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AIR NAVIGATION ACT  
(CHAPTER 6)

AIR NAVIGATION  
(121 — COMMERCIAL AIR TRANSPORT  
BY LARGE AEROPLANES) REGULATIONS 2018

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In exercise of the powers conferred by section 3A of the Air Navigation Act, the Civil Aviation Authority of Singapore, with the approval of the Minister for Transport, makes the following Regulations:

PART 1  
PRELIMINARY

**Citation and commencement**

1. These Regulations are the Air Navigation (121 — Commercial Air Transport by Large Aeroplanes) Regulations 2018 and come into operation on 1 October 2018.

**Definitions, etc.**

2.—(1) Any term in these Regulations that is defined in the First Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018 (G.N. No. S 441/2018) has the meaning given to that term in that Schedule unless the term is otherwise defined in the First Schedule to these Regulations.

(2) Every standard in these Regulations for which a value is prescribed in the International System of Units (SI) and an alternative value is prescribed in a non-SI alternative unit of measurement in

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parentheses, the relevant standard is to be regarded as reached when either value is obtained.

### **Application of these Regulations**

3.—(1) These Regulations apply to every flight carried out by an AOC holder that involves an aeroplane (called in these Regulations a large aeroplane) that corresponds to either or both of the following descriptions and may be operated by the AOC holder for the purposes of commercial air transport:

- (a) an aeroplane that has a maximum approved passenger seating configuration (MAPSC) exceeding 19;
  - (b) an aeroplane that has a maximum certified take-off mass (MCTOM) exceeding 27,000 kg.
- (2) To avoid doubt, these Regulations apply —
- (a) in addition to the provisions of the Air Navigation (119 — Air Operator Certification) Regulations 2018 (G.N. No. S 443/2018) and the Air Navigation (91 — General Operating Rules) Regulations 2018 unless otherwise stated; and
  - (b) even if the flight carried out by the AOC holder is not operated for the purposes of commercial air transport.

## PART 2

### *Division 1 — General*

#### **Aircraft airworthiness**

4.—(1) An AOC holder may operate a large aeroplane that does not have a valid Certificate of Airworthiness if all of the following conditions are met:

- (a) the purpose of the flight is to transport the aeroplane to a location where the necessary maintenance or repairs can be performed to that aeroplane;
- (b) the AOC holder has a ferry flight authorisation;



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- (c) the flight is conducted in accordance with the ferry flight authorisation, including any conditions or limitations imposed in the authorisation.

(2) An AOC holder must inform the Director-General of Civil Aviation in writing of any flight operated under a ferry flight authorisation no later than 2 days after the end of the flight.

(3) Regulation 5 of the Air Navigation (91 — General Operating Rules) Regulations 2018 does not apply to an aeroplane that is flown in accordance with paragraph (1).

### **Documents to be carried**

5.—(1) An AOC holder must ensure that all the following documents are carried on board a flight of a large aeroplane:

- (a) its Certificate of Registration;
  - (b) its Certificate of Airworthiness;
  - (c) the appropriate licence for each flight crew member;
  - (d) the aircraft radio station licence;
  - (e) the journey log book or equivalent record;
  - (f) a noise certificate, if applicable;
  - (g) a certified true copy of the AOC holder's air operator certificate and the associated operations specifications;
  - (h) a certified true copy of any 83 *bis* agreement, or the agreement summary of such an 83 *bis* agreement, if applicable;
- [S 938/2020 wef 05/11/2020]*
- (i) a certified true copy of the agreement for the lease, charter or interchange or any other similar arrangement for the aeroplane, if applicable;
  - (j) in the case of a Singapore registered aeroplane, a copy of each certificate of maintenance review in force in respect of the aeroplane;

- (k) the English translation of any document required in sub-paragraph (a), (b), (f) or (h) that is written in a language other than English.

*[S 938/2020 wef 05/11/2020]*

(2) Before commencing any flight of a large aeroplane, the pilot-in-command must ensure that the documents listed in paragraph (1) are in force and remain in force for the duration of the flight.

(3) Despite paragraph (1), the documents listed in that paragraph may be kept at the aerodrome of departure if it is a flight —

- (a) that is intended to begin and end at the same aerodrome located in Singapore; and
- (b) that does not include passage over the territory of any other State in its planned flight path.

### **Manuals to be carried**

6. An AOC holder must ensure that the following manuals are carried on every flight of a large aeroplane:

- (a) the aeroplane's flight manual or equivalent;
- (b) the AOC holder's Operations Manual, or those parts of the Operations Manual that pertain to flight operations.

### **Operational information and forms to be carried**

7. An AOC holder must ensure that all the following documents are carried on board every flight of a large aeroplane:

- (a) the technical log;
- (b) the operational flight plan;
- (c) a copy of the ATS flight plan;
- (d) the route-specific NOTAM and AIS briefing documentation;
- (e) the meteorological information appropriate to the flight;

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- (f) the current and suitable aeronautical charts to cover the route of the proposed flight and any route along which it is reasonable to expect that the flight may be diverted;
  - (g) any information on search and rescue services covering the route of the proposed flight;
  - (h) the load sheet;
  - (i) the passenger and cargo manifests;
  - (j) the information concerning any dangerous goods that are on board the aeroplane, if applicable;
  - (k) a copy of the procedures to be followed by the pilot-in-command of an intercepted aircraft, as published in an official publication by the AIS provider (such as an AIC, AIP or NOTAM);
  - (l) a copy of the visual signals for use by intercepting and intercepted aircraft, as published in an official publication by the AIS provider (such as an AIC, AIP or NOTAM);
  - (m) the aeroplane bomb search procedure checklist.

### **Common language**

**8.** An AOC holder must ensure that every person to be assigned duty as a crew member, or a member of its operations personnel, for a flight of a large aeroplane is able to communicate effectively in the English language.

### **Stowage of baggage**

**9.—(1)** An AOC holder must establish procedures for the pilot-in-command of a flight to comply with regulation 16 of the Air Navigation (91 — General Operating Rules) Regulations 2018.

(2) An AOC holder must specify procedures to ensure that —

- (a) any item of baggage or cabin equipment carried onto a large aeroplane, and taken into the passenger cabin, is adequately and securely stowed; and
- (b) during any critical phase of flight, or whenever an emergency evacuation of the aeroplane may be required,

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the egress and escape path of a passenger from the passenger's seat to an emergency exit is not obstructed by any item of baggage or cabin equipment.

### **Use of portable electronic device (PED)**

**10.**—(1) Subject to paragraphs (2), (3) and (4), an AOC holder must not permit the use of a portable electronic device on board an aeroplane.

(2) An AOC holder may permit the following types of portable electronic device to be used when a large aeroplane is operating at an altitude above 10,000 ft:

- (a) an unintentionally transmitting PED;
- (b) an intentionally transmitting PED with its transmitting function disabled.

(3) An AOC holder may permit the use of any portable electronic device on board a large aeroplane after the aeroplane has exited the runway upon landing.

(4) Where an AOC holder has obtained prior approval from the Director-General of Civil Aviation under regulation 12, the AOC holder may permit —

- (a) the use of an intentionally transmitting PED, with the transmitting functions in active mode, on a large aeroplane when the aeroplane is operating at any altitude; or
- (b) permit the use of an unintentionally transmitting PED, or an intentionally transmitting PED with the transmitting function disabled, on a large aeroplane when the aeroplane is operating at an altitude of 10,000 ft or lower.

(5) Despite paragraphs (2), (3) and (4), an AOC holder —

- (a) must not permit the use of any portable electronic device for voice communications on board a large aeroplane except after the aeroplane has exited the runway upon landing;
- (b) must not permit the use, or must terminate any permitted use, of a portable electronic device on board a large

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aeroplane if use of the portable electronic device may interfere, or is suspected of interfering, with the performance of the navigation and communication systems of the aeroplane; and

- (c) must ensure that a flight crew member of a large aeroplane does not use any portable electronic device on the flight deck unless the portable electronic device is being used for operational purposes, as approved by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 (G.N. No. S 442/2018).

(6) Nothing in this regulation prohibits the pilot-in-command of a large aeroplane from doing either or both of the following:

- (a) overriding the AOC holder's permitted use of a portable electronic device on an aeroplane under paragraph (2);
- (b) requiring the cessation of use of any portable electronic device on board the aeroplane.

### **PED as in-flight entertainment**

**11.—**(1) An AOC holder must not provide a portable electronic device as part of its in-flight entertainment or other service on board a large aeroplane except in accordance with an approval from the Director-General of Civil Aviation.

(2) Regulation 10(3), (5) and (6) applies to the use of any portable electronic device provided in accordance with paragraph (1).

### **Approval for use of PED**

**12.—**(1) Upon application by an AOC holder for an approval for the purposes of regulation 10(4)(a) or (b), the Director-General of Civil Aviation may —

- (a) refuse to grant the approval; or
- (b) grant the approval sought, subject to such conditions as the Director-General of Civil Aviation deems necessary.

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- (2) An application under paragraph (1) must contain —
- (a) a report of the safety risk assessment, and required certification tests as necessary, conducted on the tolerance of the aeroplane to radio frequency interference by portable electronic devices to ascertain that the use of the portable electronic device in the required modes will not interfere with the performance of the navigation or communications systems of the aeroplane; and
  - (b) the appropriate manuals, which contain written procedures of the following:
    - (i) the assignment of responsibilities to crew members for ensuring the safe use of any portable electronic device;
    - (ii) the procedures to isolate or prohibit the use of portable electronic devices should interference from the portable electronic device be suspected or ascertained;
    - (iii) the required training of the crew members.

### **Procedures in relation to use of PED**

**13.—**(1) An AOC holder must ensure that, before any portable electronic device is used on board a large aeroplane —

- (a) there are established procedures for ensuring that the use of the portable electronic device complies with regulation 10; and
  - (b) each crew member responsible for ensuring the safe use of any portable electronic devices on board the aeroplane is trained in the procedures required under sub-paragraph (a).
- (2) An AOC holder must inform the passengers of the circumstances under which a portable electronic device may be used on board a large aeroplane, including —
- (a) the type of portable electronic device that may be used;
  - (b) the point in time when a portable electronic device may be used; and

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(c) the conditions or limitations of such use.

### **Authorisation for carriage of dangerous goods**

**14.**—(1) An AOC holder must not carry any dangerous goods as cargo on a large aeroplane except in accordance with an authorisation granted by the Director-General of Civil Aviation.

(2) The Director-General of Civil Aviation may grant an AOC holder an authorisation for the carriage of dangerous goods as cargo, upon the Director-General of Civil Aviation being satisfied that the AOC holder has established, for the proper handling of dangerous goods —

(a) the procedures required under regulation 66; and

(b) the training programme required under regulation 153.

(3) To avoid doubt, an AOC holder who transports dangerous goods on a large aeroplane must also comply with the Air Navigation (92 — Carriage of Dangerous Goods) Regulations 2022 (G.N. No. S 998/2022).

*[S 999/2022 wef 01/01/2023]*

### **Electronic navigation data management**

**15.**—(1) An AOC holder must not use any electronic navigation data product when operating a large aeroplane unless the Director-General of Civil Aviation has approved the AOC holder's procedures for ensuring that —

(a) the process applied and the data product delivered meet acceptable standards of integrity; and

(b) the data product is compatible with, and meets the specifications of, the intended function of the equipment that will use the product.

(2) An AOC holder must ensure that both the process and the electronic navigation data product mentioned in paragraph (1)(a) are continuously monitored to ensure that they meet the standards of integrity.

(3) An AOC holder that uses electronic navigation data product must implement procedures to ensure the timely distribution and

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insertion of current and unaltered navigation data to each large aeroplane requiring insertion of such data.

### **Responsibilities of AOC holder**

**16.** Before permitting a large aeroplane to be flown, the AOC holder —

- (a) must ensure that every person assigned as a crew member for the flight is competent for the safe operation of the flight;
- (b) must ensure that the aeroplane is airworthy and appropriately equipped for the flight in accordance with Division 6; and
- (c) must be satisfied by every reasonable means that —
  - (i) the aeronautical radio stations and navigation aids serving the intended route, or any planned diversion from the intended route, are adequate for the safe navigation of the aeroplane; and
  - (ii) the aerodrome at which the aeroplane is intended to take off or land, and any alternate aerodrome at which a landing may be made, is suitable for its intended use.

### **Passenger safety**

**17.—(1)** For every flight of a large aeroplane involving the carriage of at least one passenger, the AOC holder must ensure that —

- (a) no passenger is seated so as to hinder evacuation from the aeroplane in the event of an emergency evacuation;
- (b) any passenger who appears to be under the influence of alcohol or drugs, or exhibits behavioural characteristics to the extent where the safety of the aeroplane or its occupants is likely to be endangered, is refused embarkation or removed from the aeroplane, as appropriate;



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- (c) any disabled passenger carried on board is appropriately cared for, which includes allocating appropriate seating positions and providing handling assistance in the event of an emergency;
  - (d) any passenger seated in a seat row next to an emergency exit is competent to operate the emergency exit;
  - (e) an escorted passenger does not constitute a safety hazard to the other passengers or to the aeroplane, and that prior arrangements for the carriage of the escorted passenger have been made in accordance with procedures specified in the AOC holder's Operations Manual;
  - (f) a senior cabin crew member, or the pilot-in-command, is informed when a disabled or escorted person is to be carried on board the aeroplane; and
  - (g) in the event of an emergency occurring in flight, passengers are instructed in such emergency action as may be appropriate to the circumstances.
- (2) Despite paragraph (1), a large aeroplane may carry any person on board if —
- (a) the aeroplane is being operated for the purpose of search and rescue or as an air ambulance; and
  - (b) the AOC holder has taken reasonable action to minimise the risk to the aeroplane and its occupants.
- (3) When a large aeroplane carries, or is to carry, at least one passenger, the AOC holder must ensure that —
- (a) every exit and every internal door of the aeroplane is in working order; and
  - (b) during take-off, landing and any emergency, every exit and every internal door —
    - (i) is kept free of obstruction apart from an exit which, in accordance with an approved aircraft configuration, is not required for use by any passenger; and

(ii) is not fastened by locking or otherwise so as to prevent, hinder or delay its use by any passenger.

