Civil Aviation Safety Authority
of Papua New Guinea

Advisory Circular

AC61-7

Pilot Licences and Ratings – Airline Transport Pilot Licences

Issue 2

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GENERAL

Civil Aviation Safety Authority Advisory Circulars (AC) contain information about standards, practices and procedures that the Director has found to be an Acceptable Means of Compliance (AMC) with the associated rule.

An AMC is not intended to be the only means of compliance with a rule, and consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices or procedures are found to be acceptable, they will be added to the appropriate Advisory Circular.

This Advisory Circular also includes Explanatory Material (EM) where it has been shown that further explanation is required. Explanatory Material must not be regarded as an acceptable means of compliance.

PURPOSE

This Advisory Circular provides methods, acceptable to the Director, for showing compliance with the airline transport pilot licences requirements of Rule Part 61 and explanatory material to assist in showing compliance.

RELATED CAR

This AC relates specifically to Civil Aviation Rule Parts 61 Subpart G

CHANGE NOTICE

This AC replaces Issue 1 dated 1 April 2015.

APPROVAL

This AC has been approved for publication by the Director of Civil Aviation

TABLE OF CONTENTS

Introduction

This advisory circular supports Rule Part 61 Subpart G.

Part 61 Subpart G – Airline Transport Pilot Licence

61.253 Eligibility Requirements

(a) Rule 61.253(a)(2) requires an applicant for an ATPL to hold an appropriate current CPL. This includes the requirement to hold a current Class 1 medical certificate.

(b) Rule 61.253(a)(4) requires an applicant for an ATPL to have flight time experience acceptable to the Director. Attainment of the experience requirements detailed in Appendix I of this advisory circular is acceptable.

(c) Rule 61.253(a)(5) requires an applicant for an ATPL to have passed approved written examinations, or approved equivalents, in air law, flight navigation general, flight planning, meteorology, instruments and navigation aids, human factors, and advanced aerodynamics, performance, and systems knowledge (A) or (H) as appropriate. Credits in the applicable examinations packages listed in tables 1, 2, or 3 in Appendix II will meet these requirements. Appendix III details the syllabuses that are applicable to these examinations.

(d) Rule 61.253(a)(6) requires an applicant for an ATPL to demonstrate competency in the appropriate category of aircraft to a flight examiner authorized by the Director under CAR Part 183. Appendix IV details the competencies to be tested during the flight test.

(e) A current ATPL issued by a foreign contracting State to the Convention will normally be accepted as meeting the requirements in Rule 61.253(a)(4) for flight time experience, and Rule 61.253(a)(5) for all written examination passes except for air law, provided the applicant produces evidence of having completed at least 500 hours as pilot-in-command or 1000 hours as co-pilot on multi-crew operations in multi-engine aircraft on commercial IFR operations following the issue of the flight crew licence that has been presented for recognition. Such experience is to have been gained in countries under the jurisdiction of the foreign authority that issued the ATPL.

Appendix I – ATPL Flight Time Experience Requirements

1.1 Aeroplane

Total flight time experience: At least 1500 hours in aeroplanes with appropriate cross-crediting of experience as detailed below. This flight time experience is to include at least the minimum flight time requirements that follow:

Pilot-in-command: 250 hours in aeroplanes as pilot-in-command, or not less than 150 hours as pilot-in-command and the necessary additional time to make up the total of 250 hours being 50 percent of the total flight time gained when acting as a co-pilot performing under the supervision of a pilot-in-command in accordance with rule 61.31(c). The 250 hours is to include 100 hours of cross-country navigation of which 25 hours is to have been at night.

Cross-country navigation: 200 hours in aeroplanes as co-pilot in an aeroplane required to be operated with a co-pilot, or in lieu thereof 100 additional hours of cross-country navigation flight time as pilot-in-command which may have been part of the 250 hours required for pilot-in-command.

Night flight: 100 hours in aeroplanes as pilot-in-command or as co-pilot.

Instrument time: 75 hours which is to include 50 hours instrument flight time in aeroplanes.

Cross-crediting:

Where an applicant produces acceptable evidence of piloting experience in aircraft other than in aeroplanes, half the pilot-in-command time experienced within the immediately preceding 12 months, up to the maximums that follow, may be credited towards the total flight experience required, but not to the specific flight experiences:

- for helicopters — 60 hours.
- for gliders and powered gliders — 25 hours.
- for the above combined — 60 hours.

1.2 Helicopter

Total flight time experience: At least 1000 hours in helicopters with appropriate cross-crediting of experience as detailed below. This flight time experience is to include at least the minimum flight time requirements that follow:

Pilot-in-command: 250 hours in helicopters as pilot-in-command, or Not less than 100 hours as pilot-in-command and the necessary additional time to make up the total of 250 hours being 50 percent of the total flight time gained when acting as a co-pilot performing under the supervision of a pilot-in-command in accordance with Rule 61.31(c).

Cross-country navigation: 200 hours in helicopters of which not less than 100 hours is to be as pilot-in-command and the necessary additional time to make up the total of 200 hours being 50 percent of the total flight time gained when acting as co-pilot performing under the supervision of a pilot-in-command in accordance with Rule 61.31(c).

Instrument time: 30 hours of which 20 hours is to be instrument flight time in helicopters.

Night flying: 50 hours in helicopters.

Cross-crediting:

Where an applicant produces acceptable evidence of piloting experience in aircraft other than in helicopters, half the pilot-in-command time experienced within the immediately preceding 12 months up to the maximums

that follow, may be credited towards the total flight experience required, but not to the specific experiences:

- for aeroplanes — 60 hours.
- for gliders and powered gliders — 25 hours.
- for the above combined — 60 hours.

Appendix II – ATPL Written Examinations

61.253 ATPL (A) Examinations

Examinations that are acceptable to the Director for the grant of an ATPL(A) are given in Table 1.

Table 1

Examination Authority	Subject titles	Code
CASA	Air Law (aeroplane & helicopter)	ALP
CASA	Flight Navigation – general (aeroplane & helicopter)	
CASA	Flight planning (Aeroplane)	
CASA	Meteorology (aeroplane & helicopter)	AMT
CASA	Instruments and Navigational Aids (Aeroplane)	
CASA	Human Factors (aeroplane & helicopter)	AHF
CASA	Advanced Aerodynamics, performance and systems knowledge (aeroplane)	

61.253 ATPL (H) Examinations

Examination packages that are acceptable to the Director for the grant of an ATPL(H) are given in Table 2 **or** Table 3:

Table 2

Examination Authority	Subject titles	Code
CASA	Aerodynamics and aircraft systems	AASH
CASA	Flight planning	AFPH
CASA	Performance and loading	APLH
CASA	Navigation	ANAV
CASA	Meteorology	AMET
CASA	Human Factors	AHUF
CASA	Air Law	ALP

Table 3

Examination Authority	Subject titles	Code
CASA	Aerodynamics and aircraft systems (helicopter)	TBA
CASA	Flight planning (helicopter)	TBA
CASA	Performance and loading (helicopter)	TBA
CASA	Flight Navigation – general (aeroplane & helicopter)	
CASA	Meteorology (aeroplane & helicopter)	AMT
CASA	Human Factors (aeroplane & helicopter)	AHF
CASA	Air Law (aeroplane & helicopter)	ALP

CASA = Civil Aviation Safety Authority of Australia

Appendix III – Examination Syllabus Information

3.1 Air Law (Aeroplane and helicopter) Syllabus

Candidates are required to have a broad knowledge of the purpose and content of the following documents or groups of documents:

- Civil Aviation Act 2000.
- Civil Aviation Rules (CARs).
- Civil Aviation Advisory Circulars (ACs).
- Papua New Guinea Aeronautical Information Publication (PNGAIP):
  (i) Visual Flight Guide (VFG).
  (ii) Instrument Flight Guide (IFG).
  (iii) Planning Manual.

3.1.1 Civil Aviation Act 2000

Candidates are required to have knowledge of the following section of the Act:

Sections 63 and 64 Duties of pilot in command.

3.1.2 Civil Aviation Rules (CARs)

Candidate must demonstrate knowledge of the following Rules parts. The level of knowledge for each section of the Rules is specified by the following grading:

Level	***Standard***
1	Candidates are to thoroughly understand the operational provisions of this essential knowledge.
2	Candidates are to have a working understanding of this knowledge.

