

**APPENDIX 'D'**

**AIR REGULATION**

**THE SYLLABUS OF AIR REGULATION IS AS FOLLOWS:**

**1. Air Regulation**

**1.1 International Agreements and Organizations**

a) The Convention of Chicago

**Air Navigation**

- General principles and application: sovereignty, territory
- Flight over territory of Contracting states: right of non-scheduled flight, scheduled air services, sabotage, landing at customs airports, applicability of air regulations, rules of the air, search of aircraft.
- Documents to be carried in aircraft
- International standards and recommended practices: adoption of international standards and procedures, endorsement of certificates and licenses, validity of endorsed certificates and licenses: departure from international standards and procedures (notification of differences)

b) The International Civil Aviation Organization

- objective and composition
- duties in relation to – annexes to the convention, standards and recommended practices, procedures for air navigation services, regional supplementary procedures, regional air navigation, manuals and circulars

c) Other International Agreements

- The International Air Transport Agreement - the five freedoms
- The Convention of Tokyo, La Haye, Montreal – Jurisdiction, authority of pilot-in-command of the aircraft
- DGCA India: Organization and Structure – Indian organizations name, composition, objectives and relevant documents (Aircraft Act 1934, Indian Aircraft Rules 1937)
- Indian Civil Aviation Conference
- Including Civil Aviation Requirements
- Warsaw Convention

d) PIC authority and responsibility regarding safety and security

e) Operators and pilots liabilities towards persons and goods on the ground, in case of damage and injury caused by the operations of the aircraft

f) Commercial practices and associated rules

**1.2 Annex 8 – Airworthiness of Aircraft**

- applicability

**1.3 Annex 7 – Aircraft Nationality and Registration Marks**

- applicability

**1.4 Annex 1 – Personnel Licensing**

- applicability
- relation between Annex 1 and CAR

**1.5 Rules of the Air (Based on Annex 2)**

- Annex 2: essential definitions, applicability of the rules of the air, general rules (except water operations), visual flight flights, instrument flight rules, signals, interception of civil aircraft, table of cruising levels

**1.6 Procedures for Air Navigation – Aircraft Operations Doc. 8168, Volume 1**

- a) Foreword – introduction
- b) Definitions and abbreviations (see general statements)
- c) Departure procedures - general criteria, standard instrument departures, omni-directional departures, published information, simultaneous operations on parallel or near-parallel instrument runways, area navigation (RNAV) departure procedures based on VOR / DME, use of FMS / RNAV equipment to follow conventional departure procedures
- d) Approach procedures
  - general criteria (except tables)
  - approach procedures design : instrument approach areas, accuracy of fixes (only intersection fix tolerance factors, other fix tolerance factors, accuracy of facility providing track, approach area splays, descent gradient)
  - arrival and approach segments : general, standard instrument arrival, initial approach segment (only general), intermediate approach segment, final approach segment (except tables), missed approach segment (only general)
  - visual manoeuvring (circling) in the vicinity of the aerodrome: general, the visual manoeuvring (circling) area (except table), visual manoeuvring (circling) area not considered for obstacle clearance (except table), minimum

- descent altitude/height, visual flight manoeuvre, missed approach whilst circling.
- Simultaneous ILS operations on parallel or near-parallel runways
- Area navigation (RNAV) approach procedures based on VOR/DME
- Use of FMS/RNAV equipment to follow conventional non-precision approach procedures
- e) Holding procedures
  - in-flight procedures (except table), entry, holding
  - obstacle clearance (except table)
- f) Altimeter setting procedures (including ICAO Doc. 7030-Regional Supplementary Procedures) – basic requirements (except tables), procedures
- g) Secondary surveillance radar transponder operating procedures (including ICAO Doc. 7030 – Regional Supplementary Procedures)
  - operation of transponders
  - operation of ACAS equipment
  - phraseology

**1.7 Air Traffic Services (based on Annex 11 and Doc. 4444)**

- a) Air Traffic Services – Annex 11 : Definitions (see general statements)
- b) General
  - objectives of ATS, divisions of ATS, designation of the portions of the airspace and controlled aerodromes where ATS will be provided, classification of airspaces (appendix 4 of Annex 11), required navigation performance (RNP), establishment and designation of the units providing ATS, specifications for flight information regions, control areas and control zones, minimum flight altitudes, priority in the event of an aircraft in emergency, in-flight contingencies, time in ATS
- c) Air Traffic Control
  - Application