(4) Despite paragraph (3)(b)(ii), the pilot-in-command of a large aeroplane may prevent access to the flight deck by locking or bolting any internal working door between the flight deck and an adjacent compartment to which any passengers has access.

(5) Paragraph (3) does not apply to an internal door that does not prevent, hinder or delay the exit of passengers from a large aeroplane during an emergency even if the door is not in working order.

### **Passenger briefing**

**18.—**(1) For every flight of a large aeroplane involving the carriage of at least one passenger, the AOC holder must ensure that —

- (a) the requirements specified in regulation 20 of the Air Navigation (91 — General Operating Rules) Regulations 2018 are complied with;
- (b) the passengers are instructed to fasten their seatbelts at the following times:
  - (i) when the aeroplane is moving on the ground;
  - (ii) for each take-off;
  - (iii) for each landing;
  - (iv) at any other time considered necessary by the pilot-in-command;
- (c) the passengers are informed, by illuminated “No Smoking” signs or by approved “No Smoking” placards or both, when smoking is prohibited in the aeroplane; and
- (d) any passenger who is seated next to an exit which, according to the approved aircraft configuration does not have an adjacent crew member seat, is briefed on the operation of the exit door in an emergency.

(2) For the purposes of paragraph (1)(b), the “Fasten Seat Belt” signs installed in a large aeroplane must be illuminated when passengers are required to be secured in their seats.

(3) For the purposes of paragraph (1)(c), if “No Smoking” signs are installed in a large aeroplane, the signs must be illuminated when smoking is prohibited.

(4) When a person is carried on board a large aeroplane to perform a specific function (such as an animal groom who is on board to attend to live animals being transported), the AOC holder must ensure that the person is briefed appropriately and understands the instructions given.

### **Flight deck compartment**

**19.**—(1) An AOC holder must ensure that every person present in the flight deck of a large aeroplane that is in flight is an assigned flight crew member.

(2) Despite paragraph (1), the pilot-in-command of a large aeroplane may permit the following persons to be admitted to or be carried in the flight deck compartment, or occupy a pilot seat, when the aeroplane is in flight:

- (a) an authorised representative of the Authority;
- (b) a person permitted by the AOC holder in accordance with procedures specified in its Operations Manual.

(3) An AOC holder must ensure that any person permitted to be admitted to or carried in the flight deck pursuant to paragraph (2) is familiarised with the appropriate safety procedures, as specified in its Operations Manual.

### **Use and preservation of flight recorders and records**

**20.** An AOC holder must establish appropriate procedures in the Operations Manual to ensure that the requirements of regulation 21 of the Air Navigation (91 — General Operating Rules) Regulations 2018 are complied with.

#### *Division 2 — Operational procedures*

### **Use of Operations Manual**

**21.**—(1) An AOC holder must carry out every operation of a large aeroplane in accordance with the procedures and limitations specified

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in an Operations Manual that is approved by the Director-General of Civil Aviation under the Air Navigation (119 — Air Operator Certification) Regulations 2018.

(2) Before an amendment to the approved Operations Manual may be relied upon for an operation of a large aeroplane, the AOC holder must obtain the approval of the Director-General of Civil Aviation, under the Air Navigation (119 — Air Operator Certification) Regulations 2018, for the amendment.

(3) An AOC holder must —

- (a) provide every member of its operations personnel with a copy of the approved Operations Manual containing all the instructions and information necessary for the performance of that member's duties; and
- (b) ensure that every member of its operations personnel has ready access to a copy of the approved Operations Manual, or to those parts of the Operations Manual that relate to that member's duties.

### **Operational control**

**22.**—(1) An AOC holder must establish and maintain a system of operational control.

(2) An AOC holder must describe the system of operational control in its Operations Manual.

(3) An AOC holder must exercise operational control over every flight of a large aeroplane and ensure that operational control is only delegated to —

- (a) a flight dispatcher;
- (b) the pilot-in-command; or
- (c) a designated member of its operations personnel that is accepted by the Director-General of Civil Aviation.

(4) Regulation 22 of the Air Navigation (91 — General Operating Rules) Regulations 2018 does not apply to a flight of a large aeroplane unless operational control for the flight is delegated to the pilot-in-command pursuant to paragraph (3)(b).

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**Duties of flight dispatcher**

**23.**—(1) For every flight of a large aeroplane, the AOC holder must ensure that the pilot-in-command of the aeroplane is assisted by at least one flight dispatcher in conjunction with a method of operational control and supervision of flight operations.

(2) The assistance to be rendered by a flight dispatcher under paragraph (1) includes —

- (a) during pre-flight preparation —
  - (i) providing the pilot-in-command with information relevant to flight preparation;
  - (ii) preparing the operational and ATS flight plans; and
  - (iii) submitting the ATS flight plan to every appropriate air traffic service unit;
- (b) during flight —
  - (i) providing the pilot-in-command, by appropriate means, information that may be necessary for the safe conduct of the flight; and
  - (ii) notifying the appropriate air traffic services unit when the position of the aeroplane cannot be determined by an aircraft tracking capability and attempts to establish communication with the aeroplane are unsuccessful; and
- (c) in the event of an emergency —
  - (i) initiating such procedures as outlined in the AOC holder's Operations Manual while avoiding taking any action that would contradict with the air traffic control procedures;
  - (ii) conveying to the pilot-in-command safety-related information that may be necessary for the safe conduct of the flight, including information related to an amendment to the flight plan that becomes necessary in the course of the flight; and

- (iii) notifying the appropriate authorities without delay, and requesting for assistance from such authorities if required.

### **Competence of operations personnel**

**24.—**(1) An AOC holder must ensure that every person assigned to, or directly involved in, the ground or flight operations, as a member of its operations personnel —

- (a) is properly instructed;
- (b) has demonstrated the person's abilities in the person's assigned duties; and
- (c) is aware of the person's responsibilities and the relationship of the person's duties to the operation as a whole.

(2) Where the member of its operations personnel carrying out functions relating to the safety of a large aeroplane is an employee of an organisation that the AOC holder has contracted or sub-contracted the functions to, the AOC holder must —

- (a) clearly define in the contract, or agreement, with the contracted or sub-contracted organisation the responsibilities of the organisation and its employees that will be deployed under the contract or agreement; and
- (b) clearly define the relevant duties and accountabilities of every such employee.

(3) When a member of its operations personnel is required to prepare an operational flight plan for any flight of a large aeroplane, the AOC holder must ensure that the member —

- (a) is trained and competent to perform the task;
- (b) is informed as soon as practicable of relevant changes in —
  - (i) equipment;
  - (ii) operating procedures or facilities; and
  - (iii) known hazards to flight; and

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(c) is provided, where necessary, with an aircraft operating manual for each aeroplane type operated.

(4) An AOC holder must ensure that a person does not perform any duty or function as a member of its operations personnel if the person is under the influence of any psychoactive substance that may render the person unable to perform such duty or function in a safe and proper manner.

### **Procedure compliance**

25. An AOC holder must ensure that every member of its operations personnel complies with the procedures relevant to the member's duties, as specified in its Operations Manual and other relevant documents.

### **Meteorological information**

26.—(1) An AOC holder must plan, operate, and control every flight of a large aeroplane using meteorological information provided for aviation purposes.

(2) An AOC holder must assess that every source of the meteorological information mentioned in paragraph (1) is accurate and reliable.

(3) An AOC holder must ensure that the use of the meteorological information mentioned in paragraph (1) is appropriate for the purpose of the flight.

### **Flight planning**

27.—(1) Before the commencement of any flight of a large aeroplane, the AOC holder must ensure that —

- (a) the pilot-in-command is provided with the necessary information —
  - (i) to complete the preparation for the intended flight;  
and
  - (ii) to ensure the adequacy of facilities at any aerodrome that may be used for the flight;

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- (b) the airspace containing the intended route from the aerodrome of departure to the aerodrome of arrival (including any intended take-off alternate aerodrome, destination alternate aerodrome and en-route alternate aerodrome) can be safely used for the type of operation to be conducted; and
- (c) if the flight is intended to operate over or near any conflict zone, a risk assessment is conducted and appropriate risk mitigation measures are taken to ensure the safety of the flight.

(2) For the purposes of paragraph (1)(c), “conflict zone” is any area where armed conflict is occurring or is likely to occur between militarised parties (including any area where militarised parties are in a heightened state of military alert or tension) and the safety of civil aircraft may be endangered.

*[S 938/2020 wef 05/11/2020]*

### **Flight preparation**

**28.**—(1) Before the commencement of any flight of a large aeroplane, the AOC holder must ensure that the pilot-in-command completes a statement to certify that the requirements of regulation 24 of the Air Navigation (91 — General Operating Rules) Regulations 2018 have been satisfied.

(2) An AOC holder must ensure that the pilot-in-command of a large aeroplane is provided with the information required to comply with paragraph (1).

### **Operational flight plan**

**29.**—(1) Before the commencement of any flight of a large aeroplane, the AOC holder must ensure that —

- (a) the operational flight plan for the flight has been prepared;
- (b) the pilot-in-command has approved the content of the operational flight plan and has signed the document; and



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- (c) a certified copy of the operational flight plan —
- (i) is filed with the AOC holder or the AOC holder's designated agent; or
  - (ii) is left with the appropriate authority at the point of departure.
- (2) Where the operational flight plan is prepared by a person other than the pilot-in-command, the AOC holder must ensure that —
- (a) the person who prepared the operational flight plan has signed the document; and
  - (b) the pilot-in-command is advised of the contents of the operational flight plan.
- (3) An AOC holder must ensure that its Operations Manual describes the operational flight plan and its use.

### **ATS flight plan**

**30.** Before the commencement of any flight of a large aeroplane, the AOC holder must ensure that the ATS flight plan for that flight is submitted to all appropriate air traffic services units, in accordance with the Rules of the Air.

### **Operational changes in flight**

**31.** An AOC holder must ensure that, where there is a need to alter the operational flight plan of a large aeroplane in flight and this alteration will require a change in the ATS flight plan —

- (a) the appropriate air traffic services unit has agreed to the proposed change before the proposed change is transmitted to the pilot-in-command of the aeroplane; and
- (b) the pilot-in-command has obtained all necessary air traffic control clearances before making operational changes to the aeroplane's ATS flight plan.

### **Operating in icing conditions — ground procedures**

**32.—(1)** Where a large aeroplane is planned, or is expected, to operate in conditions of known or suspected ground icing, the AOC

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holder must ensure that the flight is not commenced unless the aeroplane —

- (a) has been inspected for icing; and
  - (b) has been given appropriate de-icing or anti-icing treatment as may be required upon the inspection.
- (2) An AOC holder must record the details of any treatment given in accordance with paragraph (1)(b) in the technical log.

### **Operating in icing conditions — flight procedures**

**33.—**(1) An AOC holder must establish procedures for flight of a large aeroplane in expected or actual icing conditions.

(2) An AOC holder must ensure no flight of a large aeroplane is made in expected or actual icing conditions unless the aeroplane to be used for such a flight is certificated and equipped to cope with such conditions.

### **Operating into areas with known or forecasted volcanic ash contamination**

**34.—**(1) An AOC holder must establish procedures in its Operations Manual for use by a pilot of a large aeroplane when the aeroplane inadvertently encounters a volcanic ash cloud.

(2) Despite paragraph (1), an AOC holder must not operate a large aeroplane into an area with known or forecasted volcanic ash contamination unless the AOC holder —

- (a) has established appropriate procedures in its Operations Manual for flight dispatch, operational control and in-flight management for such a flight;
- (b) has established appropriate safety risk assessment processes as part of the safety management system for such a flight; and
- (c) has conducted the safety risk assessment mentioned in sub-paragraph (b) and ascertained that the risks to such a flight are within the acceptable level.

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## Use of aerodromes

**35.**—(1) Before authorising the use of an aerodrome for any flight of a large aeroplane, an AOC holder must ensure that the aerodrome is adequate for the aeroplane type and for the type of operation concerned.

(2) Before the commencement of any flight of a large aeroplane, the AOC holder must, as part of its safety management system, assess the level of rescue and fire fighting service protection (called in this regulation RFFS protection) available at every aerodrome specified in the operational flight plan for the flight to ensure that an acceptable level of protection is available for the aeroplane.

(3) An AOC holder must ensure that the following matters are specified in its Operations Manual:

- (a) every aerodrome to be used in its operations;
- (b) information that relates to the level of RFFS protection that is acceptable to the AOC holder.

## Requirement to use certified aerodromes

**36.** An AOC holder must ensure that a large aeroplane does not take-off or land at any place in Singapore other than at —

- (a) an aerodrome certified in accordance with paragraph 67 of the Air Navigation Order; or
- (b) a government aerodrome listed in an official publication issued by an AIS provider (such as an AIP or NOTAM).

