numbers, qualifications and experience shall be appropriate to the intended training programmes. Practical maintenance training shall be supervised by experienced aircraft maintenance engineers, and shall be recorded. A staff training policy shall be agreed with the Director-General.

- 2.3 Suitable accommodation shall be provided for the administrative and training staff.
- 2.4 The number of lecture rooms and demonstration areas shall be satisfactory when considered in relation to the intended training programmes. Heating, lighting, ventilation and noise insulation shall be to acceptable standards.
- a. Classroom accommodation shall be equipped with all necessary teaching aids, including at least wall boards for text/drawing, flip charts and projection equipment for presenting prepared figures, diagrams and text. Such equipment should be of a standard that ensures students can easily read presentation text/drawings/diagrams and figures from any position in the classroom.
 - b. Storage accommodation shall be provided for equipment not in use.
- 2.5 Appropriate teaching, demonstration and projection facilities shall be available and shall be maintained to a satisfactory standard.
- 2.6 Appropriate library facilities shall be provided for the use of training staff and trainees. The facilities shall include relevant aircraft/aircraft components maintenance manuals, official publications, and such basic educational books as may be required.
- a. Suitable arrangements shall be made to ensure that technical publications contained in the library are up to date and reflect current amendment standards.
 - b. Where the training organisation is accepted by the Director-General, any significant changes of personnel, organisation, or training syllabi shall be agreed with the Director-General.
 - c. In order to satisfy himself that the standard of approved training is being maintained at a satisfactory level, the Director-General shall have reasonable access to the organisation and its records. Periodic visits will be made and examination standards will be checked.

3 Training and Training Programmes

The provisions of this paragraph 3 are applicable to training approved in accordance with paragraph 1.1. They should also be taken into account where training is sub-contracted as in paragraph 1.2.

- 3.1 Training shall normally consist of theoretical and practical periods to syllabi and programmes acceptable to the Director-General.
- 3.2 The training programme shall, in addition to providing for training on the relevant aircraft/aircraft components and systems, provide for training in any necessary special techniques required and in the procedures and practices of the HKAR-145 approved maintenance organisation.
- 3.3 Training programmes and their administration shall comply with the following:-
 - a. Suitable standards for course entry and final performance shall be specified by the training organisation in respect of each syllabus.
 - b. Lecture notes, diagrams and any other instructional material shall be substantially accurate at the time they are handed out. Where an amendment service is not to be provided a written warning must be given to this effect.
 - c. Examinations shall be held at the conclusion of each distinct phase or section of the training. A final examination shall be held covering the complete syllabus.
 - d. The content, type, and acceptance standard of examination shall be agreed with the Director-General.
 - e. Examination questions in use shall be sufficient to give full coverage of the phase or section of the syllabus, and shall be appropriate to the expected final performance of the trainee.
 - f. The questions set in particular examinations shall be controlled by supervisory staff, and not by staff directly concerned with the instruction.
 - g. A regular programme of examination question analysis and revision shall be arranged under the direct supervision of a senior member of the training staff.

SECTION 4

HKAR-145

- h. Examination papers and records shall be the responsibility of the Approved Organisation, and shall be stored in locked cabinets.
- j. Records shall not be destroyed or dispersed without the written agreement of the Director-General.

APPENDIX 10

Minimum requirements for HKAR-145 personnel

Management personnel (Note: 1)		Knowledge						Background and work experience		
		HKAR-145 environment		HKAR-145 aircraft / aircraft component maintained		Language				
		Requirement	Provide evidence of	Requirement	Provide evidence of	Requirement	Provide evidence of			Requirement
Accountable manager / Deputy accountable manager (Note: 2)	HKAR 145.30 (a)	Ensure all necessary resources are available to support the organisation approval	Quality principles MOE Training HKAR-145 Training HF Training Safety Management System Training	NR	NR		NR	NR	NR	
		Establish the safety and quality policy								
		Basic understanding of HKAR-145								
		HF Training								
Base maintenance manager	Nominated persons: HKAR 145.30(b) & (c)	AMC 145.30(b)3	Represent the maintenance management structure of the organisation Responsible for all functions in organisation Working knowledge of HKAR-145 HF training Fuel Tank Safety Safety Management System training	Comprehensive knowledge of the MOE HKAR-145 Training and any associated requirement and procedure (aviation legislation training) (Note: 4) Knowledge of maintenance standards (Note: 5) Fuel Tank Safety training Phase 1-Awareness (Note: 3) Initial HF training (Note: 4) Safety Management System training Knowledge of EWIS training when relevant (Note: 4)	Relevant knowledge AMC 145.30(b)	Knowledge of a relevant sample of aircraft / aircraft component maintained, demonstrated by training course (Note: 4 & 6) or by an assessment performed by the Director-General	The MOE should be available in the English language	Ability to read, write and communicate to an understandable level in the English language, plus an equivalent knowledge of the language(s) in which the maintenance instructions are written	Background and satisfactory experience related to aircraft / aircraft component maintained	Practical experience and expertise in the application of aviation safety standards and safe maintenance practices, plus five years relevant work experience of which at least two years should be from the aviation industry in an appropriate position
Line maintenance manager		AMC 145.30(b)4								
Workshop manager		AMC 145.30(b)5								
Quality manager		AMC 145.30(b)6								