- provision of air traffic control service, operations of air traffic control service, separation minima, contents of clearances, co-ordination of clearances
- d) Flight Information Service
  - application
  - scope of flight information service
  - operational flight information service broadcasts
- e) Alerting Service: application, notification of rescue co-ordination centres (only INCERFA, ALERFA, DETRESFA), information to aircraft operating in the vicinity of an aircraft in a state of emergency
- f) Principles governing the identification of RNP types and the identification of ATS routes other than standard departure and arrival routes (Appendix 1)
- g) Rules of the Air and Air Traffic Services (ICAO Doc. 4444 – RAC/501/11 and ICAO Doc. 7030 – Regional Supplementary Procedures)
  - definitions (See general statements)
  - relationship to other document
- h) General provisions
  - general air traffic services operating practices: submission of a flight plan, change from IFR to VFR flight, clearances and information, control of air traffic flow, altimeter setting procedures, indication of heavy wake turbulence category and MLS capacity, position reporting, air traffic incident report, procedures in regard to aircraft equipped with airborne collision avoidance systems (ACAS)
  - Appendix 1
- i) Area Control Service
  - general provisions for the separation of control traffic
  - vertical separation : vertical separation application, vertical separation minimum, minimum cruising level, assignment of cruising level, vertical separation during ascent or descent

- horizontal separation: lateral separation application, lateral separation application, longitudinal separation application (except between supersonic aircraft)
  - reduction in separation minima
  - air traffic control clearances: contents, description of air traffic control clearances, clearance to fly maintaining own separations while in visual meteorological conditions, essential traffic information, clearance of a requested change in flight plan
  - emergency and communication failure: emergency procedures (only general priority, emergency descent, action by pilot-in-command), air-ground communication failure (only concerning the actions by pilot-in-command), interception of civil aircraft
- j) Approach Control Service
- departing aircraft: general procedures for departing aircraft, clearances for departing aircraft to climb maintaining own separation while in visual meteorological conditions, information for departing aircraft
  - arriving aircraft: general procedures for arriving aircraft, clearance to descend subject to maintaining own separation in visual meteorological conditions, visual approach, instrument approach, holding, approach sequence, expected approach time, information for arriving aircraft
- k) Aerodrome Control Service
- functions of aerodrome control towers: general, alerting service provided by aerodrome control towers, suspension of VFR operations by aerodrome control towers
  - traffic and taxi circuits: selection of runway-in-use
  - information to aircraft by aerodrome control towers: information related to the operation of the aircraft, information on aerodrome conditions
  - control of aerodrome traffic: order of priority for arriving and departing aircraft, control of departing and arriving aircraft, wake turbulence categorization of aircraft and increased longitudinal separation minima, authorization of special VFR flights
- l) Flight Information Service and Alerting Service
- Flight information service
  - Alerting service

m) Use of radar in Air Traffic Services

- general provisions: limitations in the use of radar, identification procedures (only establishment of radar identity), position information, radar vectoring
- use of radar in the air traffic control service

**1.8 Aeronautical Information Service (based on Annex 15 and AIP, India)**

- essential definitions
- applicability

**1.9 (Based on Annex 14, Vol. 1 & 2)**

a) Annex 14

- definitions
- aerodrome data
- conditions of the movement area and related facilities

b) Visual aids for navigation

- indicators and signaling devices
- markings
- lights
- signs
- markers

c) Visual aids for denoting obstacles

- marking of objects
- lighting of objects

d) Visual aids for denoting restricted use of areas

e) Emergency and other services : rescue and fire fighting

f) Attachment A to Annex 14

- calculation of declared distances
- radio altimeter operating areas
- approach lighting systems

**1.10 Facilitation (based on Annex 9)**

- definitions
- entry and departure of aircraft – description, purpose and use of aircraft documents general declaration
- entry and departure of persons and their baggage – entry requirement and procedures crew and other operator's personnel

**1.11 Search and Rescue (based on Annex 12)**

- a) Annex 12 – definitions
- b) Organization
- c) Operating procedures
  - procedures for pilots-in-command at the scene of an accident
  - procedures for pilot-in-command intercepting a distress transmission
  - search and rescue signals
- d) Search and Rescue Signals
  - signals with surface craft
  - ground/air visual signal code
  - air/ground signals

**1.12 Security (based on Annex 17)**

- a) Annex 17 – General – aims and objectives

**1.13 Aircraft Accident Investigation (based on Annex 13)**

- a) Annex 13 – definitions, applicability

**1.14 CARs : on Operations on Sections 2,7 and 8**

**1.15 National Law – National Law and differences to relevant ICAO Annexes and CARs.**

Indian aircraft act 1934-section 1,2,8,10,11A,11B, 17&18(3/9)  
Aircraft Rule 1937- Rule No. 1-19,21-29A,30,33,37A,38-48,50,52,53,55,65,67,67A,67B,68-70,76,79-89,133A,134,140,140(AB&C)15&161  
Schedule I, II, VI, & XI  
INDIAN AIRCRAFT RULES 1920-RULE NO 53-64  
AIRCRAFT RULES 1954 (Public Health Rules)  
AIRCRAFT RULES 2003 (Carriage of Dangerous Goods)