## Aerodrome operating minima — general

**37.**—(1) An AOC holder must ensure that an aerodrome is not nominated as a departure, destination or alternate aerodrome for any flight of a large aeroplane unless the aerodrome operating minima of that aerodrome can be complied with.

(2) Despite regulation 38(1), an AOC holder may use the aerodrome operating minima established by the appropriate authority of the State of the Aerodrome for the purposes of paragraph (1).

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**Aerodrome operating minima — determination**

**38.**—(1) An AOC holder must establish the aerodrome operating minima for every aerodrome that is selected as a departure, destination or alternate aerodrome for a flight of any large aeroplane.

(2) Subject to paragraph (4), an AOC holder must specify in its Operations Manual —

- (a) the aerodrome operating minima for every aerodrome mentioned in paragraph (1); and
- (b) the method used to determine the aerodrome operating minima.

(3) The method of determination mentioned in paragraph (2)(b) must involve consideration of the following matters:

- (a) the type, performance and handling characteristics of the aeroplane to be used for the operation and any relevant conditions in its Certificate of Airworthiness;
- (b) the composition of the flight crew, their competence and experience;
- (c) the dimensions and characteristics of every runway that may be selected for use;
- (d) the adequacy and performance of the available visual and non-visual ground aids;
- (e) the equipment available on the aeroplane for the purpose of navigation, acquisition of visual references or control of the flight path during the approach, landing and the missed approach;
- (f) the obstacles in the approach and missed approach areas and the obstacle clearance altitude or height for every instrument approach procedure that may be proceeded with at an aerodrome;
- (g) the means used to determine and report meteorological conditions;

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(h) the obstacles in the climb-out areas and necessary clearance margins;

*[S 938/2020 wef 05/11/2020]*

(i) any conditions specified in the operations specifications associated with the AOC holder's air operator certificate;

*[S 938/2020 wef 05/11/2020]*

(j) any aerodrome operating minima that may be established for an aerodrome by the State of the Aerodrome.

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(4) If the flight of a large aeroplane is not a scheduled journey or any part of such a journey, and is not an extended diversion time operation, an AOC holder may, in lieu of the details required under paragraph (2), specify in its Operations Manual —

(a) the method of determining the appropriate aerodrome operating minima, for use by the pilot-in-command, in respect of an aerodrome that may be selected for the flight; and

(b) when the aerodrome selected for the flight is an aerodrome where meteorological conditions cannot be communicated to the pilot-in-command of a large aeroplane in flight, the general directions to the AOC holder's pilots concerning aerodrome operating minima for safe operation.

(5) The aerodrome operating minima determined in accordance with the method specified in paragraph (3) for a selected aerodrome must not be lower than the aerodrome operating minima that may be established for that aerodrome by the State of the Aerodrome except in any particular case where the State has specifically approved the AOC holder's use of a lower aerodrome operating minima.

(6) An AOC holder must not use any head-up display, enhanced vision system, synthetic vision display, or combined vision system, or any combination of such systems and display, where equipped, to gain operational credits for operations in conditions of lower visibilities than normally associated with the aerodrome operating minima, except under and in accordance with an approval granted by the Director-General of Civil Aviation to the AOC holder under the

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Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

(7) An AOC holder must not use aerodrome operating minima lower than Category I except under and in accordance with an approval granted by the Director-General of Civil Aviation to the AOC holder under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

(8) In this regulation —

“aerodrome operating minima” includes the minimum weather conditions appropriate to each set of circumstances which can be reasonably expected at every runway that may be selected for use;

“scheduled journey” has the meaning given by the Air Navigation (Licensing of Air Services) Regulations (Rg 2).

### **Noise abatement procedures**

**39.**—(1) Unless the Director-General of Civil Aviation otherwise approves, an AOC holder must specify, in its Operations Manual, the same noise abatement procedures for every aerodrome that may be selected for an operation involving any type of large aeroplane operated by the AOC holder.

(2) The pilot-in-command of a large aeroplane must follow the noise abatement procedures specified for that aeroplane type in the AOC holder’s Operations Manual except when doing so is not in the interests of the safety of the aeroplane and its passengers.

### **Alternate aerodromes — general requirements**

**40.**—(1) An AOC holder must ensure an aerodrome is not nominated as an alternate aerodrome for any flight of a large aeroplane unless —

- (a) where the aerodrome has a specified instrument approach procedure, the weather forecasts indicate that, at the estimated time of use, the cloud ceiling and visibility will be at or above the minima specified in the Operations Manual; or

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- (b) where the aerodrome has no specified instrument approach procedure, weather forecasts indicate that, at the estimated time of use, the cloud ceiling and visibility will be at or above the Visual Flight Rules minima prescribed in the Rules of the Air.
- (2) For every flight of a large aeroplane, the AOC holder must establish, and specify in its Operations Manual —
- (a) appropriate incremental values for the height of cloud base and visibility to be added to the AOC holder's established aerodrome operating minima to ensure that an adequate margin of safety is observed in determining whether an approach and landing can be safely carried out at each alternate aerodrome; and
- (b) the margin of time for the estimated time of use of an aerodrome.
- (3) Despite regulations 41, 42 and 43, the Director-General of Civil Aviation may, based on the results of a specific safety risk assessment conducted by an AOC holder, approve operational variations to alternate aerodrome selection criteria.
- (4) The safety risk assessment mentioned in paragraph (3) is conducted to demonstrate how an AOC holder maintains an equivalent level of safety and must include an assessment of at least the following matters:
- (a) the capabilities of the AOC holder;
- (b) the overall capability of the aeroplane and its systems;
- (c) the available aerodrome technologies, capabilities and infrastructure;
- (d) the quality and reliability of meteorological information;
- (e) any identified hazards and safety risks associated with each alternate aerodrome variation;
- (f) the specific mitigation measures.

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**Take-off alternate**

**41.**—(1) An AOC holder must select, and specify in the operational and ATS flight plans, a take-off alternate aerodrome for every flight of a large aeroplane where —

- (a) the meteorological conditions at the aerodrome of departure are below the AOC holder's established aerodrome landing minima for that operation; or
- (b) it would not be possible for the aeroplane to return to the aerodrome of departure for any other reason.

(2) Except in accordance with an approval granted under the Air Navigation (98 — Special Operations) Regulations 2018 for EDTO operations, an AOC holder must ensure that the take-off alternate aerodrome selected in accordance with paragraph (1) is located —

- (a) within one hour flight time of the aerodrome of departure at a one-engine inoperative cruise speed, if the large aeroplane has 2 engines; or
- (b) within 2 hours of flight time of the aerodrome of departure at an all-engine operating cruising speed, if the large aeroplane has 3 or more engines.

(3) For the purpose of paragraph (2), flight time is calculated in International Standard Atmosphere and still air conditions using the relevant cruise speed as determined from the AOC holder's Operations Manual and the aeroplane's actual take-off mass.

**Destination alternate**

**42.**—(1) Subject to paragraph (2), an AOC holder must select, and specify in the operational and ATS flight plans, at least one destination alternate aerodrome for every flight of a large aeroplane that is to be operated in accordance with the Instrument Flight Rules.

(2) No destination alternate aerodrome is required for a flight of a large aeroplane that is operated in accordance with the Instrument Flight Rules —



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- (a) when the duration of the flight from the departure aerodrome, or from the point of in-flight re-planning, to the destination aerodrome is such that, taking into account all meteorological conditions and operational information relevant to the flight, at the estimated time of use of the destination aerodrome, a reasonable certainty exists that —
- (i) the approach and landing may be made under visual meteorological conditions; and
  - (ii) the destination aerodrome has separate runways that are usable, with at least one runway having an operational instrument procedure; or
- (b) when all the following conditions are met:
- (i) the aerodrome of intended landing is isolated with no suitable alternate aerodrome;
  - (ii) a standard instrument approach procedure is specified for the aerodrome of intended landing;
  - (iii) the flight is planned in accordance with regulation 45(6);
  - (iv) a point of no return is determined;
  - (v) the flight is continued past the point of no return only when a current assessment of meteorological conditions, traffic and other operational conditions at the aerodrome of intended landing indicate that a safe landing can be made at the estimated time of use.
- (3) An AOC holder must select, and specify in the operational and ATS flight plans, 2 destination alternate aerodromes for every flight of a large aeroplane —
- (a) where the available meteorological aerodrome reports and forecasts for the destination aerodrome indicate that the meteorological conditions at the estimated time of use will be below the AOC holder's established aerodrome operating minima for that operation; or

(b) where there is no available meteorological information for the destination aerodrome.

(4) Regulation 36 of the Air Navigation (91 — General Operating Rules) Regulations 2018 does not apply to any flight of a large aeroplane under these Regulations.

### **Operations beyond 60 minutes to en-route alternate aerodrome**

**43.**—(1) Subject to regulation 44, an AOC holder must ensure that for any flight of a large aeroplane that is intended to operate beyond 60 minutes from a point on the route to an en-route alternate aerodrome —

- (a) the en-route alternate aerodromes are identified;
- (b) the flight crew is provided with the most up-to-date information on identified en-route alternate aerodromes, including operational status and meteorological conditions; and
- (c) where the aeroplane is powered with 2 turbine engines, the information provided to the flight crew under sub-paragraph (b) indicate that conditions at the identified en-route alternate aerodromes will be at or above the AOC holder's established aerodrome operating minima for the operation at the estimated time of use.

(2) An AOC holder must not conduct any flight of the description in paragraph (1) unless —

- (a) the operational control is exercised by the AOC holder;
- (b) the relevant operating procedures are specified in the Operations Manual;
- (c) the aeroplane is dispatched in accordance with the flight dispatch procedures specified in the Operations Manual; and
- (d) the flight crew for that flight are appropriately trained.

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**Extended diversion time operations (EDTO)**

**44.**—(1) An AOC holder must not operate a large aeroplane with 2 or more turbine engines on a route where the diversion time from any point on the route to an en-route alternate aerodrome exceeds the threshold time except under and in accordance with approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

(2) For the purpose of paragraph (1) —

- (a) if the aeroplane has 2 turbine engines, the diversion time is calculated in International Standard Atmosphere and still-air conditions at the one-engine inoperative cruise speed and the threshold time is 60 minutes; or
- (b) if the aeroplane has more than 2 turbine engines, the diversion time is calculated in International Standard Atmosphere and still-air conditions at the all-engines operating cruise speed and the threshold time is 180 minutes.

**Fuel requirements — aeroplanes**

**45.**—(1) An AOC holder must establish a fuel policy for every flight of a large aeroplane for the purposes of flight planning and en-route re-planning, and to ensure that the aeroplane carries an amount of fuel that is sufficient for the aeroplane to complete the planned flight (this includes allowances for deviations from the planned operation).

(2) A fuel policy established in accordance with paragraph (1) must be based upon the following planning requirements:

- (a) either of the following sets of data:
  - (i) current aeroplane-specific data derived from a fuel consumption monitoring system, if such data is available;
  - (ii) data provided by the aeroplane manufacturer, if current aeroplane-specific data is not available;

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- (b) the operating conditions under which the planned flight is to be conducted, including but not limited to —
- (i) the anticipated aeroplane mass;
  - (ii) the route-specific NOTAM;
  - (iii) the current meteorological reports or a combination of current reports and forecasts;
  - (iv) the procedures, restrictions and anticipated delays as informed by the appropriate air traffic services units; and
  - (v) the effects of deferred maintenance items or configuration deviations, or both.
- (3) Subject to paragraphs (4), (5), (6) and (8), an AOC holder must ensure that the pre-flight calculation of usable fuel for a flight of a large aeroplane includes all of the following:
- (a) start-up and taxi fuel, which is an amount of fuel not less than the amount expected to be consumed before take-off, taking into account local conditions at the departure aerodrome and auxiliary power unit fuel consumption;
  - (b) trip fuel, which is the amount of fuel required to enable the aeroplane to take off, climb, cruise, descend, approach and land at the destination aerodrome taking into account the operating conditions listed in paragraph (2)(b);
  - (c) contingency fuel, which is an amount of fuel sufficient to compensate for unforeseen factors and is equivalent to —
    - (i) 5% of the planned trip fuel calculated in accordance with sub-paragraph (b); or
    - (ii) 5% of the fuel required from the point of re-planning, but not less than an amount of fuel required to fly for 5 minutes at holding speed at 450 m (1,500 ft) above the destination aerodrome in standard conditions;

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- (d) destination alternate fuel, which is —
- (i) for a flight requiring the nomination of a single destination alternate aerodrome under these Regulations, the amount of fuel required for the aeroplane to —
    - (A) perform a missed approach at the destination aerodrome;
    - (B) climb to the expected cruising altitude;
    - (C) fly the expected routing;
    - (D) descend to the point where the expected approach is initiated; and
    - (E) conduct the approach and landing at the destination alternate aerodrome; or
  - (ii) for a flight requiring the nomination of 2 destination alternate aerodromes under these Regulations, the amount of fuel required to enable the aeroplane to proceed to the destination alternate aerodrome which requires the greater amount of fuel, using the calculation under sub-paragraph (i);
- (e) destination alternate contingency fuel, which is 5% of the amount of fuel required under sub-paragraph (d)(i) or (ii), as applicable;
- (f) final reserve fuel, which is an amount of fuel calculated using the estimated mass of the aeroplane on arrival at the destination alternate aerodrome (or the estimated mass of the aeroplane on arrival at the destination aerodrome when no destination alternate aerodrome is required) and —
- (i) in the case of a reciprocating engine aeroplane, is an amount of fuel sufficient for the aeroplane to fly for 45 minutes at an appropriate speed and altitude conditions; or
  - (ii) in the case of a turbine engine aeroplane, is an amount of fuel sufficient for the aeroplane to fly for

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30 minutes at holding speed at 450 m (1,500 ft) above aerodrome elevation in standard conditions;

- (g) additional fuel, which is a supplementary amount of fuel required for the aeroplane —
- (i) in the event of engine failure or loss of pressurisation, whichever requires the greater amount of fuel, on the assumption that such a failure occurs at the most critical point of the route —
    - (A) to descend as necessary and proceed to an alternate aerodrome;
    - (B) to fly for 15 minutes at holding speed at 450 m (1,500 ft) above aerodrome elevation in standard conditions; and
    - (C) to make an approach and landing at the alternate aerodrome;
  - (ii) to comply with any EDTO critical fuel scenario when engaging in EDTO under an approval granted under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose; and
  - (iii) to meet any other situations that may require additional fuel;
- (h) discretionary fuel, which is an extra amount of fuel carried on the aeroplane at the pilot-in-command's discretion.