CAR Part 1 – Definitions and Abbreviations

Definitions

Candidates must understand the meaning of the following terms:

Accelerate-stop distance available	Accident
Act	Adequate aerodrome
Aerodrome	Aerodrome control service
Aerodrome Control Tower	Aerodrome Flight Information service
Aerodrome operational area	Aerodrome traffic
Aerodrome traffic circuit	Aerodrome traffic zone
Aeronautical Information Circular	Aeronautical Information Publication
Aeronautical information service	Aeroplane
Aeroplane movement	AIP Supplement

AIP service	Aircraft
Air operator security programme	Aircraft Flight Manual
Air Traffic	Aircraft radio station
Air Traffic Control (ATC) service	Air Traffic advisory service
Air Traffic Control unit	Air Traffic service
Air Transport operation	Airworthiness certificate
Aircraft category	Airworthy condition
Airworthiness directive	Altitude
Alerting service	Approach control office
Approach control service	Area control centre
Apron	Area navigation
Area Control service	ATC clearance
ATC instruction	ATS unit
Augmented crew	Authority
Aviation Medical Assessor	Cargo
Baggage	Category II precision approach procedure
Category III precision approach procedure	Class 3(a) fuel
Ceiling	Class 3(b) fuel
Certificated organisation	Class B cargo or baggage compartment
Clearway	Clearance limit
Command practice	Co-pilot
Contaminated	Configuration
Control area	Control zone
Controlled flight	Controlled airspace
Conversion instruction	Crew member
	Cross country flight
Cruising level	Dangerous goods
Current	Decision altitude
Day	Designated Medical Examiner
Decision height	Document

Disabled passenger	Domestic aerodrome
Dry	Escorted passenger
Dual flight time	Extended-range twin-engine operations
Extended over-water operation	Final reserve fuel
Fit and proper person	Flight crew member
Flight attendant	Flight Examiner
Flight following flight plan	Flight Information region
Flight instruction	Flight manual
Flight level	Flight plan
Flight time	Foreign air transport operation (Part 129 only)
Foreign aircraft	General Aviation Area
Goods	Height
Helicopter	Heliport
Hover	
IFR flight	Instrument approach procedure
Incident	Instrument flight time
Instrument flight	Instrument meteorological conditions
Instrument time	Level
International airport	Lifed
International NOTAM office	Mach number
Landing distance available	Maintenance
Manoeuvring area	Manufacturer's maintenance programme
Maximum certificated take-off weight	Meteorological information
Minimum descent altitude	Minimum descent height
Movement area	Papua New Guinea registered aircraft
Papua New Guinea Aeronautical Information	Night Publications
NOTAM	NOTAM service
Operable	Operate
Operating cycle	Operational flight plan
Originating aircraft	Owner

Passenger	Performance-class 1 helicopter Pilot-in-command
Precision approach procedure	Pressure altitude
Rating	Regular air transport passenger service
Regular air transport service	Reporting point
Required navigation performance	RNP performance
Runway	Runway visual range
SARTIME	Screening
Security	Security control
Serious incident	Shore
SIGMET information	Synthetic flight trainer
Take-off distance available	Take-off run available
Take-off weight	Taxi
Technical Instructions	Time in service
Traffic load	Translation circuit
Turbine powered	Turbofan
Turbojet	Turboprop
Type	Unlawful interference
Valid	VFR flight
Visibility	Visual meteorological conditions
Wet	ZFT simulator

Abbreviations

Candidates must have an awareness of the abbreviations listed in CAR Part 1.

CAR PART 12 – Accidents Incidents and Statistics

Section		Level
12.1	Applicability	2
12.3	Definitions	1
12.51	Notification of an accident	1
12.53	Details of an accident	1

12.55	Notification of an incident	1
12.57	Details of an incident	1
12.59	Investigation and reporting	2
12.101	Access to aircraft involved in an accident	2
12.103	Preservation of records	1
12.151	Aircraft operating statistics	1

CAR PART 20 – Transition Rules (Review as applicable)

CAR PART 61 –	**Licences and Ratings**	
Section		**Level**
61.1	Purpose	2
61.5	Requirement for licence and ratings	2
61.13	Foreign Licences recognised by Director	1
61.15	Duration of licences and ratings	2
61.17	Written examinations – prerequisites and grades	2
61.19	Cheating or other unauthorised conduct	1
61.21	Flight test prerequisites	2
61.23	Reserved	
61.25	Flight training and testing – general requirements	2
61.29	Pilot logbooks – general	1
61.35	Medical requirements	1
61.37	Recent flight experience	1
61.39	Biennial Flight Review (BFR)	1
61.41	Use of lower licence or rating	1
61.43	Examination for continued fitness or proficiency	2
61.53	Aircraft type rating eligibility requirements	1
61.55 (a)	Aircraft type rating entry in pilot logbook Student	2
61.103	Pilot – general	2
61.251	Purpose (ATPL)	1
61.253	Eligibility requirements (ATPL)	1
61.255	Privileges (ATPL)	2
61.257	Currency Requirements (ATPL)	1

CAR PART 67 – Medical Standards and Certification

Section		Level
67.51	Application	2
67.55	Issue of Medical Certificates	2
67.57	Duration of Medical Certificates	1

CAR PART 71 – Designation and Classification Of Airspace

Section		Level
71.11	Controlled and Uncontrolled airspace	1
71.13	Visual reporting points	2
71.15	QNH zones	2
71.51	Control areas	1
71.53	Control zones	1
71.55	VFR transit lanes	1
71.57	General aviation areas	1
71.59	Subsidiary airspace designations	1
71.61	Temporary airspace	1
71.101	Class A airspace	1
71.103	Class B airspace	1
71.105	Class C airspace	1
71.107	Class D airspace	1
71.109	Class E airspace	1
71. 111	Class F airspace	1
71.113	Class G airspace	1

CAR PART 71 – Subpart D Special use Airspace

Section		Level
71.153	Restricted areas	1
71.159	Military operational areas	1
71.	Conditional areas	1
71.155	Danger areas	1
71.	Aerodrome traffic zones	1
71.167	Temporary airspace	1

CAR PART 91 – General Operating and Flight Rules

Section		Level
91.5	Compliance with crew instructions and commands	1
91.7	Portable electronic devices	1
91.9	Carriage and discharge of firearms	1
91.11	Prohibition against interference with crew members, aircraft and aviation facilities	1

CAR PART 91 – General Operating and Flight Rules

Section		Level
91.101	Aircraft airworthiness	1

91.109	Aircraft flight manual	1
91.111	Documents to be carried	1
91.115	Flight attendant requirements	1
91.117	Designation of pilot-in-command	1
91.121	Stowage of passenger service equipment	1
91.125	Simulated instrument flight	1
91.127	Use of aerodromes	1
91.129	Restricted and danger areas	1
91.133	Military operational areas	1
91.135	Conditional areas	1
91.137	Volcanic hazard areas	1
91.139	General aviation areas	1
91.141	Aerodrome traffic zones	1
91.201	Safety of aircraft	1
91.203	Authority of pilot-in-command	1
91.205	Crew members at stations	1
91.207	Occupation of seats and wearing of	1
91.209	Use of oxygen equipment	1
91.211	Passenger briefing	1
91.213	Carry-on baggage	1
91.215	Carriage of cargo	1
91.217	Pre-flight action	1
91.219	Familiarity with operating limitations and emergency equipment	1
91.221	Flying equipment and operating information	1
91.223	Operating on and in the vicinity of an	1
91.225	Operations at aerodromes with air traffic	1
91.227	Operating near other aircraft	1
91.229	Right-of-way rules	1
91.233	Aircraft lights	1
91.235	Dropping of objects	1
91.237	Aircraft speed	1
91.239	Altimeter settings	1
91.241	Compliance with ATC clearances and	1
91.243	ATC light signals	1
91.245	Operations in classified and designated	1
91.246	Operations in RNP designated airspace	1

