



FLIGHT ENGINEER LICENCE (FEL)

AIR NAVIGATION ORDER

VERSION : 2.0
DATE OF IMPLEMENTATION : 20-11-2009



| | NAME | DESIGNATION | SIGNATURE |
|--------------------|--|--|-----------|
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| TYPE OF DOCUMENT | AIR NAVIGATION ORDER (ANO). | | |
| STATUS OF DOCUMENT | CONTROLLED | | |

A. AUTHORITY:

A1. This Air Navigation Order (ANO) is issued by the Director General, Civil Aviation Authority in pursuance of the powers vested in him under Rules 4(3), 35, 36, 37, 38, 39, 354, 357, 360 and all other enabling provisions of the Civil Aviation Rules, 1994 (CARs,94).

B. PURPOSE:

B1. The purpose of this Air Navigation Order (ANO) is to provide regulatory framework for the issuance, renewal and validation of Flight Engineer Licence (FEL).

C. SCOPE:

C1. This ANO relates to the rules regarding issue and renewal of Flight Engineer Licence (FEL) issued under Part V of the Civil Aviation Rules, 1994.

C2. All persons intending to act as Flight Engineer on an aircraft registered in Pakistan shall comply with instructions contained in this ANO, other relevant ANOs and related instructions issued from time to time.

D. DESCRIPTION:

D1. DEFINITIONS:

Please refer to ANO -020-XXLC-1.0.

D2. LICENCE REQUIREMENTS:

D2.1 To hold a Flight Engineer Licence (FEL) and perform the duties of a Flight Engineer without supervision, an applicant shall meet the requirements detailed in sections D2, D3, D4 and D5.

D2.2 While acting as a Flight Engineer under supervision to gain the experience requirement detailed in sections D4, an applicant shall hold a Student Flight Engineer Licence (SFEL).

D2.3 To obtain a SFEL an applicant shall meet the requirements of sections D1, and D2.

D3. AGE, MEDICAL AND LANGUAGE QUALIFICATIONS:

D3.1 An applicant shall:

D3.2 not be less than 17 years of age for a SFEL and not less than 18 years of age for a FEL;

D3.3 hold current Class-1 Medical Assessment;

D3.4 hold an educational qualification of at least Bachelor of Science; and

D3.5 be capable of speaking, reading and understanding the English Language.

D4. KNOWLEDGE:

D4.1 An applicant shall have demonstrated a level of knowledge appropriate to the privileges granted to the holder of a Flight Engineer Licence, in at least the given overleaf subjects:

D4.2 **AIR LAW:**

Rules and regulations relevant to the holder of Flight Engineer Licence; rules and regulations governing the operation of civil aircraft pertinent to the duties of a flight engineer in Pakistan.

D4.3 **AIRCRAFT GENERAL KNOWLEDGE:**

D.4.3.1 Basic principles of powerplants, gas turbines and piston engines; characteristics of fuels, fuel systems including fuel control; lubrication systems; afterburners and injection systems, function and operation of engine ignition and starter systems.

D.4.3.2 Principles of operation, handling, procedures and operating limitations of aircraft powerplants; effects of atmospheric conditions on engine performance.

D.4.3.3 Airframes, flight controls, structures, wheel assemblies, brakes and anti-skid units, corrosion and fatigue life; identification of structural damage and defects.

D.4.3.4 Ice and rain protection systems.

D.4.3.5 Pressurization and air-conditioning systems, oxygen system.

D.4.3.6 Hydraulic and pneumatic systems.

D.4.3.7 Basic electrical theory, electric systems (AC and DC), aircraft wiring systems, bonding and screening.

D.4.3.8 Principles of operation of instruments, compasses, auto-pilots, radio communication equipment, radio and radar navigation aids, flight management systems, displays and avionics.

D.4.3.9 Limitations of appropriate aircraft.

D.4.3.10 Fire protection, detection, suppression and extinguishing systems.

D.4.3.11 Use and serviceability checks of equipment and systems of appropriate aircraft.

D4.4 **FLIGHT PERFORMANCE AND PLANNING:**

D.4.4.1 Effects of loading and mass distribution on aircraft handling, flight characteristics and performance; mass and balance calculations.

D.4.4.2 Use and practical application of performance data including procedures for cruise control.