(4) Additional fuel is not required for the pre-flight calculation under paragraph (3) if the minimum amount of fuel from the total of paragraph (3)(b), (c), (d), (e) and (f) is sufficient to address all the situations that may require additional fuel.

(5) When a large aeroplane is operated under the conditions specified in regulation 42(2)(a), the AOC holder may replace the fuel components in paragraph (3)(d), (e) and (f) with a minimum fuel reserve which comprises the higher of the following:

- (a) the amount of fuel required by the aeroplane to fly from the intended destination at decision height to landing at the

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destination alternate aerodrome, including an additional 5% of such amount of fuel for contingency situations;

- (b) the amount of fuel required for the aeroplane to fly for 60 minutes at holding speed, in standard conditions, at 450 m (1,500 ft) above the destination aerodrome elevation.

(6) When the aerodrome of intended landing for any flight of a large aeroplane is an isolated aerodrome, the AOC holder may replace the fuel components in paragraph (3)(d), (e) and (f) with an island hold reserve, which is —

- (a) for a reciprocating engine aeroplane, the lesser of the amount of fuel required for the aeroplane —

- (i) to hold at cruise level for 45 minutes and an additional time of 15% of the flight time planned to be spent at cruising level, which includes the amount for the final reserve fuel; or

- (ii) to hold for 2 hours; and

- (b) for a turbine engine aeroplane, an amount of fuel sufficient to enable the aeroplane to hold for 120 minutes at normal cruise consumption above destination aerodrome elevation, which includes the amount for the final reserve fuel.

(7) An AOC holder must ensure that the pilot-in-command of any large aeroplane —

- (a) does not commence the flight unless the usable fuel on board meets the applicable requirements in —

- (i) paragraph (3)(a), (b), (c), (d), (e), (f) and (g);

- (ii) paragraphs (3)(b), (c) and (g) and (5); or

- (iii) paragraphs (3)(a), (b), (c) and (g) and (6); and

- (b) does not continue the flight beyond the point of in-flight re-planning, which is planned in accordance with regulation 46, unless the usable fuel on board meets the applicable requirements in —

- (i) paragraph (3)(b), (c), (d), (e), (f) and (g);
- (ii) paragraphs (3)(b), (c) and (g) and (5); or
- (iii) paragraphs (3)(b), (c) and (g) and (6).

(8) The Director-General of Civil Aviation may approve variations to the pre-flight fuel calculations specified in paragraph (3) for taxi fuel, trip fuel, contingency fuel, destination alternate fuel and additional fuel if the results of a specific safety risk assessment by an AOC holder show that an equivalent level of safety is maintained for such a flight.

(9) The specific safety risk assessment mentioned in paragraph (8) must include —

- (a) the fuel calculations for the flight;
- (b) the capability of the AOC holder to include —
  - (i) a data-driven method that includes a fuel consumption monitoring programme; and
  - (ii) the advanced use of alternate aerodromes; and
- (c) the specific mitigation measures taken by the AOC holder.

(10) An AOC holder must ensure that, when fuel is used for any purpose other than the originally intended purpose (as decided during pre-flight planning) after the commencement of a flight of a large aeroplane, a re-analysis of the fuel required is performed and, if applicable, adjustment of the planned operation is made.

(11) Regulation 37 of the Air Navigation (91 — General Operating Rules) Regulations 2018 does not apply to any flight of a large aeroplane under these Regulations.

### **Alternate destination with in-flight re-dispatch**

**46.—**(1) An AOC holder may plan for a flight of a large aeroplane to have an alternate destination with in-flight re-dispatch only if —

- (a) the alternate destination is available for landing at the appropriate time; and
- (b) the weather forecast at the alternate destination indicates that a landing can be made.



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(2) Subject to paragraph (3), when planning for an alternate destination with in-flight re-dispatch under paragraph (1), the AOC holder —

- (a) must ensure that the trip fuel as required under regulation 45(3)(b) comprises the fuel required by the aeroplane to fly —
  - (i) from take-off, including climb and cruise, to the in-flight re-dispatch point; and
  - (ii) from the in-flight re-dispatch point to landing at the final destination; and
- (b) may reduce the contingency fuel specified in regulation 45(3)(c) to the higher of —
  - (i) 5% of the planned fuel burn from the in-flight re-dispatch point to the final destination; or
  - (ii) the AOC holder's minimum contingency fuel that has been stated in its fuel policy.

(3) For any flight of a large aeroplane that includes an alternate destination with an in-flight re-dispatch, the AOC holder must, where necessary, increase the total fuel load of the aeroplane to not less than the fuel load needed for the aeroplane to fly to the alternate destination, calculated in accordance with regulation 45(3) and (4).

(4) An AOC holder must ensure that a large aeroplane is re-dispatched only if the amount of fuel on board at the time of re-dispatch is sufficient for the aeroplane to reach the final destination and satisfies —

- (a) regulation 45(3)(b), (c) and (g) and (5) when operating under the conditions in regulation 45(5); or
- (b) regulation 45(3)(b), (c), (d), (e), (f) and (g) in all other cases.

### **In-flight fuel management**

**47.—**(1) An AOC holder must establish policies and procedures in its Operations Manual to ensure that in-flight fuel checks and fuel management are carried out for every flight of a large aeroplane to

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ensure that the aeroplane can proceed to an aerodrome where a safe landing is made.

(2) The pilot-in-command of a large aeroplane must request delay information from the appropriate air traffic control unit when the aeroplane encounters unanticipated circumstances that may result in the aeroplane landing at the destination aerodrome with less than —

- (a) the final reserve fuel plus any fuel required to proceed to an alternate aerodrome; or
- (b) the final reserve fuel plus the fuel required to operate to an isolated aerodrome.

### **Checklists for flight crew**

**48.**—(1) An AOC holder must ensure that every person assigned duty as a flight crew member for a flight of a large aeroplane is provided with the checklists of aircraft procedures for normal, abnormal and emergency situations.

(2) An AOC holder must ensure that every checklist provided in accordance with paragraph (1) is designed in accordance with human factors principles and contain sufficient information to enable a flight crew member to comply with —

- (a) the aircraft flight manual;
- (b) the Operations Manual; and
- (c) such other documents as may be associated with the Certificate of Airworthiness.

(3) An AOC holder must ensure that flight crew operating procedures incorporate the use of appropriate checklists for normal, abnormal and emergency situations in all phases of aircraft operations.

(4) An AOC holder must ensure that every flight crew member for a flight of a large aeroplane uses the appropriate checklists before, during and after all phases of aircraft operation.

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### **Checklists for cabin crew of procedures in abnormal or emergency situations**

**49.**—(1) An AOC holder must ensure that every person assigned duty as a cabin crew member for a flight of a large aeroplane is provided with the checklists of the procedures for abnormal and emergency situations.

(2) An AOC holder must ensure that every checklist provided in accordance with paragraph (1) is designed in accordance with human factors principles and contains sufficient information to enable the cabin crew to comply with the requirements of the Operations Manual.

(3) An AOC holder must ensure that every cabin crew member for a flight of a large aeroplane uses the appropriate checklist in the event of an abnormal or emergency situation.

### **In-flight simulation of emergency situations**

**50.** For any flight of a large aeroplane involving the carriage of cargo, mail or at least one passenger, the AOC holder must ensure that —

- (a) no emergency or abnormal situation is simulated; and
- (b) no simulated instrument flight is conducted.

### **Aircraft tracking**

**51.**—(1) An AOC holder must track the position of every large aeroplane that corresponds to one of the following descriptions, in the manner specified in paragraph (2), while that aeroplane is in flight:

- (a) an aeroplane with an MCTOM exceeding 45,500 kg;
- (b) an aeroplane with an MCTOM exceeding 27,000 kg but not exceeding 45,500 kg and an MAPSC exceeding 19,

unless the appropriate air traffic service unit is able to do so.

(2) The aircraft position tracking capability mentioned in paragraph (1) —

- (a) must track the position of the aeroplane once every 15 minutes while the aeroplane is in flight;

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- (b) must not make use of voice reporting High Frequency (HF) radio; and
- (c) must, for any flight on or after 8 November 2018, make use of automated reporting.
- (3) In the event that an AOC holder is unable to track a particular aeroplane or flight in accordance with paragraph (2) due to temporary operational constraints, the AOC holder may continue to operate that aeroplane or flight if —
- (a) there are appropriate mitigating measures in place for locating the aeroplane when needed;
- (b) the AOC holder makes a report of the non-tracking situation to the Director-General of Civil Aviation within 72 hours after the termination of the affected flight; and
- (c) the procedures to monitor aeroplanes that could not be tracked are in the AOC holder's Operations Manual.
- (4) An AOC holder must establish procedures in its Operations Manual for the retention of aircraft tracking data to assist in determining the last known position of the aircraft as necessary.

### **Locating aeroplane in distress**

**52.—**(1) An AOC holder must establish procedures for the AOC holder to be alerted when any large aeroplane equipped in accordance with regulation 105 is in distress.

(2) When an AOC holder or an appropriate air traffic services unit has reason to believe that any aeroplane described in paragraph (1) is in distress, the AOC holder must coordinate with the air traffic services unit.

(3) When a large aeroplane operated by an AOC holder is in emergency phase, the AOC holder must provide position information of the aeroplane to —

- (a) all relevant air traffic services units;
- (b) all relevant Search and Rescue (SAR) coordination centres and sub-centres; and

(c) any other organisations that the Director-General of Civil Aviation may require, as appropriate.

(4) In this regulation, an aeroplane is in distress when it is in a state that can result in an accident if the aeroplane behaviour event is uncorrected.

### **Use of oxygen**

**53.** An AOC holder must ensure that every flight crew member who is performing in-flight duties essential to the safe operation of a large aeroplane in flight uses supplemental oxygen continuously whenever the cabin pressure altitude exceeds 10,000 ft.

### **Cosmic radiation**

**54.—**(1) An AOC holder must establish procedures in its Operations Manual for the operation of any large aeroplane at an altitude above 49,000 ft.

(2) The procedures established in accordance with paragraph (1) must include —

- (a) procedures for the use of equipment to monitor cosmic radiation on a flight which is operated at an altitude above 49,000 ft; and
- (b) procedures for recording the total cosmic radiation dose received over a period of 12 consecutive months by any person who is assigned duty as a crew member of a flight which is operated at an altitude above 49,000 ft.

### **Manipulation of controls**

**55.** An AOC holder must ensure that only the following persons are permitted to manipulate the flight controls of a large aeroplane that is in flight for any purpose:

- (a) a flight crew member qualified in accordance with Division 10 and authorised by the AOC holder;
- (b) an authorised representative of the Authority —
  - (i) who has the permission of the AOC holder and the pilot-in-command; and

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- (ii) who is performing a duty for which the representative was authorised by the Authority.

### **Flight crew communication**

**56.** An AOC holder must ensure that every person assigned duty as a flight crew member of a large aeroplane, and who is required to be on flight deck duty on the aeroplane, communicates through boom or throat microphones whenever the aeroplane is flying at an altitude below the higher of —

- (a) 15,000 ft; or
- (b) the transition level or altitude.

### **Locking of flight deck door**

**57.—**(1) An AOC holder must ensure that, for a flight of any large aeroplane that is equipped with a flight deck door, that door is closed and locked from the moment all external doors are closed following embarkation until the moment any external door is opened for disembarkation, except when the opening of the flight deck door is necessary to permit access to and egress by an authorised person.

(2) An AOC holder must establish procedures for a cabin crew member of a large aeroplane described in paragraph (1) to discreetly inform the flight crew of any security situation which may arise in the aircraft cabin.

### **Fuelling operations**

**58.—**(1) An AOC holder must ensure that a large aeroplane is not refuelled or defuelled whenever a passenger is embarking, disembarking or on board the aeroplane unless —

- (a) the aeroplane is properly attended by qualified personnel ready to initiate and direct an evacuation by the most practical and expeditious means available; and
- (b) two-way communication is maintained by use of the aeroplane inter-communication system or other suitable means between the ground crew supervising the refuelling

or defuelling and the qualified personnel on board the aeroplane.

(2) Nothing in this regulation requires the deployment of integral airstairs or the opening of emergency exits as a prerequisite to refuelling or defuelling.