CAR PART 91 – General Operating and Flight Rules

Section		Level
91.247	Use of SSR transponder and altitude reporting equipment	1

91.249	Aircraft callsigns	1
91.301	VFR meteorological minima	1
91.303	Special VFR weather minima	1
91.305	Fuel requirements for flight under VFR	1
91.307	VFR flight plan	1
91.309	Position reports	1
91.311	Minimum heights for VFR	1
91.313	VFR cruising altitude and flight level	1
91.315	Operating in snow and ice conditions	1
91.401	Minimum flight crew	1
91.403	Fuel requirements for flights under IFR	1
91.405	IFR alternate aerodrome requirement	1
91.407	IFR flight plan	1
91.409	Adherence to flight plan	1
91.411	Inadvertent change to flight plan	1
91.413	Take-off and landing under IFR	1
91.415	Category II and III precision approach procedures	1
91.417	Category II and II precision approach procedure manual	1
91.419	Approval of category II and III precision approach procedure manual	2
91.421	Operating in icing conditions	1
91.423	Minimum altitudes for IFR flights	1
91.425	IFR cruising altitude or flight level	1
91.427	IFR radio communications	1
91.429	IFR operations – two-way radio communications failure	1
91.431	Notification of facility malfunctions	1
91.501	General requirements – instruments and equipment	1
91.505	Seating and restraints	1
91.507	Passenger information signs	1
91.509	Minimum instruments and equipment	1
91.511	Night VFR instruments and equipment	1
91.513	VFR communication equipment	1
91.515	Communication and navigation equipment – VFR over	1
91.517	IFR instruments and equipment	1
91.519	IFR communication and navigation equipment	1
91.521	Category II and III precision approach equipment	1
91.523	Emergency equipment	1

CAR PART 91 – General Operating and Flight Rules

Section		**Level**
91.525	Flights over water `	1

91.529	Emergency locater transmitter (ELT)	1
91.533	Oxygen for non-pressurised aircraft	1
91.535	Oxygen for pressurised aircraft	1
91.537	Inoperative instruments and equipment	1
91.539	Approval of MEL	1
91.541	SSR Transponder and altitude reporting equipment	1
91.543	Altitude alerting system or device – turbojet or turbofan	1
91.545	Assigned altitude indicator	1
91.607	Annual and 100-hour inspections	1
91.609	Radio station tests and inspections	1
91.611	Altimeter system and altitude reporting equipment tests and inspections	1
91.613	SSR Transponder tests and inspections	1
91.615	ELT tests and inspections	1
91.617	Operation after maintenance	1
91.619	Annual review of airworthiness	1
91.621	Maintenance programs	1
91.629	Technical log	1

CAR PART 92 – Carriage of Dangerous Goods

Section		**Level**
92.3	Definitions	2
92.5	Classification	1
92.7	General carriage requirements	1
92.9	Forbidden dangerous goods	1
92.51	Packaging requirements	2
92.53	Packaging approval	2
92.55	Packing requirements	2
92.57	Marking requirements	2
92.59	Labelling requirements	2
92.103	Offer of dangerous goods	2
92.105	Dangerous goods transport document	1
92.157	Aircraft loading restrictions	1
92.161	Separation, segregation, and security	1
92.173	Information to Pilot-in-Command	2
92.179	Information to passengers	2

CAR PART 121 – Air Transport Operations – Large Aeroplanes

Section		**Level**
121.3	Definitions	1

121.5	Laws, regulations, and procedures	1
121.7	Procedure compliance	1
121.9	Crew member grace provisions	1
121.11	Flight simulator and other training device approval	1
121.13	Carriage of firearms	2
121.59	Flight preparation	2
121.61	Operational flight plans	2
121.63	Search and rescue information	2
121.65	Emergency and survival equipment information	1
121.71	Use of aerodromes	1
121.73	Night operations	1
121.75	Fuel	1
121.77	Flight check system	1
121.79	Emergency light operation	2
121.81	Passengers safety	1
121.83	Passenger information	1
121.85	Flight compartment admission	2
121.87	Manipulation of controls	1
121.89	Flight recorder requirements	1
121.91	Refueling and defueling operations	1
121.93	Fuel spillage	1
121.153	Meteorological information	1
121.155	Meteorological conditions – VFR flight	1
121.157	Meteorological conditions – IFR flight	1
121.159	Aerodrome operating minima – IFR flight	1
121.161	IFR departure limitations	1
121.163	Reduced take-off minima	1
121.165	En-route limitations	1
121.167	ETOPS limitations	1
121.169	IFR procedures	1
121.205	General performance	1
121.207	Take-off distance	1
121.209	Runway surface correction factors	1
121.211	Net take-off flight path	1
121.213	Engine inoperative – gradient and stall corrections	1
121.215	En-route critical engine inoperative	1
121.217	En-route – 90 minute limitation	1
121.219	Landing-climb – destination and alternate	1
121.221	Landing distance – dry runways	1
121.223	Landing distance – wet and contaminated runways	1
121.225	Steep approach and short landing techniques	1
121.303	Goods, passenger, and baggage weights	1
121.305	Aeroplane load limitations	2

121.307	Load manifest	1
121.359	Night flight	1
121.361	Instrument flight rules	1
121.363	Flights over-water	1
121.365	Emergency equipment	1
121.367	Protective breathing equipment	1
121.369	Public address and crew member intercom systems	1
121.371	Cockpit voice recorder	1
121.373	Flight data recorder	1
121.375	Additional attitude indicator	1
121.377	Weather radar	2
121.379	Ground proximity warning system	1
121.505	Flight crew duty assignment	1
121.507	Pilot-in-command experience requirements	1
121.509	Second-in-command experience	1
121.511	Pilot experience	1
121.513	Pilot operating limitations	1
121.515	Category II or III approaches and reduced take-off	1
121.517	Flight crew member pairing limitations	1
121.519	Flight attendants duty assignment	1
121.557	Crew member training programme	2
121.559	Crew member introduction segment	2
121.561	Crew member transition segment	2
121.563	Crew member upgrade segment	2
121.565	Crew member recurrent segment	2
121.567	Consolidation	2
121.569	Pilot operating experience	1
121.571	Pilot line-operating flight time	1
121.579	Maneuvers requiring a flight simulator	1
121.581	Crew members training records	2
121.583	Pilot flight examiner experience requirements	2
121.585	Pilot instructor experience requirements	2
121.587	Pilot instructor supervisor experience requirements	2
121.589	Simulator instructor and examiner	2
121.607	Flight crew competency checks	1
121.609	Flight-instructor competency checks	1
121.805	Flight Crew responsibilities	1
121.855	Documents to be carried	1
121.857	Operation record	1
121.859	Retention period	1
121 Appendix B	Instruments and Equipment Airworthiness Design Standards – A working knowledge of this	
121 Appendix C	Runways – A working knowledge of this appendix.	
AC 119-2	Air Operations – Fatigue of flight crew working knowledge of this Advisory Circular.	

PART 125 – Air Transport Operations – Medium Aeroplanes

Rule		Level
125.3	Definitions	1
125.5	Laws, regulations, and procedures	1
125.7	Procedure compliance	1
125.9	Exemptions	1
125.11	SEIFR passenger operations	1
125.53	Aircraft airworthiness	1
125.54	SEIFR Proving flights	2
125.57	Flight preparation	2
125.59	Emergency and survival equipment information	1
125.61	Fuel	1
125.63	Flight check system	1
125.65	Passengers safety	1
125.67	Flight compartment admission	2
125.69	Manipulation of controls	1
125.71	Flight recorder requirements	1
125.72	HUMS requirements	1
125.73	Refueling and defueling operations	1
125.75	Fuel spillage	1
125.77	Use of aerodromes	1
125.79	SEIFR passenger operations	1
125.81	Operations of single-engine aeroplanes – IFR	1
125.83	Restriction or suspension of operations	1
125.85	Minimum height for VFR flights	1
125.87	Flight over water	1
125.93	SEIFR – immediate actions for non-indications	2
125.95	SEIFR – area navigation system requirements	2
125.153	Meteorological information	1
125.155	Meteorological conditions – VFR flight	1
125.157	Meteorological conditions – IFR flight	1
125.159	Aerodrome operating minima – IFR flight	1
125.161	IFR departure limitations	1
125.163	Reduced take-off minima	1
125.165	IFR procedures	1
125.205	Part 121 Subpart D compliance	1
125.207	General aeroplane performance	1
125.209	Take-off distance	1
125.211	Runway surface and slope correction factors	1
125.213	Net take-off flight path – aeroplanes under IFR	1
125.215	Engine inoperative – gradient and stall	1
125.217	En-route critical engine inoperative	1
125.219	En-route – 90 minute limitation	1