## **2     Human Performance & Limitations**

### **2.1     Human Factors : Basic Concepts**

- a)     Human Factors in aviation
  - competence and limitations
  - becoming a competent pilot – the traditional approach towards 'proficiency', the human factors approach towards 'professionalism'
- b)     Flight Safety concepts

### **2.2     Basic Aviation Physiology and Health Maintenance**

- a)     Basics of flight physiology
  - the atmosphere : composition, gas laws, oxygen requirements of tissues
  - Respiratory and circulatory systems: pressurization, decompression, rapid decompression, entrapped gases, barotraumas, counter measures, hypoxia, symptoms, time of useful consciousness, hyperventilation, accelerations
  - High altitude environment: ozone, radiation, humidity
- b)     Man an Environment the sensory system
  - integration of sensory inputs : spatial disorientation, illusions, approach and landing problems
- c)     Health and Hygiene
  - personal hygiene
  - common minor ailments: cold, influenza, gastro-intestinal upset
  - problem areas for pilots : hearing loss, flight related hazards to hearing, defective vision, hypotension, hypertension, coronary disease, obesity, nutrition hygiene, tropical climates – epidemic diseases
  - intoxication: tobacco, alcohol, drugs and self-medication, various toxic materials
  - incapacitation: symptoms and causes, recognition, operating coping procedures

### **2.3 Basic Aviation Psychology**

- a) Human information processing
  - attention and vigilance: selectivity of attention, divided attention
  - perception: perceptual illusions, subjectivity of perception
  - Response selection: learning principles and techniques, drives, motivation and performance
- b) Decision making
  - decision-making concepts: structure (phases), limits, risk assessment, practical application
- c) Avoiding and managing errors: Cockpit Management
  - safety awareness: risk area awareness, identification of error proneness (oneself), identification of error sources (others), situational awareness stress
  - Co-ordination (multi-crew concepts)
  - Co-operation: small group dynamics, leadership, management styles, duty and role
  - Communication: communication model(s), verbal and non-verbal communication, communication barriers, conflict management
- d) Personality
  - Personality and attitudes : development, environmental influences
  - individual differences in personality: self-concepts (e.g. , action vs. state-orientation)
  - identification of hazardous attitudes (error proneness)
- e) Human overload and under load
  - arousal
  - stress: definitions, anxiety and stress, effects of stress
  - fatigue: types, causes, symptoms, effects of fatigue

- body rhythm and sleep: rhythm disturbances, symptoms, effects, management, circadian rhythm
- fatigue and stress management: coping strategies, management techniques, health and fitness programmes, relaxation techniques
- f) Advanced cockpit automation
  - advantages and disadvantages (criticalities)
  - automation complacency

### **3. Operational Procedures**

#### **3.1 Operational Procedures – Special and Emergency Procedures General:**

- a) ICAO Annex 6, Parts I, II and III (as applicable)
  - definitions
  - applicability
  - general framework and contents
- b) CAR-OPS – Requirements
  - General requirements about
    - quality system
    - additional crew members
    - methods of carriage of persons
    - admission of flight deck
    - unauthorized carriage
    - portable electronic devices
    - endangering safety
    - additional information and forms to be carried
    - information retained on ground
    - power to inspect
    - production of documentation and records
    - preservation of documentation
    - leasing
  - Operator certification and supervision requirements
    - general rules for Air Operator Certification
    - issue
    - variation and continued validity of an AOC
    - administrative requirements
  - Operational Procedures requirements
    - operational control and supervision
    - use of Air Traffic Services

- instrument departure and approach procedures
- carriage of person with reduced mobility
- carriage of inadmissible passengers, deportees, or
- persons in custody
- stowage of baggage and cargo
- passengers seating
- security of passenger cabin and galley(s)
- smoking on board
- take-off conditions
- application of take-off minima's
- ETOPS
- RVSM
  
- All-weather Operations requirements: Low Visibility
  - Aerodrome Operating Minima's – General
  - Low Visibility Operations – General operating rules
  - Low Visibility Operations – Aerodrome considerations
  - Low Visibility Operations – Training and qualifications
  - Low Visibility Operations – Operating procedures
  - Low Visibility Operations – Minimum equipment
  - VFR Operating Minima
  