D4.5 **HUMAN PERFORMANCE AND LIMITATION:**

D.4.5.1 Human performance and limitations, relevant to the flight engineer.

D4.6 **OPERATIONAL PROCEDURE:**

D.4.6.1 Principles of maintenance, procedures for the maintenance of airworthiness, defect reporting, pre-flight inspections, precautionary procedures for fuelling and use of external power; installed equipment and cabin systems.

D.4.6.2 Normal, abnormal and emergency procedures.

D.4.6.3 Operational procedures for carriage of freight and dangerous goods.

D4.7 **PRINCIPLES OF FLIGHT:**

D.4.7.1 Fundamentals of aerodynamics.

D3.8 **FUNDAMENTALS OF NAVIGATIONS:**

D.3.8.1 Principles and operation of self-contained systems; and

D.3.9 **OPERATIONAL ASPECTS OF METEOROLOGY:**

D3.9.1 Interpretation and application of aeronautical meteorological reports, charts and forecasts; use of, and procedures for obtaining, meteorological information, pre-flight and in flight; altimetry;

D.3.9.2 Aeronautical meteorology; climatology of relevant areas in respect of the elements having an effect upon aviation; the movement of pressure systems, the structure of fronts, and the origin and characteristics of significant weather phenomena which affect take-off, en-route and landing conditions; hazardous weather avoidance;

D.3.10 **RADIOTELEPHONY:**

Radiotelephony procedures and phraseology.

D5. EXPERIENCE:

D5.1 Unless otherwise approved by the Competent Authority a person shall not undertake the FEL Flight/Simulator check unless he:

D.5.1.1 is the holder of SFEL;

D.5.1.2 has completed an approved training course with approved training institution; and

D.5.1.3 has accumulated the aeronautical experience set out in paragraph D5.2.

D5.2 With the exception detailed in paragraph D4.4 and D4.5, aeronautical experience of an applicant shall consist of not less than 100 hours as flight engineer under the supervision of an Approved Person.

D5.3 The 100 hours of flight time mentioned in paragraph D4.2 shall include operational experience in the performance of the duties of Flight Engineer in at least the following areas;

D.5.3.1 **NORMAL PROCEDURES:**

D5.3.1.1 Pre-flight inspection

D5.3.1.2 Fuelling procedures, fuel management

D5.3.1.3 Inspection of maintenance documents

D5.3.1.4 Normal inspection of maintenance documents

D5.3.1.5 Normal flight deck procedures during all phases of flight

D5.3.1.6 Crew co-ordination and procedures in case of crew incapacitation

D5.3.1.7 Defect reporting.

D.5.3.2 **ABNORMAL AND ALTERNATE (STANDBY) PROCEDURES:**

D5.3.2.1 Recognition of abnormal functioning of aircraft systems

D5.3.2.2 Use of abnormal and alternate (standby) procedures

D.5.3.3 **EMERGENCY PROCEDURES:**

D5.3.3.1 Recognition of emergency conditions

D5.3.3.2 Use of appropriate emergency procedures

D5.4 Up to 50 hours as Flight Engineer under supervision in an approved Flight Simulator is acceptable towards 100 hours required vide paragraph D5.2 above;

D5.5 Up to 10 hours as pilot of an aircraft which has a separate Flight Engineer's station incorporated into the design of the aircraft is acceptable towards 100 hours required vide paragraph D4.2 above;

D6. SKILL:

D6.1 An applicant shall have demonstrated the ability to perform as flight engineer of an aircraft to the CAA Flight Inspector or an Approved Person, the duties and procedures described in paragraph D5.3 with degree of competency appropriate to the privileges granted to the holder of a flight engineer licence and to:

D.6.1.1 use aircraft systems within the aircraft's capabilities and limitation;

D.6.1.2 exercise good judgment and airmanship;

D.6.1.3 apply aeronautical knowledge;

D.6.1.4 perform all the duties as part of an integrated crew with the successful outcome never in doubt; and

D.6.1.5 Communicate effectively with the other flight crewmembers.

D7. EXAMINATIONS AND TESTS:

D7.1 All written examinations and flight tests shall be conducted at such times and places and in such a manner as determined by the Authority.

D7.2 An applicant who fails to pass a flight test may apply for a retest only when he has carried out the further study or training determined by the person who conducted the test.