125.221	Landing-climb – destination and alternate	1
125.223	Landing distance – dry runways	1
125.225	Landing distance – wet and contaminated	1
125.227	Steep approach and short landing techniques	1
125.228	FAR Part 23 commuter category and SFAR 41	1
125.229	Take-off distance	1
125.231	Net take-off flight path	1
125.233	Landing distance – dry runways	1
125.235	Landing distance – wet and contaminated	1
125.303	Goods, passenger, and baggage weights	1
125.305	Aeroplane load limitations	2
125.307	Load manifest	1
125.355	Seating and restraints	1
125.359	Night flight	1
125.361	Instrument flight rules	1
125.363	Emergency equipment	1
125.365	Public address and crew member intercom	1
125.367	Cockpit voice recorder	1
125.369	Flight data recorder	1
125.371	Additional attitude indicator	1
125.373	Weather radar	2
125.375	Ground proximity warning system	1
125.377	HUMS	2
125.409	Persons certifying maintenance	2
125.415	Maintenance review	2
125.503	Assignment flight crew duties	1
125.505	Pilot-in-command type experience requirements	1
125.507	Pilot-in-command VFR experience requirements	1
125.509	Pilot in Command IFR experience requirements	1
125.511	Minimum flight crew – IFR	1
125.555	Training records	2
125.557	Initial training for crew members	2
125.559	Transition training for crew members	2
125.561	Recurrent training for crew members	2
125.567	Flight crew member instructor qualifications	2
125.607	Flight crew competency checks	1
125.611	Crew member grace provisions	1
125.805	Flight Crew responsibilities	1
125.855	Documents to be carried	1
125.857	Operation record	1
125.859	Retention period	1
125.861	HUMS records	1
125 Appendix B	A working knowledge of this appendix.	
125 Appendix C	Runways – A working knowledge of this appendix.	
AC 119-2	Air Operations – Fatigue of Flight Crew	

3.1.3 Advisory Circulars

Candidates must have a working knowledge of the following current Advisory Circulars:

- AC 12-1 Mandatory Occurrence Notification and Information
- AC 61-1.5 – Commercial Pilot Licences
- AC 61-1.7 – Airline Transport Pilot licence
- AC 67-1 Medical Standards and Certification
- AC 92-1 Dangerous Goods Training
- AC 92-2 Dangerous Goods Carriage
- AC 92-3A Dangerous Goods Packaging
- AC 119-2 – Air Operations – Fatigue of flight crew
- AC 139-8A Heliport Design (for ATPL (H) candidates only).

3.1.4 PNGAIP Planning Manual

Candidates for the Air Transport Pilot licence must have a satisfactory working knowledge of the information contained in all sections of the PNGAIP Planning Manual.

Visual Flight Guide (VFG)

Candidates for the Airline Transport Pilot Licence must have a satisfactory working knowledge of the information contained in the Visual Flight Guide.

Instrument Flight Guide (IFG)

Candidates for the Airline Transport Pilot Licence must have a satisfactory working knowledge of the information contained in the Instrument Flight Guide.

3.2 Flight navigation general (aeroplane & helicopter) syllabus

This syllabus includes all the items in the CPL and instrument rating (IR) navigation syllabuses and may examine those items in greater depth.

Form of the earth: Knowledge of illustrations of spheroid, axis, poles, great circle, small circle, rhumb line, the geographical system of latitude and longitude, equator, prime meridian, date-line, departure, convergency, conversion angle, projection, scale, representative fraction and orthomorphism.

Visibility: The determination of visual range from an aircraft in flight.

The moon: General knowledge of the movements of the Sun, Earth and Moon, the phases of the Moon, the times of rising and setting of the Moon at the various phases.

Relative velocity: The solution of problems.

Wind velocity: Methods of determination.

Position lines: Use and correction where appropriate of visual, radio and radar observations to determine position.

Fuel calculations: Specific gravity of fuel, variation of fuel volume with change of temperature.

3.3 Flight planning (aeroplane) syllabus

This syllabus includes the flight planning aspects of the CPL and IR Navigation syllabuses and may examine those items in greater depth.

Flight plan: The practical preparation of a long distance flight plan.

Flight planning: The purpose, use, value and limitations of the flight plan, modification of flight plans necessitated by conditions experienced in flight.

Critical points and point of no return: The use of aircraft performance data and meteorological data for the determination of point of no return and critical point for normal, engine-out and depressurized operations, the relative effect of changes of airspeed, wind component and rate of fuel consumption on point of no return and critical point.

Aerodynamics and turbine engine characteristics: The variation of aircraft performance with height and weight and the relation between these factors and power, speed and fuel consumption.

Aircraft performance: Methods of presenting aircraft performance data such as those relating to power, speed, height and temperature. Graphs and tabulated data.

Cruise control: Methods for turbine aircraft, their advantages and disadvantages and their selective use, the use of aircraft performance data and meteorological data for the determination of optimum conditions for climbing, cruising and descending.

3.4 Meteorology (aeroplane & helicopter) syllabus

This syllabus includes all the items in the CPL syllabus and may examine those items in greater depth.

The atmosphere: The vertical temperature structure of the earth's atmosphere, occurrence and importance of trace elements and water vapour.

Temperature: Shortwave and longwave radiation in the atmosphere, factors affecting temperature at and near the earth's surface, contrasting thermal properties of land and sea, adiabatic and non-adiabatic processes, latent heat and the effect of water vapour on stability, convection, heat transfer by convection, and factors affecting temperature in the upper air.

Atmospheric pressure and density: Pressure, temperature and density relationships in the atmosphere, effect of water vapour on air density, altimetry, standard atmospheres, pressure altitude and density altitude, and use of QFE and QNH.

Wind: Effect of friction, effect of earth's rotation, geostrophic wind, wind in the friction layer and its variation with height, orographical effects on winds, local winds.

Atmospheric turbulence: Scales of turbulence affecting aircraft, types of turbulence; thermal, frictional, orographic, high level, characteristics of turbulence and avoidance techniques, association of turbulence with synoptic features.

Precipitation: Physical processes involved, hail and snow.

Ice accretion on aircraft: Airframe and engine icing, effects on aircraft performance, recommended flight procedures, propeller and pitot icing.

Thunderstorms: Structure, gusts, downdrafts, squalls and turbulence associated with thunderstorms, flight

through thunderstorms, lightning and static electricity.

Visibility and fog: Horizontal visibility at ground level, runway visual range, air to ground and air to air visibility, temperature inversions and haze or dust layers in the atmosphere, dust storms and sand storms.

Observations and measurement of meteorological elements: The units, methods and equipment used on the ground to measure pressure, temperature, humidity, precipitation, cloud types, amounts, heights of bases and tops, surface wind, visibility and knowledge of the weather elements observed by civil aircraft.

Use of meteorological data: Use of data obtained by radiosonde, radar wind-finding equipment, weather surveillance radar and their relation to aircraft operation, an understanding of specific humidity and mixing ratio.

Air masses: Description, factors affecting the properties of an air mass, classification of air masses, modifications to air masses.

Fronts: Boundaries between air masses; general situation, associated clouds and weather of warm fronts, cold fronts, warm occlusions, cold occlusions, and stationary fronts, principal frontal zones of the earth.

Air masses and frontal analysis: Frontal depressions, formation, warm and cold fronts, occluding process, distribution of weather, families of depressions, troughs, flight conditions through and above depressions; non-frontal depressions, causes, thermal, orographic, secondary, tropical revolving storms, tornadoes, waterspouts, troughs of low pressure; anticyclones, types, general properties, cold anti-cyclones, warm anti-cyclones, ridge of high pressure, col; prognostic rules, movement of fronts, formation and development of fronts, movement of pressure systems, development of pressure systems, effect of mountain ranges and mountain masses on movement of pressure systems and associated fronts; effect of topographical features on the development of weather and clouds, and icing in fronts and air masses.

Weather systems in low latitudes: Low-level wind currents in the tropics, trade wind systems, monsoons, inter-tropical convergence zone, South Pacific convergence zone, convergence and divergence at low levels, synoptic systems found in low latitudes, upper level troughs in temperate latitudes and their effect on weather in low latitudes, tropical cyclones, and typical paths and seasonal variations.

Atmospheric flow at upper levels: Contours of an isobaric surface, analogy with topographical charts, comparison of mean sea-level isobaric charts and 1000 hectopascal contour charts, knowledge of how upper level charts are constructed, stream line and isotach chart, use of scales for estimating geostrophic wind, the relation between winds at different levels, the significance of thickness charts, normal variation of tropospheric wind field with height, and level of maximum wind and its relation to the tropopause.