- Instrument and safety equipment requirements
  - general introduction
  - circuit protection devices
  - windshield wipers
  - airborne weather radar equipment
  - flight crew interphone system
  - public address system
  - internal doors and curtains
  - first aid kits
  - emergency medical kit
  - first air oxygen
  - supplemental oxygen – pressurized aeroplanes
  - supplemental oxygen – non-pressurized aeroplanes
  - crew protective breathing equipment
  - hand fire extinguishers
  - crash axes and crowbars
  - marking of break-in points
  - means for emergency evacuation
  - megaphones
  - emergency lightings
  - automatic emergency locator transmitter
  - life jackets

- life rafts and survival ELTs for extended over-water flights
- survival equipment
- Communication and navigation equipment requirements
  - radio equipment
  - audio selector panel
  - radio equipment VFR
  - communication and navigation IFR and VFR
- Flight crew
  - flight and duty time limitations and rest requirements
  - cabin crew

Knowledge of basic navigation equipment, operational and regulatory, requirements for long-range flights in MNPS, Trans-oceanic and polar airspace.

c) **Special Operational Procedures and Hazards (General Aspects)**

- Minimum equipment list
  - AFM
- Ground de-icing
  - icing conditions
  - definition and recognition, on ground/in-flight
  - de-icing, anti-icing, types of de-icing fluids
  - performance deterioration, on ground/in-flight
- Bird strike risk and avoidance
- Noise abatement
  - influence by the pilot (power setting, low drag, low power)
- Fire/smoke
  - actions in case of overheated brakes after aborted take-off and landing
- Decompression of pressurized cabin
  - slow decompression
  - rapid or explosive decompression
  - dangers and action taken

- Windshear, microburst
  - definition and description
  - effects and recognition during departure and approach
  - actions to avoid and actions taken during encounter
- Wake turbulence
  - cause
  - influence of speed and mass, wind
  - actions taken when crossing traffic, during take-off and landing
- Security
  - unlawful events
- Emergency and precautionary landings operations in various terrain – water (i.e. slopes, mountains, jungle, offshore)
  - definition
  - cause
  - factors to be considered (wind terrain, preparation, flight tactics, landing in various terrain and water)
  - passenger information
  - evacuation
  - action after landing
- Fuel jettisoning
  - safety aspects
- Transport of dangerous goods
  - Annex 18
  - practical aspects
- Contaminated runways
  - kinds of contamination
  - braking action, brake co-efficient
  - performance correction and calculations

## **3.2 Communications**

### **3.2.1 VFR Communications**

#### **a) Definitions**

- Meaning and signification of associated terms
- Air Traffic Services abbreviations

- Q-code groups commonly used in RTF air-ground communications
- Categories of messages
- b) General Operating Procedures
  - Transmission of letters
  - Transmission of numbers (including level information)
  - Transmission of time
  - Transmission of technique
  - Standard work and phrases (relevant RTF phraseology included)
  - Radiotelephony call signs for aeronautical stations including use of abbreviated call signs
  - Radiotelephone call signs for aircraft including use of abbreviated call signs
  - Transfer of communication
  - Test procedures including readability scale
  - Read back and acknowledgement requirements
  - Radar procedural phraseology
- c) Relevant Weather information terms (VFR)
  - Aerodrome weather
  - Weather broadcast
- d) Action required to be taken in case of communication failure
- e) Distress and urgency procedures
  - Distress (definition – frequencies – watch of distress frequencies – distress signal – distress message)
  - Urgency (definition – frequencies – urgency signal – urgency message)
- f) General Principles of VHF Propagation and Allocation of Frequencies

### **3.3 IFR Communications**

- a) Definitions
  - Meaning and significance of associated terms
  - Air Traffic Control abbreviations

- Q-code groups commonly used in RTF air-ground communications
- b) General Operating Procedures
  - Transmission of letters
  - Transmission of numbers (including level information)
  - Transmission of time
  - Transmission of technique
  - Standard words and phrases (relevant RTF phraseology included)
  - Radiotelephony call signs for aeronautical stations including use of abbreviated call signs
  - Radiotelephone call signs for aircraft including use of abbreviated call signs
  - Transfer of communication
  - Test procedures including readability scale; establishment of RTF communications
  - Read back and acknowledgement requirements
  - Radar procedural phraseology
  - Level changes and reports categories of messages
- c) Action required to be taken in case of communication failure
- d) Distress and Urgency Procedures
  - PAN medical
  - Distress (definition – frequencies – watch of distress frequencies – distress signal – distress message)
  - Urgency (definition – frequencies – urgency signal – urgency message)
- e) Relevant Weather Information Terms (IFR)
  - Aerodrome weather
  - Weather broadcast
- f) General Principles of VHF propagation and allocation of frequencies
- g) Morse Code