D7.3 An applicant shall provide a suitable simulator/aircraft for the purpose of undergoing the flight test. The type of simulator/aircraft is subject to approval by the Authority.

D8. RECENT EXPERIENCE:

D8.1 Unless otherwise approved by the Competent Authority the holder of a flight engineer licence shall not perform the duties of flight engineer without supervision unless he meets the recent experience requirements prescribed by the operator and has passed a check conducted by an Approved Person within 6 months immediately preceding the date on which a flight commences.

or

The holder of a Flight Engineer licence shall not act as a flight engineer other than under supervision of any type of an aircraft endorsed on his licence, on which he has not performed the duties of flight engineer in the preceding 90 days unless otherwise authorised by the Competent Authority. He shall also meet the other requirements prescribed by the operator and approved by the Competent Authority.

D9. VALIDITY:

D9.1 The Licence shall remain valid for one year subject to the provisions of CARs, 94 and relevant Air Navigation Orders.

D10. RENEWAL:

D10.1 Unless otherwise approved by the Authority, an applicant for renewal of a licence shall be required to submit a duly completed renewal application form to the Licencing Authority, accompanied by satisfactory evidence that he:

D10.2 has carried out during the 6 months preceding the date of application, not less than 6 hours as Flight Engineer or as Flight Engineer under supervision. In the absence of such evidence an applicant shall be required to pass the FEL renewal flight/ simulator check; and

D10.3 has successfully completed two checks in the preceding 12 months with a minimum interval of 4 months, if he is an employee of an operator having an approved training program under Rules 193 of CARs, 94;

D10.4 is the holder of a Class – 1 Medical Assessment.

D11. PRIVILEGES:

D11.1 The holder of a SFEL may perform the duties of flight Engineer under the supervision of DCFE or DTFE.

D11.2 The holder of FEL may perform the duties of a Flight Engineer on an aircraft for which his Licence is endorsed and has recent experience.

D12. LIMITATIONS:

D12.1 The holder of a SFEL shall not perform the duties of Flight Engineer on an aircraft:

D12.2 For which his licence is not endorsed;

D12.3 Unless he has completed under the supervision of a DCFE or DTFE:

D12.4 Has undertaken 10 hours non – revenue flight training; or

D12.5 Has undertaken 15 hours flight training in an approved flight simulator as part of normal crew complement;

D12.6 Written certification from a DCFE, that he is competent to operate under supervision on revenue earning flights.

D13. FEE SCHEDULE FOR FOO/FD LICENCE

D13.1 The fee schedule for Licensing actions and examination shall be given in Air Navigation Order ANO-021-XXLC-2.0.

E. EVIDENCES (ACRONYMS / RECORDS / REFERENCES):

E1. ACRONYMS:

| | | |
|------|---|----------------------------------|
| AC | : | ALTERNATING CURRENT |
| ANO | : | AIR NAVIGATION ORDER |
| APM | : | AIRPORT MANAGER |
| DC | : | DIRECT CURRENT |
| DFFE | : | DESIGNATED CHECK FLIGHT ENGINEER |

E2. RECORDS:

| | |
|------|---|
| E2.1 | Application Form CAAF-001-XXLC-2.0 |
| E2.2 | Renewal Form CAAF-002-XXLC-2.0 |
| E2.3 | Check Report CAAF-011-XXLC-2.0 |
| E2.4 | Route Check Report CAAF-012-XXLC-2.0 |
| E2.5 | Training Record CAAF-013-XXLC-2.0 |
| E2.6 | Training Record (Simulator) CAAF-014-XXLC-2.0 |

E3. REFERENCES:

| | |
|------|----------------------------------|
| E3.1 | ANO 90.0013 (Issue I) |
| E3.2 | ICAO Annex 1. |
| E3.3 | Civil Aviation Regulations, 1994 |
| E3.4 | Air Safety Circular (Licensing) |

IMPLEMENTATION:

This Air Navigation Order shall be implemented with effect from 20th November, 2009 and supersedes ANO 90.0013 (Issue I).

(M. JUNAID AMEEN)
Air Commodore (Retd.)
Director General
Pakistan Civil Aviation Authority

Dated: November, 2009

(CAPT. S. AFTAB HUSAIN)

General Manager Licensing

Dated: November, 2009

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