(3) Regulation 45 of the Air Navigation (91 — General Operating Rules) Regulations 2018 does not apply to a large aeroplane.

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**Occupation of seats and wearing of restraints**

**59.**—(1) For every flight of a large aeroplane, the AOC holder must ensure that —

- (a) every person on board the aeroplane is seated and restrained in accordance with regulation 51 of the Air Navigation (91 — General Operating Rules) Regulations 2018; and
- (b) if cabin crew is required in accordance with regulation 138 —
  - (i) every person assigned as a cabin crew member for the flight is seated with the person's seat belt, or safety harness when provided, fastened during take-off, landing and such other times as the pilot-in-command may require; and
  - (ii) any cabin crew member assigned to emergency evacuation duties occupies a cabin crew seat during take-off, landing and such other times as the pilot-in-command may direct.

(2) An AOC holder must not permit a cabin crew seat in a large aeroplane to be occupied by a person other than a cabin crew member unless the aeroplane is landing in the following circumstances:

- (a) where unexpected crew incapacitation results in an insufficient number of cabin crew members who are able to operate the emergency exits;
- (b) where an emergency is declared and the person is displaced from a passenger seat to a cabin crew seat to enhance evacuation management.

(3) An AOC holder must ensure that a person who is not a cabin crew member does not occupy a cabin crew seat in the circumstances described in paragraph (2)(a) or (b) unless —

- (a) the person is able-bodied and was briefed on the necessary safety procedures, including the activation of the exit door, before being permitted to occupy the cabin crew seat and to assist in evacuation management; and



(b) the AOC holder has established relevant procedures in its Operations Manual.

(4) In this regulation, “cabin crew seat” means a seat provided in accordance with regulation 87(4).

### **Control of infectious diseases**

**60.**—(1) An AOC holder must establish procedures, and provide the necessary equipment, for the handling of an outbreak of any infectious disease, as informed by the World Health Organization, at any destination which the AOC holder operates to.

(2) An AOC holder must ensure that every person assigned to be a member of its operating personnel for any flight of a large aeroplane is familiar with the procedures and equipment mentioned in paragraph (1).

### **Cargo compartment safety**

**60A.**—(1) An AOC holder must establish policies and procedures in its Operations Manual —

(a) to ensure that a safety risk assessment is conducted to ascertain that the risks associated with the transport of any items in the cargo compartment for any flight of a large aeroplane are within the acceptable level; and

(b) to ensure (with reasonable certainty) that in the event of a fire involving any items being transported in the cargo compartment during any flight of a large aeroplane, the fire can be detected and sufficiently suppressed or contained by the elements of the aeroplane’s design associated with cargo compartment fire protection until the aeroplane makes a safe landing.

(2) The safety risk assessment mentioned in paragraph (1)(a) must include an assessment of at least the following matters:

(a) any hazards associated with the properties of the items to be transported;

(b) the capabilities of the AOC holder;

- (c) any operational considerations;
- (d) the capabilities of the aeroplane and its systems;
- (e) the containment characteristics of unit load devices;
- (f) the packing and packaging;
- (g) the safety of the supply chain for the items to be transported;
- (h) the quantity and distribution of the items of dangerous goods to be transported.

(3) An AOC holder must ensure that the elements of the cargo compartment fire protection system for a large aeroplane (as approved by the aeroplane manufacturer), and a summary of the demonstrated cargo compartment fire protection certification standards for the aeroplane, are contained in the aeroplane's flight manual or other documentation supporting the operation of the aeroplane.

*[S 938/2020 wef 05/11/2020]*

### *Division 3 — Operating limitations*

#### **Meteorological conditions — VFR flight**

**61.** An AOC holder must ensure that no flight of a large aeroplane is carried out in accordance with the Visual Flight Rules unless current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions along the route or that part of the route to be flown in accordance with the Visual Flight Rules will be such as to enable compliance with the Visual Flight Rules at the appropriate time.

#### **Meteorological conditions — IFR flight**

**62.** An AOC holder must ensure that a flight of a large aeroplane that is to be carried out in accordance with the Instrument Flight Rules —

- (a) does not take-off from the departure aerodrome unless the meteorological conditions at the departure aerodrome are

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at or above the aerodrome operating minima for that operation at the time of use; and

- (b) does not take-off or continue beyond the point of in-flight re-planning unless at the aerodrome of intended landing, or at each alternate aerodrome to be selected in accordance with these Regulations, current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions will be, at the estimated time of use, at or above the aerodrome operating minima that the AOC holder has established for that operation.

### **IFR departure limitations**

**63.**—(1) An AOC holder must ensure a large aeroplane does not commence an IFR flight when weather conditions at the departure aerodrome are below prescribed IFR landing minima unless meteorological reports and forecasts indicate that a successful approach and landing can be made at the take-off alternate aerodrome.

(2) An AOC holder must not conduct any low visibility operation with a large aeroplane except under and in accordance with an approval granted by the Director-General of Civil Aviation to the AOC holder under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

(3) In this regulation, “low visibility operation” means —

- (a) a Category II or III approach and landing; or
- (b) a take-off with RVR of less than 400 m, or such higher value specified by the competent authority of the State of the Aerodrome.

### **Minimum flight altitudes**

**64.**—(1) An AOC holder must ensure that, when establishing the minimum flight altitude for a route of any flight of a large aeroplane, all of the following factors are taken into account:

- (a) the accuracy and reliability with which the position of the aeroplane can be determined;

- (b) the inaccuracies in the indications of the altimeters used;
- (c) the characteristics of the terrain;
- (d) the probability of encountering unfavourable meteorological conditions such as severe turbulence and descending air currents;
- (e) any possible inaccuracies in aeronautical charts;
- (f) all relevant airspace restrictions;
- (g) any minimum flight altitude established by the State in which the operation takes place.

(2) An AOC holder must specify in its Operations Manual the method used to establish a minimum flight altitude under paragraph (1), including any conditions that the Director-General of Civil Aviation may have specified when approving that method.

### **Instrument flight procedures**

**65.**—(1) An AOC holder must ensure that a large aeroplane that is being operated in accordance with the Instrument Flight Rules complies with the instrument approach procedures approved by the State of the Aerodrome.

(2) An AOC holder must specify in its Operations Manual the instrument approach procedures as part of the standard operating procedures.

### **Dangerous goods**

**66.**—(1) An AOC holder must establish and maintain procedures in its Operations Manual for the proper handling of dangerous goods by its agents and personnel, as applicable.

(2) Where an AOC holder does not have an authorisation granted under regulation 14 for the carriage of dangerous goods as cargo, the procedures to be established under paragraph (1) include procedures to prevent the unauthorised carriage of dangerous goods.

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*Division 4 — Mass and balance and loading of aircraft*

**Loading of aircraft**

**67.**—(1) An AOC holder must ensure that a large aeroplane is only loaded —

- (a) under the supervision of a person who is qualified in loading operations; and
- (b) in accordance with the loading instructions.

(2) An AOC holder must prepare the loading instructions to ensure that —

- (a) the load is safely carried on the large aeroplane for the flight; and
- (b) any condition relating to the loading of the aeroplane, as may be specified in the Certificate of Airworthiness or flight manual for the aeroplane, is complied with.

(3) In this regulation, “loading instructions” means written instructions in respect of the distribution and securing of the load on an aeroplane.

**Load sheet**

**68.**—(1) For every flight of a large aeroplane, the AOC holder must ensure that the load sheet enables the pilot-in-command to determine the load of an aeroplane and its distribution are such that all operational limitations of the aeroplane are not exceeded.

(2) Before each flight or sector of a multi-sector flight of a large aeroplane, the AOC holder must ensure that —

- (a) the load sheet is completed;
- (b) the person preparing the load sheet is identified and the person confirms the accuracy of the data on the load sheet; and
- (c) the pilot-in-command accepts the load sheet by signing on it.

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(3) For every flight of a large aeroplane, the AOC holder must ensure that the load sheet for that flight contains the following information:

- (a) the date of the operation;
- (b) the aircraft registration;
- (c) the flight number;
- (d) the departure aerodrome and the destination aerodrome;
- (e) the total number of crew members;
- (f) evidence that the centre of gravity of the aeroplane is within specified limits, except when the AOC holder records this information in another document;
- (g) the actual mass of the aeroplane for the operation, including the aeroplane's actual zero fuel mass, take-off mass and landing mass for the operation;
- (h) the maximum allowable mass for the operation, including the maximum allowable zero fuel mass, take-off mass and landing mass for the operation;
- (i) the actual mass of take-off fuel and trip fuel;
- (j) the difference between the allowed traffic load mass and the actual traffic load mass;
- (k) the total number of seats in each class occupied by passengers;
- (l) the total number of passengers on board the aeroplane;
- (m) the edition number of the load sheet used for that flight, if the load sheet is in an electronic format.

*[S 769/2018 wef 24/11/2018]*

(4) An AOC holder must establish procedures and limitations for dealing with last minute changes to the load, and describe these procedures in its Operations Manual.

(5) An AOC holder must retain a copy of the load sheet for at least the period specified in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018.

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**Goods, passenger and baggage mass**

**69.**—(1) For every flight of a large aeroplane, the AOC holder must establish the actual mass of goods, and checked baggage, to be carried on board.

(2) For every flight of a large aeroplane, the AOC holder must establish the mass of the passengers, crew members and their hand baggage using —

- (a) the actual mass of the person or hand baggage;

(b) the standard mass stated in the following Table 1; or

Table 1

	<i>Standard mass per person including hand baggage</i>
Adult passengers on all flights	77 kg
Children (between 2 and 12 years of age) or infants under 2 years if occupying a separate seat	35 kg
Infants under 2 years of age if sharing a seat with an adult	0
Flight crew member	85 kg
Cabin crew member	70 kg

(c) the standard mass established in accordance with a programme specified in its Operations Manual.

### **Loading procedures to be in Operations Manual**

**70.**—(1) An AOC holder must specify in its Operations Manual —

- (a) the principles, methods and processes involved in complying with the requirements in this Division for all types of intended operations involving a large aeroplane; and
- (b) the procedures established in accordance with paragraph (2).

(2) An AOC holder must establish procedures to ensure that —

- (a) the AOC holder is notified of any incident or damage to a large aeroplane during loading; and
- (b) after any incident or damage mentioned in sub-paragraph (a), the flight does not proceed unless the airworthiness of the aeroplane to be used has been assessed to be satisfactory.



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*Division 5 — Performance***Performance planning**

71.—(1) An AOC holder must take into account the following factors when developing procedures for a large aeroplane to perform its intended operations safely:

- (a) the mass of the aeroplane;
- (b) the aeroplane configuration;
- (c) the aeroplane operating techniques;
- (d) the operation of aeroplane systems which may have an adverse effect on performance;
- (e) the runway gradient;
- (f) the condition of the runway;
- (g) the water surface state, where relevant;
- (h) the pressure altitude and temperature;
- (i) any wind;
- (j) any other environmental conditions which may have an adverse effect on performance;
- (k) the accuracy of the charts and other data used.

(2) When developing procedures for obstacle avoidance during take-off, landing and bailed landing, of a large aeroplane, an AOC holder must take into account aerodrome obstacle data.

**Performance data**

72. An AOC holder must ensure that the performance data for a large aeroplane —

- (a) is contained in the aeroplane's flight manual or, where provided by the aeroplane manufacturer or other source, an equivalent document; and
- (b) is available to every person who is a flight crew member, or who is responsible for flight planning or aircraft dispatch.

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**Runway friction coefficient**

73. An AOC holder must ensure that, where performance data for a large aeroplane is determined using measured coefficient of runway friction, the pilot-in-command complies with a procedure that correlates the measured coefficient of runway friction and the effective braking coefficient of friction of that aeroplane type, over the required speed range for the existing runway conditions.

**Runway surface conditions**

74. For every flight of a large aeroplane, the AOC holder must ensure that —

- (a) all performance calculations take into account runway surface conditions; and
- (b) before a runway is used for take-off, the surface conditions of the runway would allow the aeroplane to take off safely.

**Wet and contaminated runway surfaces**

75. When it is necessary for a large aeroplane to take off from a contaminated or wet runway, the AOC holder must take into account —

- (a) the runway overrun area;
- (b) the local wind conditions, including any element of tailwind or crosswind; and
- (c) the height of any snow banks adjacent to the runway.

**Runway factors**

76. When calculating the distance required for a large aeroplane to take-off or land from a runway which is not a paved, dry and flat surface, the AOC holder must take into account all factors that would affect the performance of the aeroplane.

**Runway length**

77. When calculating the distance of a runway that is available for take-off by a large aeroplane, the AOC holder must take into account

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the length of the runway which will necessarily be used for lining up the aeroplane in the direction of take-off.

### **Performance — mass limitations**

**78.**—(1) An AOC holder must ensure that the mass of a large aeroplane at the start of its take-off does not exceed any of the following limits:

- (a) the mass at which the requirements of the applicable Performance Class can be complied with for the planned flight;
- (b) the maximum take-off mass specified in the aircraft flight manual for that pressure altitude appropriate to the aerodrome elevation and any other local atmospheric condition that is used as a parameter to determine the maximum take-off mass;
- (c) the maximum mass specified in the applicable noise certificate granted in respect of the aeroplane, unless otherwise authorised by the competent authority of the State of the Aerodrome.