Jet streams: General structure, conditions favourable for their occurrence, associated observable phenomena, relation to thickness patterns, tropopause and frontal structure, turbulence and cloud forms associated with jet streams, and climatology of the jet stream.

Climatology: The global distribution of temperature, pressure and wind at upper levels and their seasonal variations, the distribution and seasonal variations of these elements in the Australian, Papua New Guinea, and South Pacific areas, and the variation of tropopause height over the globe.

Meteorological organisation for international air navigation: The broad outlines of the international meteorological organisation involved in the preparation of synoptic charts, including the general principles of collection and distribution of reports, the standard hours of observation and the standard times for which synoptic charts are drawn, a more detailed knowledge of the meteorological organisation and procedures, including the meteorological codes and forms employed, for flights on a typical air route.

Meteorological information: Interpretation of synoptic surface and upper level charts for the understanding and discussion of meteorological briefing based on such charts.

3.5 Instruments and navigation aids (aeroplane) syllabus

The fundamentals of magnetism: Properties of a magnet, methods of magnetization and demagnetisation, magnetic properties of hard and soft iron, permeability and retentivity, flux density, magnetic induction, shielding, inverse cube law, magnetic moment, magnetic field associated with an electric current.

Terrestrial magnetism: The earth as a magnet, north and south magnetic poles, magnetic meridian, magnetic variation, isogonic and agonic lines, the earth's magnetic field, its intensity and direction, angle of dip, isoclinic lines, the resolution of the earth's total force into horizontal and vertical components h and z and the effect of change of latitude on the value of these components, magnetic equator, regular and irregular changes in the earth's magnetic field, local irregularities in the earth's magnetic field.

Direct reading magnetic compasses: The principal parts of the compass and their function, aperiodicity, pivot friction and pendulous suspension, reading a compass, parallax error, geographical and physical limitations affecting the satisfactory functioning of the compass, serviceability tests, the causes and effects of the dynamic errors to which direct reading compasses are subject during flight.

Remote reading magnetic compasses: General principles, detector units, principles of transmission systems and cockpit instrumentation, the function of the principal components, operation before and during flight and limitations of one type of gyro-magnetic compass currently in use.

Aircraft magnetism: Hard iron in an aircraft and the resulting permanent magnetic field, soft iron in an aircraft and its temporary magnetization by the earth's magnetic field, the characteristic effects of such fields on the magnetic compass during level flight and in climb and descent.

Changes in deviation: The importance of checking deviation in flight, the effects of change of geographical position, the characteristics and effects of sub-permanent magnetic fields in aircraft, the effects of electrical storms and magnetic materials carried in an aircraft, methods of determining compass deviation in flight and the factors affecting the accuracy of such methods.

The properties of the gyroscope: Precession, effect of earth's rotation and change of geographical position.

Gyro controlled instruments: Directional gyro indicator, artificial horizon, turn and slip indicator; description, general principles, operation and use, errors and limitations.

Pressure operated instruments: Airspeed indicator, description and general principles, limitation at high speed, errors and their correction; pressure altimeter, description, general principles and operation, calibration and errors, conversion of indicated altitude to approximate true and density altitudes; altitude warning device, purpose, method of operation; machmeter, description, general principles, errors, conversion of Mach number to airspeed; vertical speed indicator, description, general principles, operation and use, errors and limitations; central air data computer, purpose, general principles, operation and use, errors and limitations.

Air temperature gauge: General principles, errors and their correction.

Integrated flight systems: Attitude director indicator, Horizontal situation indicator, knowledge of their inputs; remote vertical gyros, advantages, principles, power supplies, levelling devices, torque motor erection and limitations in gyro movement; electronic flight instrument system, major components, EADI, EHSI, symbol generator, control panel, general principles and interpretation of commonly used displays; flight management system, purpose, major components, auto-pilot or flight director (or both) mode control panel, control display unit, thrust management computer, basic principles, operation and use.

Radar aids: Range and bearing measurement, pulse, pulse width, pulse recurrence frequency; primary radar, principles, equipment, use and limitations; secondary radar, principles, equipment, application and potentialities; weather radar, principles, application and operational limitations; Doppler radar, principles,

accuracy and limitations, effects of terrain, and use of associated computers.

General knowledge of radios and navigation aids: Amplitude modulation, frequency modulation, phase modulation, interrupted carrier wave, pulse transmission; HF communications, use, advantages and limitations, frequencies, propagation, power, range, receiver and transmitter tuning, and serviceability checks; SELCAL, description, application, advantages and limitations; ground proximity warning system, purpose, general principles, and method of operation; radio altimeter, description, general principles, and method of operation; VLF and Omega, principles, components, sky wave propagation, range and accuracy, lane ambiguity, synchronization, ground and air equipment, errors and limitations, operation and use; inertial navigation system, principles of operation, accuracy and limitations, and use of associated computers; global positioning system, future air navigation system, microwave landing system, description, general principles, application, advantages and limitations; microburst windshear warning devices; collision warning equipment, description, principles, operation, calibration, use and limitations; emergency locator beacon – aircraft (ELBA), purpose and operation; flight recorder, purpose, operation, and parameters.

3.6 Advanced aerodynamics, performance, and systems knowledge (aeroplane) syllabus

Auto-pilot and flight control systems: Major components and operation of vacuum-hydraulic and electronic auto-pilot systems, power-assisted and power-operated flight control systems, fly-by-wire systems, stability augmentation.

Electrical systems: Ignition, lighting, generators, AC and DC power supply circuits, static electricity, precautions against high charges, bonding methods, static dischargers, pre-flight inspection of bonding, earthing wires, pigtails, block diagram of terminals, cells, batteries, regulators, relays, AC supply, vibrators, inverters, alternators.

Fuel systems: Fuel tanks, types, water drains, vents, baffles, corrosion prevention, pressurisation, fire protection, reserve supply, stand pipe, fuel quantity gauges, tank numbering, precautions against water condensation, fuel booster pumps, tank on line fitting, wobble pumps, strainers or sediment traps, engine pumps, selector valves, gravity feed system, action of crossfeed, fuel transfer in flight, dangers of misuse of fuel system, cause, effects and remedies of vapour locks.

Hydraulic systems: Basic hydraulics, mechanical advantage, advantage of hydraulic system over mechanical system, properties of hydraulic oils, pumps and filters used, accumulators, operation, diaphragm rupture, serviceability, reservoirs, features, oil level on ground and in flight, stand-pipe, emergency fluids, pressure regulators, balance type, mechanical type, spool type, manual power valve, by-pass valves, jacks and actuators and other fittings, seals, typical undercarriage, brake and control flight systems.

Pneumatic systems: Compressor drives and compressors, pressures used, water separators, pressure systems.

Oxygen systems: Requirements for commercial aircraft, high and low pressure systems.

Pressurisation and air conditioning systems: Pressurisation systems, cooling units, pressure differential, pressure differential control, rate selectors, heating systems.

Fire warning and extinguisher systems: Fire warning lights and alarms, test switches, live wire system, extinguisher systems, extinguishing agents, fire fighting methods, types of fire and preferred extinguishing agent.

Flight performance: Effects of loading and mass distribution on aeroplane handling, flight characteristics and performance, mass and balance calculations, use and practical application of take-off, landing and other performance data.

Aerodrome geometry and definitions: Runway, stopway, clearway, take-off distance, take-off run,

accelerate-stop distance, balanced field. The ICAO system of Aircraft Classification Number (ACN) and Pavement Classification Number (PCN).

Take-off speeds: V_{EF} , V_1 , V_{MCG} , $V_{1(MCG)}$, V_{MCA} , V_R , V_{MU} , V_{LOF} , V_2

Take-off climb: First, second, third and final segments; gross and net take-off flight path.

An understanding of factors which determine the maximum take-off weight from a particular runway: Take-off field length, take-off (weight-altitude-temperature) limits, tyre speed limits, brake energy and cooling limits and how this flight manual data is used to construct specimen performance charts.

The rejected take-off decision: Operational considerations.

ICAO PANS-OPS 3 departure procedures: Considerations; obstacle clearance; departure routes.

Using specimen performance data, calculate: Maximum take-off weight, take-off thrust (including reduced thrust), max. continuous thrust, climb thrust, cruise thrust; take-off speeds.

Flap retraction schedule, climb speed schedules, maximum rate climb, maximum angle climb, time and distance to altitude.