Note:

- (1) When the HKAR-145 approved maintenance organisation is adopting other positions for nominated personnel, the minimum evidences needed for these persons are identified in the grey blocks.
- (2) When the Accountable Manager is not the chief executive officer, a statement is required that the proposed person has direct access to the chief executive officer and has a sufficiency of maintenance funding allocation.
- (3) Applicable only to HKAR-145 approved maintenance organisations involved in the maintenance of large aeroplanes (as defined in Section 4 Appendix 4) and fuel system components installed on such aeroplanes when the maintenance data are affected by Critical Design Configuration Control Limitations (CDCCL).
- (4) These courses could be imparted by the HKAR-145 approved maintenance organisation, or by a HKAR-147 approved maintenance training organisation, or by any other organisation accepted by the Director-General.
- (5) Can be demonstrated by experience and/or appropriate training.
- (6) "relevant sample" means that those courses should cover typical systems embodied in those aircraft / aircraft component being maintained within the scope of approval.
- (7) For the HKAR-145 approved maintenance organisation located outside Hong Kong, equivalent courses may be acceptable to the Director-General.

APPENDIX 11**Aircraft component certifying staff****1 General**

- 1.1 This appendix is designed to be used by HKAR-145 approved maintenance organisations when:
- a. Defining the aircraft component certifying staff qualification procedure in the MOE; and
 - b. Assessing each aircraft component certifying staff authorisation granted.
- 1.2 Aircraft component certifying staff means staff authorised by the HKAR-145 approved maintenance organisation to issue Authorised Release Certificate (CAD Form One) for aircraft component under the HKAR-145 approval.

2 Aircraft component certifying staff qualification criteria

- 2.1 Basic requirements:
- a. Be age 21 or above; and
 - b. Be able to demonstrate a working knowledge of English for the maintenance data.
- 2.2 Maintenance experience requirements:
The aircraft component certifying staff should be able to show minimum:
- a. 2 years of experience in the field of maintenance for simple aircraft components, such as cargo containers and pallets, including at least 12 months of practical experience in the specific aircraft component maintenance area/workshop; or
 - b. 3 years of experience in the field of maintenance for complex aircraft components including 24 months of practical experience in the specific aircraft component maintenance area/workshop.
- 2.3 Aircraft component training:
Depending on the complexity and the technology of the aircraft component, the aircraft component certifying shall be able to demonstrate he/she received appropriate theoretical and practical component training from:
- a. The OEM;
 - b. The OEM recognised training organisation; or

- c. The appropriately rated HKAR-145 approved maintenance organisation provided:
 - (1) the person nominated to carry out the training can demonstrate he/she has received training to an appropriate level for the subject aircraft component;
 - (2) the person nominated to carry out the training is appropriately authorised by the HKAR-145 approved maintenance organisation and is able to demonstrate a significant experience on the relevant aircraft component maintenance;
 - (3) the training syllabus has been reviewed by the Engineering Manager and/or the Quality Manager; and
 - (4) the aircraft component is available for practical training purpose.

For simple aircraft components, the HKAR-145 approved maintenance organisation may take credit of the aircraft component certifying staff experience and/or a previous training on a aircraft component from the same family and same technology.

2.4 Bench test training:

Where there is a need to use bench test, the aircraft component certifying staff shall be able to demonstrate he/she received appropriate training. This training for the use of specific tools required by the OEM maintenance data shall be received from:

- a. The OEM;
- b. The bench test manufacturer; or
- c. The appropriately rated HKAR-145 approved maintenance organisation.

2.5 Specific tool/equipment training:

Where there is a need to use specific tool/equipment, the aircraft component certifying staff shall be able to demonstrate he/she received appropriate training. This training for the use of specific tool/equipment required by the OEM maintenance data shall be received from:

- a. The OEM;
- b. The specific tool/equipment manufacturer; or
- c. The appropriately rated HKAR-145 approved maintenance organisation.

2.6 Additional training:

The aircraft component certifying staff shall be able to demonstrate he/she received, as appropriate, training on:

- a. Initial human factor training according to HKAR 145.30(e) and GM 145.30(e) training syllabus;
- b. MOE and internal procedures applicable to aircraft component certifying staff (including issuance of Authorised Release Certificate CAD Form One)
- c. Safety Management System (SMS) training (refer to CAD 712 for further

details).