(2) In the event of in-flight re-planning for any flight of a large aeroplane, the AOC holder must ensure that the mass of the aeroplane at the point from which the revised operational flight plan applies does not exceed the mass at which the requirements of the applicable Performance Class can be complied with for the planned flight.

(3) An AOC holder must ensure that the estimated mass of a large aeroplane at the expected time of landing at the destination aerodrome, and at any destination alternate aerodrome, does not exceed the maximum landing mass specified in the aircraft flight manual for the pressure altitude appropriate to the aerodrome elevation and any other local atmospheric condition that is used as a parameter to determine the maximum landing mass.

(4) An AOC holder must ensure that the mass of a large aeroplane at the expected time of landing at the destination aerodrome, and at any destination alternate aerodrome, does not exceed the maximum mass specified in the applicable noise certificate granted in respect of

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the aircraft unless otherwise authorised by the competent authority of the State of the Aerodrome.

### **Performance applicability — aeroplanes**

**79.**—(1) An AOC holder must ensure that a large aeroplane that corresponds to one of the following descriptions is operated in accordance with the specified Performance Class:

- (a) a multi-engine aeroplane powered by turbo-propeller engines with an MAPSC exceeding 9 must be operated in accordance with Performance Class A;
- (b) a multi-engine turbojet-powered aeroplane must be operated in accordance with Performance Class A;
- (c) an aeroplane powered by reciprocating engines with an MAPSC exceeding 9 must be operated in accordance with Performance Class C.

(2) Despite paragraph (1), where full compliance with paragraph (1) is not possible due to specific design characteristics of a large aeroplane, the AOC holder may apply performance standards —

- (a) that ensure a level of safety equivalent to the appropriate Performance Class; and
- (b) that are approved by the Director-General of Civil Aviation.

### *Division 6 — Instrument and equipment*

#### **General**

**80.**—(1) An AOC holder must ensure that a large aeroplane does not commence a flight unless —

- (a) the aeroplane is equipped with the type and number of instruments and equipment that the aeroplane is required to be equipped with under the provisions of this Division; and
- (b) the prescribed instruments and equipment, and the manner of their installation, are approved or accepted by the aeroplane's State of Registry.

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(2) Where a large aeroplane is registered in Singapore, the AOC holder must ensure that —

- (a) a prescribed instrument or item of equipment (other than a prescribed instrument or item of equipment listed in the Second Schedule) that is installed on the aircraft; and
- (b) the manner of installation of the instrument or item of equipment described in sub-paragraph (a),

are approved or accepted by the Director-General of Civil Aviation in accordance with the Air Navigation Order.

(3) The Director-General of Civil Aviation may, in any particular case, direct an AOC holder to carry on any large aeroplane such additional or special equipment or supplies as the Director-General of Civil Aviation may specify —

- (a) to facilitate the navigation of the aircraft;
- (b) to carry out search and rescue operations; or
- (c) for the survival of any person carried on board the aeroplane.

### **Inoperative instruments and equipment**

**81.**—(1) Subject to paragraphs (2) and (3), an AOC holder must not commence any flight of a large aeroplane if any instrument or item of equipment that the aeroplane is required under these Regulations to be carried on the aeroplane in the circumstances of the intended flight is not carried or is not in a fit condition for use.

(2) The Director-General of Civil Aviation may, subject to such conditions as the Director-General of Civil Aviation thinks fit, permit an AOC holder to operate a particular large aeroplane in specific circumstances even if the aeroplane does not carry a required instrument or item of equipment or that instrument or item of equipment is not in a fit condition for use.

(3) Where a permission is granted under paragraph (2), the AOC holder may operate the specified large aeroplane in the circumstances specified in the permission if —

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- (a) the AOC holder has provided the particulars of the permission to the pilot-in-command of the aeroplane;
  - (b) the pilot-in-command has reviewed the particulars of the permission and determined that compliance with regulation 24 of the Air Navigation (91 — General Operating Rules) Regulations 2018 is possible; and
  - (c) every inoperative instrument or item of equipment is conspicuously marked “Inoperative” and the details of its required maintenance is recorded in the technical log.
- (4) To avoid doubt, a permission granted under paragraph (2) in respect of a foreign registered aeroplane does not affect the AOC holder’s responsibility to comply with the airworthiness requirements of the State of Registry.
- (5) Where an exit door of a large aeroplane becomes inoperative at a place where repairing or replacing the exit door is not reasonably practicable, the AOC holder may permit the aeroplane to continue carrying passengers until the aeroplane lands at a place where the exit door can be repaired if all of the following conditions are met:
- (a) the total number of inoperative exit doors does not exceed one, or such number approved by the Director-General of Civil Aviation;
  - (b) the conditions of flight are in accordance with arrangements approved by the Director-General of Civil Aviation either in relation to the particular aeroplane or to the class to which that aeroplane belongs in respect of —
    - (i) the number of passengers carried;
    - (ii) the position of the seats which the passengers occupy;
    - (iii) the fastening of the exit door by locking or otherwise;
    - (iv) the covering of the words “Exit” or “Emergency Exit” or an equivalent symbol above the inoperative exit door; and

- (v) the conspicuously marking of the exit by appropriate means to indicate that it is inoperative.

### **Minimum equipment list**

**82.**—(1) For every large aeroplane in its fleet, the AOC holder must establish a minimum equipment list —

- (a) that is approved by the Director-General of Civil Aviation;
- (b) that is based upon, but no less restrictive than, the relevant master minimum equipment list; and
- (c) that includes any permission granted by the Director-General of Civil Aviation in regulation 81.

(2) The minimum equipment list established under paragraph (1) must be specified in the AOC holder's Operations Manual.

### **Marking of exits and break-in areas**

**83.**—(1) An AOC holder must ensure that —

- (a) every exit of a large aeroplane is marked with —
  - (i) a universal symbolic exit sign approved by the Director-General of Civil Aviation or the words “EXIT” or “EMERGENCY EXIT”; and
  - (ii) instructions in English and diagrams to indicate the correct method of opening the exit; and
- (b) the markings required under sub-paragraph (a) —
  - (i) are red or green in colour;
  - (ii) are placed on or near the inside surface of the door or other closure of the exit; and
  - (iii) if the exit can be opened from the outside of the aeroplane, are also placed on or near the exterior surface.

(2) An AOC holder must ensure that every exit of a large aeroplane that is intended to be used by passengers in an emergency is marked on the exterior surface of the aeroplane by a band outlining the exit that —

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- (a) is not less than 5 cm in width; and
- (b) is in a colour that clearly contrasts with the background on which the marking appears.
- (3) An AOC holder must ensure that every area of the aeroplane fuselage that is suitable for break-in by rescue crews in the event of an emergency (called in this regulation a break-in area) —
- (a) is rectangular in shape;
- (b) is marked on the exterior surface of the aeroplane's fuselage by right-angled corner markings, each arm of which is 10 cm in length along its outer edge and 3 cm in width; and
- (c) is marked across the centre with the words "CUT HERE IN EMERGENCY".
- (4) Where a break-in area marked in accordance with paragraph (3) has corner markings that are more than 2 m apart, the AOC holder must ensure that the break-in area is marked with intermediate lines 10 cm in length and 3 cm in width such that the distance between adjacent markings does not exceed 2 m.
- (5) An AOC holder must ensure that, apart from a marking required under paragraph (1) or (2), every marking required under this regulation —
- (a) is red in colour; and
- (b) in any case in which the colour of the adjacent background renders the red marking not readily visible, is outlined in white or some other contrasting colour in such a manner as to render the marking readily visible.
- (6) An AOC holder must ensure that every marking required by this regulation —
- (a) is painted or affixed by other equally permanent means; and
- (b) is kept clean and unobscured at all times.



### **Flight deck door**

**84.**—(1) An AOC holder must ensure that every aeroplane, of a type described in paragraph (1A), that carries passengers is equipped with a flight deck door —

- (a) that is designed to resist penetration by small arms fire and grenade shrapnel and to resist forced intrusions by unauthorised persons; and
- (b) that is capable of being locked and unlocked from either pilot's station.

*[S 769/2018 wef 24/11/2018]*

(1A) The aircraft types mentioned in paragraph (1) are —

- (a) any aeroplane with an MCTOM exceeding 54,500 kg;
- (b) any aeroplane with an MCTOM exceeding 45,500 kg and an MAPSC exceeding 19; and
- (c) any aeroplane with an MAPSC exceeding 60.

*[S 769/2018 wef 24/11/2018]*

(2) An AOC holder must ensure that every aeroplane equipped with a flight deck door in accordance with paragraph (1) —

- (a) is provided with means of monitoring, from either pilot's station, the entire door area outside the flight deck to identify persons requesting entry and to detect suspicious behaviour or potential threat; and
- (b) is provided with means by which a cabin crew member may discreetly notify the flight crew of any suspicious activity or security breach in the cabin.

### **Location of instruments and equipment**

**85.** An AOC holder must ensure that any instrument or item of equipment that is installed in a large aeroplane —

- (a) if the instrument or item of equipment is to be operated or used by a single pilot, the instrument or equipment is installed so that the instrument or item of equipment can be readily seen and operated from that pilot's normal seating

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position with the minimum practicable deviation from normal line of sight along the flight path; and

- (b) if the instrument or item of equipment is to be operated or used by 2 pilots, the instrument or equipment is installed so that the instrument or item of equipment can be readily seen and operated from each pilot's normal seating position.

### **Markings and placards**

**86.** An AOC holder must ensure that, for every large aeroplane —

- (a) any placard, listing or instrument marking containing prescribed operating limitations is displayed —
- (i) in a conspicuous place in the aeroplane; and
  - (ii) in such a manner to minimise the risk of erasure, disfigurement, obscuring, or removal;
- (b) each unit of measure used on a placard, listing or instrument marking is the same as that on any related instrument or in the related flight manual;
- (c) each fuel contents gauge is clearly marked to indicate the units to which the gauge is calibrated;
- (d) a placard or marking is displayed in the immediate vicinity of each fuel and oil filler with the specification or grade, or both, of fuel or oil, as appropriate;
- (e) for each door (other than a flight deck door) in the aeroplane that separates a passenger compartment from another compartment that has emergency exit provisions, a placard is displayed to indicate that the door must be open during take-off and landing;

*[S 837/2021 wef 04/11/2021]*

- (f) any placard or marking required under any certificate issued in respect of the aeroplane is present at the designated location and remains legible; and

*[S 837/2021 wef 04/11/2021]*

- (g) a passenger information sign or placard containing a prohibition against smoking is displayed in each lavatory compartment and every other appropriate location in the aeroplane.

*[S 837/2021 wef 04/11/2021]*

### **Seating and restraints**

**87.**—(1) Subject to paragraph (3), an AOC holder must ensure that every large aeroplane is equipped with —

- (a) a seat or berth for each person on board; and
- (b) a safety belt for each seat or a restraining belt for each berth.

(2) An AOC holder must ensure that each seat provided in a large aeroplane for a flight crew member —

- (a) is equipped with a safety harness or, if the aircraft type certificate allows, a seat belt with a diagonal shoulder strap; and
- (b) incorporates a means —
  - (i) to automatically restrain the occupant in the event of rapid deceleration; and
  - (ii) to prevent an incapacitated occupant from interfering with the controls, where practicable.

(3) An AOC holder must ensure that every passenger under 2 years of age on board a large aeroplane is provided with a child restraint device.

(4) For every large aeroplane with a Certificate of Airworthiness that is first issued on or after 1 January 1981, the AOC holder must ensure that the aeroplane is equipped with a forward or rearward facing seat for each cabin crew member that —

- (a) is fitted with a safety harness;
- (b) is within 15 degrees of the longitudinal axis of the aeroplane;
- (c) is located near floor level; and

(d) is close to emergency exits.

### **Aircraft operating under VFR**

**88.** An AOC holder must ensure that a large aeroplane that is to be flown in accordance with the Visual Flight Rules is equipped with a means of measuring and displaying —

- (a) magnetic heading;
- (b) the time in hours, minutes and seconds;
- (c) barometric altitude;
- (d) indicated airspeed; and
- (e) mach number, if the speed limitation prescribed by the aircraft flight manual is expressed in terms of mach number.

### **VFR flights operated as controlled flights**

**89.** An AOC holder must ensure that a large aeroplane that is to be flown as a controlled flight in accordance with the Visual Flight Rules is equipped in accordance with regulation 91.

### **Equipment for flight in icing conditions**

**90.** An AOC holder must ensure that a large aeroplane that is to be flown in circumstances in which icing conditions are reported to exist or are expected to be encountered is certificated and equipped to operate in icing conditions.