High and low speed buffet margins, turbulence penetration speeds.

One engine inoperative drift down and cruise: Gross and net level off altitudes.

Descent distance and time to touchdown.

Flap extension/manoeuvring speeds, landing reference speed, landing distance (normal), landing distance (non-normal), landing field length requirements.

Approach-climb, landing-climb, go around thrust, PANS OPS 3 missed approach procedure.

Gas turbine engines: As for the Gas Turbine Rating syllabus except that persons who have successfully completed an approved course for that rating are exempt from this part of this examination. The requirements of an approved course would be met by completion of an appropriate course at an organisation certificated to offer that course under Civil Aviation Rule Part 141, with certification that a satisfactory standard of knowledge had been achieved.

Aerodynamics – transonic speeds: Speed of sound, compressibility and incompressibility, shock waves, shock stall, shock drag, Mach number, critical Mach number, behaviour of aircraft at shock stall including Mach tuck, height and speed range, shock waves, pressure distribution, sonic booms, raising critical Mach number, slimness, sweepback, control problems, area rule, vortex generators.

Aerodynamics – supersonic speeds: Mach angle, supersonic flow, compressive flow, supersonic flow over aerofoil, convergent divergent nozzle, expanding, contracting duct, boundary layer and supersonic flow, supersonic wing shapes, plan forms, aerofoil sections, supersonic body shapes, area rule at supersonic speeds, stability and control problems, flight at supersonic speeds.

3.7 Human factors (aeroplane & helicopter) syllabus

The syllabus for an ATPL Human Factors written examination is the same as the syllabus for the CPL Human Factors written examination, except that the questions asked on those topics will be more searching and a higher standard of answer will be required.

In accordance with the concepts of the Rule/AC system, successful completion of an approved course in Human Factors would be accepted as equivalent to a written examination pass in the subject for ATPL. This requirement would be met by:

- completion of a course of Human Factors training at an organisation certificated under Civil Aviation Rule Part 141, or otherwise acceptable to the Director, with certification that a satisfactory standard had been achieved. For a training course to be acceptable as a human factors pass for ATPL, it should be to the ATPL human factors syllabus, be of at least 100 hours duration (which may include preparatory reading and projects), and include internal assessment, or

- completion of the Massey University course 75.667/28.610 – Psychology of Flight Deck Performance (formally Aviation Psychology) with a pass grade. This is a one year part-time course that consists of a course text, course readings, workshops, seminars and research. It may be taken internally or extra-murally. Assessment is by a 3000 word short essay, an aviation psychology project with a 5000 word report, and a three hour written university examination.

3.8 Aerodynamics and aircraft systems (helicopter) syllabus

ADVANCED AERODYNAMICS

Review of terminology and definitions

(a) IAS, CAS, EAS, TAS

(b) Reference speeds including VTOSS, CDP, LDP, VTOCS, VY, VY(SE), VminIFR

(c) Define tip path, tip path plane, axis of rotation, shaft axis, disc area, chord line, blade angle, angle of attack, coning angle, feathering, feathering axis, disc loading, blade loading, solidity, flapping, dragging, teetering rotor, articulated rotor, semi rigid rotor.

Aerodynamic forces

(a) The atmosphere as applies to aerodynamics

(b) Lift, induced and parasite drag, lift/drag ratio

(c) Effect of RAF on angle of attack, induced airflow and effects, total reaction, rotor thrust, torque, torque reaction, rotor thrust/rotor drag ratio, forces opposing weight, factors influencing rotor thrust, Bernoullies theorem, Hookes joint effect.

Stability

(a) Static and dynamic stability

(b) Stability during hover
(c) Stability during forward flight

(d) Effect of off set flapping hinges

(e) Effect of stabiliser bar

(f) Effect of Centre of Gravity

(g) Effects of altitude and speed on stability

(h) Effect of horizontal stabiliser

Forward flight

(a) Arrangement of forces and effects of C of G position

(b) Basic aspects-tilting the disc through cyclic

(c) Dissymmetry of lift, dissymmetry lift elimination through flapping

(d) Flapback, designs to reduce flapping amplitude, delta-3 hinge, offset pitch horn

(e) Reverse flow, transitional flow, inflow roll.

Climbing and descending

(a) Forces in a vertical climb

(b) Horsepower available (HPA) curve and factors affecting the HPA: altitude, DA, collective setting.

(c) Rate and angle of climb and relationship to HPA and HPR curve

(d) Effect of wind, altitude, and sling loads on rate and angle of climb

(e) forces in a vertical descent

(f) Over pitching

(g) Rate and angle of descent and relationship to HPR and HPA curves

(h) Effect of wind, AUW, altitude and sling loads on rate and angle of descent.

Hovering

(a) Definition

(b) Hover in and out of ground effect (IGE, OGE)

(c) Factors affecting ground effect, height, DA, AUW, nature of surface, slope, wind, recirculation.

Turning

(a) Centripetal force and angle of bank

(b) Rate and radius of turn, relationship of angel of bank

(c) Steep turn, load factor, power requirement

(d) Forces in climbing and descending turns

(e) Effect of attitude and bank angle on rate and radius of turn

(f) Effect of AUW on rate/radius

(g) Effect of wind when turning around a ground feature

(h) Effects of slipping and skidding

Autorotation

(a) Definition

(b) Auto rotative forces/drag

(c) Effects of airflow on vertical autorotation

(d) Effects of airflow on forward autorotation

(e) Rate of descent requirements for autorotation – minimum rate of descent, maximum air range

(f) Effect of weight, altitude, temperature

Rotor blades

(a) Feathering, taper, washout, lift distribution

(b) Flapping, flapping to equality

(c) Dragging

(d) Changing blade C of G

(e) Limits of rotor RPM

Tail Rotor

(a) Principles of operation – pitch control

(b) Primary and additional purpose

(c) Autorotation

(d) Tail rotor drift

(e) Tail rotor roll

(f) Tail rotor flapping, shrouded rotors

Ground resonance

(a) Definition

(b) Causes of ground resonance

(c) Recovery action

Vortex ring state

(a) How vortex ring develops

(b) Effects of ROD-flow and tip vortex action on rotor thrust

(c) Effects of power and airspeed on vortex ring state

(d) Flight conditions leading to vortex ring state

(e) Tail rotor vortex ring state

(f) Loss of tail rotor effectiveness (LTE)

Retreating blade stall

(a) Conditions which could cause retreating blade stall

(b) Effects of reverse flow, effect of airspeed on stall angle

(c) Factors effecting the advancing blade

(d) Symptoms and recovery from retreating blade stall

(e) Methods to minimise retreating blade stall (swept tips)

(f) Effect of altitude on Vne

(g) Forward speed limiting factors.

Aerodynamic vibrations

(a) Causes of low, medium, and high frequency vibrations.

(b) Causes of chordwise vibrations.

(c) Methods of reducing aerodynamic vibrations.

Blade sailing, dynamic roll-over, mast bumping

(a) Definitions

(b) Cause of blade sailing and prevention

(c) Forces in dynamic roll-over

(d) Avoidance of dynamic roll-over

(e) Factors effecting mast bumping/flapping amplitude

(f) Avoidance of mast bumping

3.9 Airframe and systems

FLIGHT CONTROLS

Review of flight controls

(a) Primary flight controls

(b) Pitch (cyclic), yaw, collective

(c) Trim systems

(d) Canted tail rotor

(e) Sweep back on tips

(f) Shrouded tail rotor

Aerodynamic enhancements

(a) Canted tail rotor

(b) Sweep back on tips

(c) Shrouded tail rotor

(d) Tail surfaces, fins, end plates, stabilisers

Powered controls

(a) Methods of transmitting demand to control surfaces

(b) Feedback

(c) Natural and artificial feel

(d) Possibility/availability of manual reversion

Hydraulic systems

(a) Functioning of typical hydraulic system with multiple pumps and services; main, standby and emergency systems

(b) Understand purpose/function of major components: pumps, accumulators, reservoirs, selector valves, check (one way) valves

(c) Recognising on a diagram the symbols for major components and be able to trace the functioning of a diagrammatic system (system detail at the level of a typical Flight Manual)

(d) Typical services operated (typical system of allocating priority to certain services)

3.10 Air conditioning

Air supply system

(a) Power sources such as engine transmission, driven compressor, bleed air, gas turbine compressor, turbo charger compressor

(b) Typical services provided

(c) Availability of services such as possibility of limitations during take-off and landing or during engine start.