In addition, where needed, the aircraft component certifying staff shall demonstrate he/she received appropriate training on:

- a. Fuel Tank Safety items, CDCCL level 1 or level 2 (refer to Section 4 Appendix 4 for further details);
- b. Electrical Wiring Interconnection System (EWIS) (refer to AMC 145.30(e)8 for further details);
- c. Any additional training(s) justified during the assessment performed by the appropriately rated HKAR-145 approved maintenance organisation (e.g. human factor, aviation legislation, etc.).

2.7 Recent maintenance experience:

The HKAR-145 approved maintenance organisation shall ensure that the aircraft component certifying staff can demonstrate recent experience on the component area/workshop relevant to the component type intended to be authorised.

The recent maintenance experience shall be understood as meeting the requirement of 6 months of experience in two years period preceding the intended date of issuance of the certification authorisation.

2.8 Additional criteria for the renewal of individual authorisation:

The aircraft component certifying staff shall receive continuation training that includes human factors, fuel tank safety, EWIS and aviation regulation as applicable to the approval ratings and scope of work.

The aircraft component certifying staff shall demonstrate 6 months of experience during the two years period preceding the renewal of authorisation.

3 Summary table for HKAR-145 aircraft component certifying staff qualification criteria

Initial	Basic requirements	Be age 21 or above and able to demonstrate a working knowledge of English for the maintenance data
	Maintenance experience requirements	<ul style="list-style-type: none"> • 2 years of experience in the field of maintenance for simple aircraft components, such as cargo containers and pallets, including at least 12 months of practical experience in the specific aircraft component maintenance area/workshop; or • 3 years of experience in the field of maintenance for complex aircraft components including 24 months of practical experience in the specific aircraft component maintenance area/workshop
	Aircraft component training	The OEM or the OEM recognised training organisation or the appropriately rated HKAR-145 approved maintenance organisation
	Bench test training	The OEM or the bench test manufacturer or the appropriately rated HKAR-145 approved maintenance organisation
	Specific tool/equipment training	The OEM or the specific tool/equipment manufacturer or the appropriately rated HKAR-145 approved maintenance organisation
	Additional training	<ul style="list-style-type: none"> • Initial human factor training according to HKAR 145.30(e) and GM 145.30(e) training syllabus; • MOE and internal procedures applicable to aircraft component certifying staff (including issuance of Authorised Release Certificate CAD Form One); and • SMS training. <p>In addition, where needed, the aircraft component certifying staff shall demonstrate he/she received appropriate training on:</p> <ul style="list-style-type: none"> • Fuel Tank Safety items, CDCCL level 1 or level 2 (refer to Section 4 Appendix 4 for further details); • EWIS (refer to AMC 145.30(e)8 for further details); or • Any additional training(s) justified during the assessment performed by the appropriately rated HKAR-145 approved maintenance organisation (e.g. human factor, aviation legislation, etc.).
	Recent maintenance experience	6 months of experience in two years period preceding the intended date of issuance of the certification authorisation
Renewal	Continuing training	The OEM or the OEM recognised training organisation or the appropriately rated HKAR-145 approved maintenance organisation (includes human factors, fuel tank safety, EWIS and aviation regulation as applicable to the approval ratings and scope of work)
	Maintenance experience	6 months of experience during the two years period preceding the renewal of authorisation

Note: The complexity and technology of the component shall be considered. For simple aircraft components, the HKAR-145 approved maintenance organisation may take credit of the aircraft component certifying staff experience and/or a previous training on a component from the same family and same technology

APPENDIX 12**Develop Maintenance Organisation Exposition Procedures for Welder Qualification and Approval****1 General**

This appendix provides guidelines for developing Maintenance Organisation Exposition (MOE) procedures for welder qualification and approval.

2 MOE Elements

The following elements should be included in the procedures in section 3.11 of the MOE:

- a. The standard to be followed for the qualification of welders;
- b. Material groups of the materials upon which the organisation will perform welding repair;
- c. Methods of welding that the organisation will use;
- d. The control process of the list of approved welders should be described in the MOE. The list of current approved welder could be a separate document;
- e. Roles and privileges of approved welders;
- f. Experience and qualification requirements;
- g. Vision test requirements;
- h. Selection criteria of laboratory for welding specimen assessment;
- i. Initial welding theoretical and practical training requirements;
- j. Organisation welding procedures training requirements;
- k. Examination requirements;
- l. Continuation training and testing requirements;
- m. Authorisation issue, renewal and withdrawal procedures;

- n. Welder records retention procedures;
 - i. Duration;
 - ii. Location;
 - iii. Types of documents to be retained; and
- o. Contracted welders control procedures.