### **Aircraft operating at night or under IFR**

**91.—(1)** An AOC holder must ensure that a large aeroplane that is to be flown at night, in accordance with the Instrument Flight Rules, or when the surface is not in sight, is equipped with a means of measuring and displaying —

- (a) magnetic heading;
- (b) the time in hours, minutes and seconds;
- (c) barometric altitude from 2 independent altimetry sources, at least one of which must be a sensitive pressure altimeter;

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- (d) airspeed calibrated in knots, with a means of preventing malfunctioning due to either condensation or icing;
  - (e) mach number, if the speed limitation prescribed by the aeroplane's flight manual is expressed in terms of mach number;
  - (f) turn and slip;
  - (g) aircraft attitude for each required pilot, except in an aeroplane where one of these may be replaced by the turn and slip indicator;
  - (h) stabilised aircraft heading;
  - (i) the adequacy of the power supply to any gyroscopic instruments;
  - (j) outside air temperature; and
  - (k) rate of climb and descent.
- (2) An AOC holder must ensure each attitude indicator provided in accordance with paragraph (1)(g) —
- (a) is powered by a separate power source that is capable of automatically continuing to power the indicator for at least 30 minutes after total failure of the main electrical system; and
  - (b) has an indicator on the instrument panel of the aeroplane to inform the pilot when the attitude indicator is being operated by emergency power.
- (3) Where the large aeroplane is a pressurised aeroplane, the AOC holder must ensure that the equipment installed to measure barometric altitude in accordance with paragraph (1)(c) has a counter drum pointer or equivalent presentation.
- (4) Where a large aeroplane is to be flown at night, the AOC holder must ensure that the aeroplane is equipped with the following lights:
- (a) any lights required by the Rules of the Air;
  - (b) illumination for all flight instruments and equipment essential for the safe operation of the aeroplane;

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- (c) lights in all passenger compartments;
  - (d) an independent portable light for each crew member station;
  - (e) a means to illuminate or detect the formation of ice.
- (5) In this regulation, “the surface is not in sight” means that —
- (a) the flight crew is not able to see sufficient surface features;  
or
  - (b) the surface illumination is insufficient to enable the flight crew to maintain the aeroplane in a desired attitude without reference to any flight instrument.

### **Spare fuses**

**92.**—(1) An AOC holder must ensure that every large aeroplane in its fleet carries on board a quantity of spare fuses mentioned in paragraph (2) for every fuse of an electrical circuit that is accessible for replacement while the aeroplane is in flight.

(2) The quantity of spare fuses required under paragraph (1) is the higher of —

- (a) 10% of the total number of fuses in each rating of fuses that are accessible for replacement while the aeroplane is in flight; or
- (b) 3 fuses of such description.

### **Altitude alerting system**

**93.**—(1) An AOC holder must ensure that a large aeroplane powered by at least one turbine engine is equipped with an altitude alerting system or device.

(2) The altitude alerting system or device provided in accordance with paragraph (1) must be capable of —

- (a) alerting the pilot to an approaching pre-selected altitude by means of visual and aural signals, such that the pilot may establish level flight from climb or descent without exceeding the pre-selected altitude;

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- (b) being tested without special equipment to determine proper operation of alerting signals;
  - (c) enabling the use of pre-selected altitudes in increments commensurate with the altitudes at which the aeroplane is approved for use; and
  - (d) accepting barometric pressure settings if the system or device operates on barometric pressure.
- (3) An AOC holder must ensure that every large aeroplane that —
- (a) is to be operated in accordance with the Instrument Flight Rules; and
  - (b) is not required to carry an altitude alerting system or device under paragraph (1),

is equipped with a means of indicating an altitude assigned by an appropriate air traffic control unit.

- (4) The means of indicating assigned altitude required under paragraph (3) —
- (a) must be located so that adjustment of the assigned altitude information may be readily made from each pilot seat;
  - (b) must display assigned altitude information such that the information is clearly visible to all flight crew members whose duties involve monitoring altitude assignment; and
  - (c) must enable the use of pre-selected altitudes in increments commensurate with the altitudes at which the aeroplane is operated.

### **Communication equipment**

**94.—**(1) An AOC holder must ensure that every large aeroplane is equipped with —

- (a) radio communication equipment that is capable of providing continuous two-way communication with an appropriate air traffic services unit or aeronautical telecommunication facility, and for receiving meteorological information, at any time during flight; and

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- (b) a headset with a boom or throat microphone.
- (2) The radio communication equipment required under paragraph (1) must provide for communication on the emergency frequency 121.5 MHz.
- (3) An AOC holder must not operate a large aeroplane in defined portions of airspace or on a route where the appropriate air traffic services authority has specified a required communication performance for performance-based communication unless —
- (a) the aeroplane is equipped with the capability of operating in accordance with the specified required communications performance; and
  - (b) the AOC holder has an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

### **Navigation equipment**

- 95.**—(1) An AOC holder must ensure that every large aeroplane is equipped with a navigation system that enables the aeroplane to proceed in accordance with —
- (a) the operational flight plan; and
  - (b) the requirements of an appropriate air traffic services authority.
- (2) An AOC holder must not carry out a specified navigation performance operation with a large aeroplane unless —
- (a) the aeroplane is equipped with the capability of operating in accordance with the specified navigation performance; and
  - (b) the AOC holder has an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.
- (3) An AOC holder must not operate a large aeroplane in RVSM airspace unless —



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- (a) the aeroplane is equipped with the capability —
    - (i) to indicate to the flight crew the flight level being flown;
    - (ii) to automatically maintain a selected flight level;
    - (iii) to provide an alert to the flight crew when the altitude of the aircraft deviates from the selected flight level by more than 300 ft (90 m); and
    - (iv) to automatically report pressure altitude; and
  - (b) the AOC holder has an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

(4) In this regulation, “specified navigation performance operation” has the meaning given by the Air Navigation (98 — Special Operations) Regulations 2018.

### **Surveillance equipment**

**96.**—(1) An AOC holder must equip every large aeroplane with surveillance equipment that enables the aeroplane to operate in accordance with the requirements of the appropriate air traffic services authority.

(2) An AOC holder must not operate a large aeroplane in an area where the appropriate air services authority has specified a required surveillance performance for performance-based surveillance unless —

- (a) the aeroplane is equipped with the capability to operate in accordance with the specified required surveillance performance; and
- (b) the AOC holder has an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

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### **Installation of communication, navigation and surveillance equipment**

**97.** An AOC holder must ensure that the installation on a large aeroplane of any equipment required for communications, navigation or surveillance purposes is such that the failure of any single unit of such equipment, or any combination of such equipment will not result in the failure of another unit required for communications, navigation or surveillance purposes.

### **Landing in instrument meteorological conditions**

**98.—(1)** An AOC holder must ensure that every large aeroplane that may be required to land in instrument meteorological conditions is provided with appropriate navigation equipment.

(2) The navigation equipment provided in accordance with paragraph (1) must be capable of receiving signals to provide guidance to a point from which a visual landing can be made at any aerodrome used and for any designated alternate aerodrome.

### **Category II and III precision approach equipment**

**99.** An AOC holder must not conduct a Category II or III precision approach with a large aeroplane unless —

- (a) the aeroplane is equipped with the capability to conduct such operations; and
- (b) the AOC holder has an approval granted by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018 for that purpose.

### **Crew intercom and public address system**

**100.—(1)** An AOC holder must ensure that every large aeroplane is equipped with —

- (a) a public address system; and
- (b) a crew member intercom system.

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- (2) A public address system required under paragraph (1)(a) —
- (a) must be capable of operation independent of the crew member intercom system required under paragraph (1)(b), with the exception of the handsets, headsets, microphones, selector switches and signalling devices;
  - (b) must be accessible for immediate use from each of the flight crew member stations in the flight deck;
  - (c) must have a microphone or equivalent installed for each required floor-level passenger emergency exit that has an adjacent cabin crew seat, which is readily accessible for immediate use by the seated cabin crew member; and
  - (d) must be understandably audible at all times at all passenger seats, lavatories, cabin crew seats and work stations.
- (3) A microphone or equivalent installed for the purposes of paragraph (2)(c) may serve more than one emergency exit if the proximity of the exits allows unassisted verbal communication between the seated cabin crew members.
- (4) A crew member intercom system required under paragraph (1)(b) —
- (a) must be capable of operation independent of the public address system required under paragraph (1)(a), with the exception of the handsets, headsets, microphones, selector switches and signalling devices;
  - (b) must provide a means of two-way communication between all members of the flight crew;
  - (c) must provide a means by which a crew member may communicate with another crew member at the flight deck, each passenger compartment and each galley not located on a passenger deck;
  - (d) must be accessible for immediate use from every flight crew member station in the flight deck;
  - (e) must be accessible for immediate use from at least one cabin crew member station in each passenger compartment;

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- (f) must be accessible for use at enough cabin crew stations so that all floor-level emergency exits in each passenger compartment are observable from a station so equipped; and
  - (g) must have an alerting system that —
    - (i) incorporates aural or visual signals for use by any crew member;
    - (ii) provides a means for the crew member who is receiving a call to determine whether it is a normal call or an emergency call; and
    - (iii) provides a means of two-way communication between ground personnel and any 2 flight crew members in the flight deck when the aeroplane is on the ground.

### **Emergency lighting**

**101.** Before operating a large aeroplane at night, the AOC holder must ensure that, to facilitate evacuation in the event of an emergency, the aeroplane is equipped with —

- (a) an emergency lighting system in the passenger compartment and at the location of each emergency exit;
- (b) an emergency floor path lighting system in the passenger compartment that leads to every emergency exit; and
- (c) an emergency lighting system that provides illumination outside the aeroplane.

### **Medical and emergency equipment**

**102.—(1)** An AOC holder must ensure that —

- (a) every large aeroplane is equipped with at least one first-aid kit; and
- (b) in the case of a large aeroplane that carries passengers, the aeroplane is equipped with the number of first-aid kits specified in the following Table 2.

Table 2: First-aid kits

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<i>MAPSC</i>	<i>Total number of kits</i>
0 to 100	1
101 to 200	2
201 to 300	3
301 to 400	4
401 to 500	5

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(2) An AOC holder must ensure that every first-aid kit required under paragraph (1) —

- (a) is stowed in an accessible place in the aeroplane;
- (b) contains items which are appropriate to the nature of the flight, and suitable to treat minor injuries; and
- (c) if the aeroplane is required to carry cabin crew, is suitable for use by the cabin crew to manage any incident of ill health.

(3) An AOC holder must ensure that —

- (a) where a large aeroplane is required to carry cabin crew, the aeroplane is equipped with a universal precaution kit for the use by cabin crew members to manage any incident of ill health associated with a case of suspected communicable disease, or a case of illness involving contact with body fluids;
- (b) where a large aeroplane is authorised to carry more than 250 passengers, the aeroplane is equipped with at least 2 universal precaution kits; and
- (c) where a large aeroplane is authorised to carry more than 100 passengers and is to be flown on a sector that is more than 2 hours in length, the aeroplane is equipped with at least one medical kit for use by a medical doctor or another qualified person in treating in-flight medical emergencies.

*[S 212/2020 wef 01/04/2020]*

(4) An AOC holder must ensure that —

- (a) every large aeroplane is equipped with —
  - (i) at least one fire extinguisher, accessible to a flight crew member, on or near the flight deck; and
  - (ii) at least one fire extinguisher in each compartment that is separate from the flight deck; and

- (b) in the case of a large aeroplane that carries passengers, the aeroplane is equipped with a number of portable fire extinguishers that is not less than the quantity specified for an aeroplane of that MAPSC in the following Table 3.

Table 3: Portable fire extinguishers

<i>MAPSC</i>	<i>Minimum total number of fire extinguishers for an aeroplane of that MAPSC</i>
1 to 30	1
31 to 60	2
61 to 200	3
201 to 300	4
301 to 400	5
401 to 500	6
501 to 600	7
601 to 700	8

(5) An AOC holder must ensure that any fire extinguisher provided in accordance with paragraph (4) —

- (a) is a type that will not cause dangerous contamination of the air within the aeroplane; and
- (b) is filled with an extinguishing agent that is not a type listed in Annex A, Group II of the Montreal Protocol on Substances That Deplete the Ozone Layer, 8th Edition, 2009 where the fire extinguisher —
- (i) is a portable fire extinguisher in an aeroplane for which the Certificate of Airworthiness is first issued (whether in Singapore or elsewhere) on or after 31 December 2018; or
- (ii) is a built-in fire extinguisher in a lavatory disposal receptacle for towels, paper or waste in an aeroplane for which the Certificate of Airworthiness is first

issued (whether in Singapore or elsewhere) on or after 31 December 2011.

(6) An AOC holder must ensure that every aeroplane with an MAPSC exceeding 19 is equipped with an axe that is readily accessible to the crew.

(7) Before an aeroplane with an MAPSC exceeding 60 is used to carry any passengers, the AOC holder must ensure that the aeroplane is equipped with portable battery-powered megaphones —

- (a) that are readily accessible from a normal cabin crew seat for crew members assigned to direct emergency evacuation; and
- (b) that are not less than the quantity specified for an aeroplane of that MAPSC in the following Table 4 and are installed in accordance with that Table.

Table 4: Megaphones

<i>MAPSC (per deck)</i>	<i>Distribution of megaphones (per deck)</i>		
	<i>Forward end</i>	<i>Mid section</i>	<i>Most rearward location</i>
61 to 99	-	-	1
100 to 199	1	-	1
200 or more	1	1	1

[S 212/2020 wef 01/04/2020]

(8) An AOC holder must ensure that every item of equipment provided in accordance with paragraphs (1), (3) and (4) is marked to clearly indicate its method of operation.

(9) If an item of equipment required under paragraph (1), (3) or (4) is stored in a compartment or container, the AOC holder must ensure that the compartment or container is marked to indicate its contents.



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**Response kit and guidance for dangerous goods emergency**

**103.**—(1) An AOC holder must ensure that every large aeroplane carries —

- (a) a copy of the “ICAO 9481 N/928 - Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods” to assist the crew to deal with any dangerous incident occurring on board the aeroplane during flight; and
- (b) a “Dangerous goods emergency response kit” for use on board an aircraft.

(2) An AOC holder must ensure that every person assigned duty as a crew member of a large aeroplane is trained to use the items specified in paragraph (1).