Air conditioning system

(a) Types of systems such as freon, air cycle machine

(b) Brief outline of operation of the system such as single and multi zone

(c) Purpose and need for humidifier

3.11 Ice, rain, and particle protection

DISTINCTION BETWEEN ANTI-ICE AND DE-ICE SYSTEMS

Actuating systems

Basic principles of hydromechanics

(a) Principle of transmission of force by an incompressible fluid

(b) Brief comparison with use of a compressible fluid

Thermal ice protection

(a) Where used such as flying surfaces, air intakes, pitot and other sensors, windshields

(b) Methods such as electric, air, oil

(c) Limitations

Fluid ice protection

(a) Where used such as ground de-icing

(b) Limitations

Rain removal from windscreens

Wipers

Effects on helicopter performance

(a) Ice accumulation

(b) Use of engine air bleed ice control systems

Particle separator systems

(a) Limitations on use

(b) Effect on performance

3.12 Fuel systems

(a) Class 3(b) fuels

(b) Jet fuel (JetA1), different forms, other fuels and volatility

(c) Specific gravity meaning and variation with temperature, effect of variation

Carriage of fuel on the aircraft

(a) Fuel tanks

(b) C of G balance during fuel usage

(c) Problems such as algae, corrosion, water content

(d) Need for venting

(e) Anti-icing additives

Operation of fuel system

(a) Function of a typical multi engine fuel system

(b) Understanding purpose and function of major components

(c) Recognising on diagrams the symbols for major components

(d) Understanding suction feed/transfer as back-up for pressure feed/transfer

Operational considerations

(a) Fuel temperature max and min, need for fuel heating

(b) Cooling and lubrication of pumps

(c) Cooling of oil/hydraulic systems and the effects of fuel flow rates

(d) Minimum fuel level for pick-up for delivery to engine, maintain oil hydraulic cooling, effects of aircraft attitude, fuel jettison.

Fuel system monitoring

(a) Gauges for fuel contents, flow meters, effect of check angle, likely errors

(b) Warning systems such as low fuel level and low pressure level

(c) Measurement of tank contents using dipstick, drip stick, floatsticks, importance of having aircraft level, precautions in use

3.13 Electrical systems

Selected components

(a) Bus, concept of a bus, common terminology, hot, emergency and essential bus types

(b) Circuit breaker, function, precautions when resetting, multiple circuit breaker panels need for identification, grid system of nomenclature (eg CB G22 on P3 panel)

(c) Battery, types of high performance batteries in common use, charge and discharge characteristics, advantages of AC verses DC, types of generator

(d) Electrical power generation for AC and DC, types of generators, advantages, limitations

(e) Transformer/Rectifier unit purpose, function of diodes/Reverse Current Relays

(f) Power distribution by connecting generator to a bus, connecting multiple generators to bus system – split buses, paralleling generators, priority supplies in event of partial engine failure.

Operation of electrical system

(a) Functioning of a typical AC based electrical system with multiple generators, multiple AC and DC buses, APU and GPU

(b) Recognise on a diagram the symbols for the major components and be able to trace the functioning of the diagrammatic system. (system detail at the level of typical operations manual diagram)

Aircraft Structure as an electrical conductor

(a) Application

(b) Bonding requirement

3.14 Power Plants – Turbine engine

ENGINE INSTRUMENTS

Displays

(a) Types of displays commonly available such as pointer-and-dial, vertical strip, EICAS, Cathode Ray Tubes, Light Emitting Diodes.

(b) Purpose of monitoring engine parameters, comparison of engine performance, trends/use of analogue displays/indications, identification of malfunctions/failures

(c) Desirability of rapidly being able to identify a gauge with its engine – examples of good/bad instrumentation layout, brief reference to misidentification of engine.

Torque Meter

(a) Inputs and methods of functioning

(b) Types of indicators and units of torque

(c) Typical appearance of a set of gauges in a modern multi engine helicopter

RPM indicator

(a) Types of display – RPM, percent.

(b) Multiple RPM displays – N1, N2, NR

(c) Typical appearance of a set of gauges in a modern multi engine helicopter

Temperature Indicator

(a) Types of display – analogue/digital

(b) Over temperature warnings

(c) Typical appearance of a set of gauges in a modern multi engine helicopter

Fuel consumption

(a) Flow meters – analogue/digital indicators, importance on start-up and shut-down

(b) Fuel-used gauges – may be incorporated with flow meter

(c) Typical appearance of a set of gauges in a modern multi engine helicopter

Total air temperature gauge (TAT)

(Note: not an engine system gauge but included here for simplicity of coverage)

(a) Purpose and functioning

(b) Typical indicators

Monitoring systems

(a) Indicators, units, warning systems,

(b) Mechanical and electrical remote signal transmission systems

(c) Health and Usage Monitoring System (HUMS) operation and indication

3.15 Flight Instrumentation Systems

Application of computers to aircraft

(a) Flight management systems

(b) Performance management systems

(c) Fly-by-wire

Electronic flight instrument system (EFIS)

(a) Advantages over conventional system

(b) Typical inputs and outputs

(c) Data input

(d) Control panel display unit

(e) Example of typical aircraft installation

Flight management system

(a) Advantages over conventional system

(b) Typical inputs and outputs

(c) Data input
(d) Control panel display unit

(e) Example of typical aircraft installation

Stability, Augmentation and Automatic flight control system (AFCS)

AFCS

(a) Purpose and function of AP – common types, pitch, collective, other

(b) Components

(c) Typical Auto pilot (AP) controller

(d) Command and manual modes, typical sub-modes, stability augmentation system (SAS), attitude retention system (ARS/ATT), ALT/HDG/IAS hold, VOR/LOC/ILS/INS/GPS tracking, Flight management System (FMS) coupling, auto-hover

(e) Typical limitations/restrictions

Flight director (FD)

(a) Purpose/function of FD

(b) Common types of presentation – V bars, cross bars

(c) Typical components

(d) Typical FD controller

(e) Typical modes of operation – mode indicator

Autoflight

(a) Relationship between FD and AP

(b) Relationship between FMS and FD/AP

(c) Redundancy requirements

WARNING AND RECORDING EQUIPMENT

Ground proximity warning systems (GPWS) and auto voice activated decision system (AVADS).

(a) Purpose/function of GPWS

(b) Modes of operation, operating envelopes

(c) Hard and soft warnings – aural and visual

(d) Inputs and outputs

(e) Limitations and restrictions

(f) Typical GPWS display/control panel

(g) AVADS – principles of operation, warnings, limitations

Traffic collision Avoidance system (TCAS)

(a) Purpose and function of TCAS

(b) Operating envelope – inputs and outputs

(c) Aural and visual warnings

(d) Limitations and restrictions

(e) Typical TCAS display/control panel

Rotor overspeed/underspeed warning system

Inputs and outputs

Flight data recorder (FDR)

(a) Purpose and function of FDR

(b) Typical data coverage available

(c) Physical appearance of a set of gauges of recorder and recorded data

Health and Usage Monitoring system (HUMS)

(a) Purpose and function of HUMS

(b) Down loading

(c) Actuation

Master warning systems (MWS)

(a) Purpose and function of MWS

(b) Typical warning systems

(c) Aural/visual outputs – warnings, cautions

(d) Typical displays provided

(e) Take-off inhibiting of MWS outputs

Fire detection, warning, extinguishing systems

(a) Types

(b) Warnings

(c) Limitations

(d) Actuation

(e) Effects

3.16 Flight planning (helicopter) syllabus

Practical flight planning

Complete a practical flight planning exercise using specified initial conditions and operations manual data. Other conditions may be inserted or varied enroute for test purposes. The exercise is intended as a consolidated test of a candidate's ability to apply flight planning, performance and navigational principles and will include—

(a) Calculation of take-off limits

(b) Selection of take-off path / runway

(c) Payload/fuel uplift capability

(d) MTOW including limits imposed by cruise factors

(e) Calculation of take-off distances

(f) Preparation of weight and balance – adjustment of load/fuel as required

(g) Selection of route and altitude

(i) allowing for wind and temperature

(ii) based on given forecast or actual conditions

(iii) synoptic

(iv) sigmet

(v) winds

(vi) TAF METARs

(vii) include departure, destination and alternate requirements

(h) Preparation of a fuel plan

(i) Sector fuel burns

(ii) mid zone weight

(iii) total fuel burn

(iv) alternate and reserve fuel

(v) total fuel required

(i) preparation of a navigation plan

(i) sector times, distances, tracks

(ii) headings and ground speeds

(iii) minimum enroute altitudes

(iv) allowance for climb and descent

(v) lowest safe altitudes

(j) Inflight computations, revisions or replanning

(i) fuel state, fuel requirements, fuel reserves

(ii) navigational progress, tracks, ETA's, enroute wind

(iii) diversion from track

(iv) change of cruising level

(v) engine-out flight

3.17 Performance and loading (helicopter) syllabus

TAKE-OFF AND LANDING PERFORMANCE

Terminology

Understand and be able to use terms in correct context

(a) Speeds

(i) VTOSS, VYSE, VTOCS

(ii) max rate and max angle climb speed

(iii) CDP (speed/time) LDP

(b) Distance

(i) TORR/TORA, TODR/TODA, ASDR/ASDA, LDR/LDA

(ii) balanced field length

(iii) clearway, stop-way

(c) Weights

(i) TOW/MTOW, LW/MLW, ZFW/MZFW

(ii) basic operating weight

(iii) useable fuel

(iv) payload

THEORY – TAKE-OFF PERFORMANCE

Runway/helipads

(a) Derivation/basis of take-off distance

(b) Derivation/basis of accelerate-stop distance – delay factors assumed

(c) Clearways and stopways function

(d) Allowance for head/tail wind

Take-off performance

(a) Concept/purpose of take-off and segments

(b) Composition of segments – first, second, third, fourth

(c) Take-off climb gradients

(i) distinction between gross and net gradient

(ii) purpose of net gradient

(d) Gradients required in each segment

(i) gross and net obstacle clearance requirements take-off area (IMC case only)

(ii) vertical clearance

(e) Curved departures

(i) point at which turn may commence

(ii) bank angle

(iii) vertical clearance

Take-off weight restrictions

Factors affecting the maximum permissible take-off weight

(a) Structural limit

(b) Enroute accountability VFR

(c) Enroute accountability night/IFR

(d) Second segment climb limit

(e) Landing weight

(f) Enroute climb requirement

Power assessment

Practical application – take-off

(a) Use typical flight manual data to determine either

(i) MTOW on given runway or helipad

(ii) min runway length at given take-off weight incorporating any or all of the following variables – wind component, temperature, altitude, engine type and/or power setting

Theory – landing performance

(a) Runway: Derivation/basis of landing distance

(i) certification of landing technique

(ii) factoring

(b) Allowance for wind

(c) Approach and touch-down

(d) Determination of LDP

(e) Landing weight restrictions

(f) Factors affecting the maximum permissible landing weight

(g) Effects of operating technique

(h) Practical application – landing

(i) Use typical flight manual data to determine MLW on given runway or helipad

(j) Climb, cruise and descent performance

(k) Understand and be able to use terms in correct context such as

(i) long range cruise (LRC)

(ii) specific range

(iii) point of no return (PNR)

(iv) point of safe diversion (PSD)

(v) equi-time point (ETP)

(vi) ISA and temperature derivatives such as ISA+10

Performance class-1 (Cat-A) performance calculations

(a) Cat-A take-off criteria

(b) Cat-A landing criteria

(c) Reject take-off distance performance graphs

(d) Effect of wind on VTOSS speeds

(e) WAT charts for weight, altitude, temperature performance

(f) LDR as used for Cat-A performance for landing distance required

Basis of speed Management

Effect of altitude and temperature variations

(i) fuel consumption

(ii) range

(iii) specific range

(iv) rate of climb

Effect of operational decisions

(a) Factors affecting choice of cruise speed

(b) Selection of descent point

(c) Engine out considerations

Enroute flight path gradients

(a) Enroute climb gradient

(b) Enroute obstacle clearance (IMC case)

(i) horizontal distance from cloud

(ii) vertical distance from obstacles

(iii) net gradient required at minimum clearance

(c) Drift down procedure and increased vertical clearance required

Practical application

Climb

Given appropriate initial data including variations from ISA, use typical flight manual information to determine time distance fuel used to a given altitude, or altitude reached after a given time or distance

Cruise and descent

Given appropriate initial data, including variations from ISA, use typical flight manual information to determine, under normal and engine out conditions

(a) Maximum and optimum cruise levels

(b) TAS and fuel consumption at specific altitudes, adjusting for use of bleed air etc as required

(c) Max weight or temperature at which specified performance and or altitudes can be obtained

(d) Holding speeds and fuel consumption at specified and optimum altitudes

(e) Appropriate descent points and calculate time of descent

Weight and Balance

Terminology

Understand and be able to apply in correct context the following terms and concepts

(a) CG, CG index, CG envelope

(b) Floor limits

(c) Moment arm

(d) Loading zones

(e) Basic weight

(f) Zero fuel weight

(g) Average weights for flight crew, passengers and baggage

(h) Approved load control system

Theory

Basic weight and balance

(a) Review basic theory of CG and moments

(i) CG index

(ii) CG envelope

(b) Review standard terminology for weights

(i) Basic weight

(ii) Operating weight

(iii) Zero fuel weight

(iv) Fuel weight, payload

(c) Understand the consequences of overloading on

(i) take-off performance

(ii) climb/cruise performance

(iii) aircraft structure

(d) Understand the requirement for passenger seat allocation and need to control seating changes in large aircraft

(e) Effect of weight on autorotation and landing

Load control system

(a) Purpose and function of a load control system – weight control authority

(b) Approved load controlled (ALC) – responsibility of ALC

(c) Responsibilities of pilot in command – pilots may assume responsibility of ALC

(d) Load sheet requirements and contents

Practical application

Use typical flight manual information to extract weight and balance data

(a) Given appropriate initial data, determine any or all of —

(i) CG at empty weight

(ii) movement of CG with addition of fuel and payload

(iii) movement of CG due to fuel consumption in flight

(iv) effect of CG of raising/lowering undercarriage

(b) Determine CG limits for take-off, cruise and landing

(c) Determine adjustments required to the payload to permit operations within the CG envelope

Given appropriate initial data, assess a complete weight and balance proforma and determine whether it is acceptable for flight.

Sling load / winch – effects on C of G

Appendix IV – ATPL Flight Test Syllabus

4.1 General

The applicant will be required to provide a multi-engine aircraft (or flight simulator approved for that purpose) equipped for flight under IFR, with an approved intercommunication system and with an approved means of simulating instrument flight conditions. They are also required to provide a copy of the current meteorological forecast for the period of the flight. An ATPL flight test will include all elements of the instrument rating flight test and will include a route sector of at least 50 nm with diversion to an alternate.

4.2 General knowledge test

The test is to include an oral general knowledge test followed immediately by a pilot competency test. Failure to pass in any item of the pilot competency test will result in the applicant's instructor being advised of the failure aspects and the further training believed necessary before a further flight test may be undertaken.

Certificate of airworthiness, flight manual, release to service, radio licence and aircraft log book.

Aircraft performance and calculation of take-off and landing distances.

Fuel requirements and fuel management.

Aircraft loading including fuel, oil and baggage, and completion of a load sheet.

Aircraft inspection, pilot maintenance, and pre-flight check.

Location, use and operation of emergency equipment.

Weather on the day of the test including the interpretation of the meteorological forecast.

4.3 Pilot competency test

Normal and emergency manoeuvres.

Solely by reference to instruments, normal and emergency manoeuvres including recovery from abnormal situations appropriate to the type of aircraft used in the test.

Operation with one powerplant inoperative.

Compliance with air traffic services practices and procedures, and required communications with a degree of competency appropriate to the privileges of the holder of an ATPL.

Under actual or simulated instrument flight conditions, holding procedures and approach to land procedures using pilot-interpreted aids, demonstrating a requisite degree of skill in the use of all related instruments, and any other demonstration of skill required for the instrument rating.

The flight test is to be conducted in a multi-engine aircraft of a MCTOW of at least 5700 kilograms or in a multi-engine aircraft which the Director approves as performing to the equivalent operational standard as aircraft used in airline operations. It is to be at a weight that will give a positive indication of the applicant's competency to fly the aircraft in the most adverse aircraft configuration appropriate to the manoeuvre being demonstrated, provided that subject to the approval of the Director, all or selected manoeuvres may be demonstrated by means of a flight simulator approved for that purpose if it is inadvisable that such demonstrations be conducted in flight.