**Emergency locator transmitter**

**104.**—(1) An AOC holder must ensure that every large aeroplane is equipped with —

- (a) at least one automatic ELT or a capability in accordance with regulation 105; and
- (b) at least one survival ELT.

(2) Despite paragraph (1)(b), where a large aeroplane is required to carry life rafts in accordance with regulation 108, the AOC holder must ensure that the total number of survival ELTs that the aeroplane is equipped with is a number that is equivalent to at least one survival ELT for every 4 life rafts or part thereof that the aeroplane is required to carry.

(3) An AOC holder must ensure every emergency locator transmitter provided in accordance with paragraph (1) or (2) —

- (a) operates in accordance with the requirements of Volume III of Annex 10 of the Chicago Convention; and
- (b) is capable of transmitting on 121.5 MHz and 406 MHz.

(4) An AOC holder must ensure that every emergency locator transmitter that is capable of transmitting on 406 MHz —

- (a) is coded in accordance with Volume III of Annex 10 of the Chicago Convention; and
- (b) is registered with the agency responsible for the maintenance of the aircraft register.

### **Autonomous location transmitting capability**

**105.**—(1) An AOC holder must, no later than 1 January 2025, equip a large aeroplane with an MCTOM exceeding 27,000 kg and for which the aeroplane's Certificate of Airworthiness is first issued on or after 1 January 2024 with a capability of autonomously transmitting information from which the aeroplane's location can be determined by the AOC holder at least once every minute when the aeroplane is in distress.

*[S 212/2020 wef 01/04/2020]*

*[S 938/2020 wef 05/11/2020]*

*[S 823/2022 wef 03/11/2022]*

- (2) The capability required in paragraph (1) includes —
  - (a) the automatic detection of any event that indicates the aeroplane is in a distress condition;
  - (b) the automatic activation of the transmission of the position information within 5 seconds after detection of the activation event;
  - (c) the provision for manual activation for the transmission;
  - (d) the time stamping of the transmitted information;
  - (e) the ability to continuously transmit the necessary information during the loss of aircraft electrical power for at least the expected duration of the entire flight; and
  - (f) the deactivation of an activated autonomous transmission of position information only by the same mechanism that activated it.
- (3) An AOC holder must ensure that the capability installed for the purposes of paragraph (1) —

- (a) provides position information that meets the position accuracy requirements established for emergency locator transmitters; and
- (b) has a low rate of false activation that is acceptable to the Director-General of Civil Aviation.

### **Survival equipment**

**106.**—(1) An AOC holder must ensure that every large aeroplane carries survival equipment and signalling devices appropriate to the areas to be overflown and to the circumstances of the flight.

(2) The equipment carried on a large aeroplane for compliance with paragraph (1) may include, as appropriate, the equipment specified in regulations 107 and 108 and the Third Schedule.

### **Flights over water — general requirements**

**107.**—(1) An AOC holder must ensure that a large aeroplane that is to be flown over water is equipped with a life jacket for every person on board.

(2) Every life jacket provided in accordance with paragraph (1) —

- (a) must be equipped with a survivor locator light;
- (b) must be equipped with a whistle, except for a life jacket constructed and carried on board solely for use by a child under 4 years of age; and
- (c) must be stowed in a place which is easily accessible from the seat or berth of the person for whom the life jacket is provided.

(3) An AOC holder must ensure that every life raft, life jacket or signalling device provided in accordance with this regulation and regulation 108 —

- (a) is installed in a conspicuously identified location with the contents clearly indicated; and
- (b) is easily accessible in the event of a ditching.

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**Flights over water — specific requirements**

**108.**—(1) Before a large aeroplane with a single engine is operated over water at a distance that is more than 30 minutes at cruise speed or 100 NM, whichever is lesser, from land suitable to make an emergency landing, the AOC holder must equip the aeroplane with —

- (a) life rafts in accordance with paragraph (4); and
- (b) equipment for making distress signals, as described in the Rules of the Air.

(2) Where a large aeroplane with more than one engine —

- (a) is incapable of maintaining level flight above the minimum flight altitude in the event of an engine failure; and
- (b) is to be operated over water at a distance that is more than 30 minutes at cruise speed or 100 NM, whichever is lesser, from land suitable to make an emergency landing,

*[S 679/2018 wef 09/10/2018]*

the AOC holder must equip the aeroplane with —

- (c) life rafts in accordance with paragraph (4); and
- (d) equipment for making distress signals, as described in the Rules of the Air.

(3) Where a large aeroplane with more than one engine —

- (a) is capable of continuing flight without descending below the minimum flight altitude in the event of engine failure; and
- (b) is to be operated over water at distance that is more than 120 minutes at cruise speed or 400 NM, whichever is lesser, from land suitable to make an emergency landing,

*[S 679/2018 wef 09/10/2018]*

the AOC holder must equip the aeroplane with life rafts in accordance with paragraph (4).

(4) The life rafts provided in accordance with paragraphs (1)(a), (2)(c) and (3) —

- (a) must be in sufficient numbers to carry all persons on board;

- (b) must be of sufficient buoyancy and rated capacity to accommodate all occupants of the aeroplane in the event of a loss of one raft of the largest rated capacity;
- (c) must be stowed so as to facilitate their ready use in the event of an emergency; and
- (d) must be equipped with —
  - (i) equipment in accordance with the Third Schedule; and
  - (ii) such life-saving equipment, including means of sustaining life, as is appropriate to the flight to be undertaken.

(5) An AOC holder must ensure that every aeroplane with an MCTOM exceeding 27,000 kg is equipped with an underwater locating device —

- (a) which automatically activates when underwater;
- (b) which operates at a frequency of 8.8 kHz;
- (c) which is capable of operating for a minimum of 30 days; and
- (d) which is securely attached to an appropriate location on the aeroplane that is not the wings or the empennage.

### **Pressure-altitude reporting transponder**

**109.** An AOC holder must ensure that every large aeroplane is equipped with a pressure-altitude reporting transponder —

- (a) which operates in accordance with the provisions of Volume IV of Annex 10 of the Chicago Convention;
- (b) which is capable of operating in Mode S;
- (c) which has a data source that provides pressure-altitude information with a resolution of 7.62 m (25 ft) or better; and
- (d) which is provided with airborne or on-the-ground status of the aeroplane when that aeroplane is equipped with an automatic means of detecting such status.

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**Passenger safety instructions**

**110.**—(1) An AOC holder must ensure that every large aeroplane is equipped with a means of conveying the following information and instructions to passengers:

- (a) when seat belts are to be fastened;
- (b) when and how any oxygen equipment that is required to be carried is to be used;
- (c) any restrictions on smoking;
- (d) the location and use of life jackets, and life cots if carried;
- (e) the location and method of opening emergency exits.

(2) An AOC holder must ensure that every passenger of a large aeroplane is provided with a passenger safety card containing appropriate information to supplement the passenger briefing required in regulation 18.

(3) The passenger safety card mentioned in paragraph (2) must be accepted by the Director-General of Civil Aviation before being provided to any passenger of a large aeroplane.

**Oxygen indicators**

**111.** An AOC holder must ensure that every large aeroplane to be operated at an altitude above flight level 100 —

- (a) is equipped with a means of indicating to the flight crew —
  - (i) whether the passenger oxygen system is activated;
  - (ii) if the oxygen system is supplied by a gaseous system, the amount of breathing oxygen available in each source supply; and
  - (iii) if the aeroplane is a pressurised aeroplane, by visual or aural warning, when the cabin pressure altitude exceeds 10,000 ft; and
- (b) is equipped with a means of indicating to each user of an individual dispensing unit, whether the oxygen is being delivered to the dispensing unit.

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**Non-pressurised aeroplanes**

**112.** An AOC holder must ensure that a large aeroplane with a non-pressurised cabin is not operated above flight level 100 for any commercial air operation except under and in accordance with an approval granted by the Director-General of Civil Aviation.

**Oxygen equipment and supplies for pressurised aeroplanes**

**113.—**(1) Subject to paragraphs (3) and (4), an AOC holder must ensure that every large aeroplane that is a pressurised aeroplane, and that is to be operated above flight level 100, carries a supply of oxygen sufficient for a duration that is the greater of —

- (a) the duration of time that is calculated in accordance with its Operations Manual before the commencement of the flight, being the period or periods which it is reasonably anticipated that the aeroplane will be flown in the circumstances of the intended flight at a height where such requirements apply and in calculating the duration account must be taken of —
  - (i) the possibility of depressurisation when flying above flight level 100;
  - (ii) the possibility of failure of one or more of the aircraft engines;
  - (iii) any restrictions due to required minimum safe altitude;
  - (iv) the fuel requirement; and
  - (v) the performance of the aeroplane; or

- (b) the duration of time that is calculated in accordance with the following Table 5 for the circumstances that the aeroplane is to be operated in.

Table 5: Oxygen supply for a pressurised aircraft

<i>Circumstances</i>	<i>Supply for</i>	<i>Duration</i>
(1) When flying above flight level 100 but not exceeding flight level 250	Every flight crew member	30 minutes or whenever the cabin pressure altitude exceeds 10,000 ft, whichever is the greater.
	Every cabin crew member and 10% of passengers	<p>(a) When the aeroplane is capable of descending and continuing to its destination as specified in Capability 1, 30 minutes or whenever the cabin pressure altitude exceeds 10,000 ft, whichever is greater.</p> <p>(b) When the aeroplane is not capable of descending and continuing to its destination as specified in Capability 1, whenever the cabin pressure altitude is greater than 10,000 ft but does not exceed 12,000 ft.</p>
	Every cabin crew member, and all passengers	When the aeroplane is not capable of descending and continuing to its destination as specified in Capability 1, and the cabin pressure altitude exceeds 12,000 ft, the duration is the period when the cabin pressure altitude exceeds 12,000 ft or 10 minutes, whichever is the greater.



(2) When flying above flight level 250	Every flight crew member	2 hours or whenever the cabin pressure altitude exceeds 10,000 ft, whichever is the greater.
	Every cabin crew member	Whenever the cabin pressure altitude exceeds 10,000 ft and a portable supply for 15 minutes.
	10% of passengers	Whenever the cabin pressure altitude exceeds 10,000 ft, but does not exceed 12,000 ft.
	30% of passengers	Whenever the cabin pressure altitude exceeds 12,000 ft, but does not exceed 15,000 ft.
	All passengers	If the cabin pressure altitude exceeds 15,000 ft the duration is the period when the cabin pressure altitude exceeds 15,000 ft or 10 minutes, whichever is the greater.
	2% of passengers or 2 passengers, whichever is the greater, being supply of first-aid oxygen which must be available for simultaneous first-aid treatment of 2% or 2 passengers wherever the passengers are seated in the aeroplane	Whenever after decompression, cabin pressure altitude exceeds 8,000 ft.

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(2) In Table 5, “Capability 1” means that, at the time when a failure to maintain cabin pressurisation occurs, the aeroplane is capable of —

- (a) descending to flight level 130 within 4 minutes, in accordance with the emergency descent procedure specified in the relevant aircraft flight manual and without flying below the minimum altitudes for safe flight specified for the aeroplane in the AOC holder’s Operations Manual or equivalent; and
- (b) continuing at or below that flight level to its place of intended destination or any other place at which a safe landing can be made.

(3) An AOC holder may, in lieu of complying with paragraph (1), comply with paragraph (4) if the large aeroplane —

- (a) has a Certificate of Airworthiness that was first issued (whether in Singapore or elsewhere) before 1 January 1989; and
- (b) is provided with means for maintaining a pressure greater than 700 hPa throughout the flight in the flight crew compartment and in the compartments in which passengers are carried.

(4) The supply of oxygen to be provided for the purposes of paragraph (3) is —

- (a) in every case where a large aeroplane is to be flown above flight level 350, a supply of oxygen in a portable container sufficient for the simultaneous first-aid treatment of 2 passengers; and
- (b) in the event of failure to maintain a pressure greater than 700 hPa in accordance with paragraph (3)(b) in the circumstances specified in columns 1 and 2 of the following Table 6, a supply of oxygen sufficient for continuous use by the persons specified in column 3 for the period specified in column 4 of that Table.

Table 6: Alternative oxygen supply

Column 1	Column 2	Column 3	Column 4
<i>Aeroplane to operate at altitudes</i>	<i>Capability of aeroplane to descent (where relevant)</i>	<i>Persons for whom oxygen is to be provided</i>	<i>Period of supply of oxygen</i>
Above flight level 100		In addition to any passenger for whom oxygen is provided as specified below, every crew member.	30 minutes or the period specified at Condition A, whichever is greater.
Above flight level 100 but not above flight level 300	Aeroplane is either flying at or below flight level 150 or is capable of descending and continuing to the destination as specified at Condition X	10% of passengers.	30 minutes or the period specified at Condition A, whichever is greater.
	Aeroplane is flying above flight level 150 and is not capable of descending and continuing to the destination as specified at Condition X	All passengers.	10 minutes or the period specified at Condition B, whichever is greater.
		10% of passengers.	30 minutes or the period specified at Condition C, whichever is greater.
Above flight level 300 but not	Aeroplane capable of descending and	15% of passengers.	30 minutes or the period specified at

above flight level 350	continuing to the destination as specified at Condition Y		Condition A, whichever is greater.
	Aeroplane is not capable of descending and continuing to the destination as specified at Condition Y	All passengers.	10 minutes or the period specified at Condition B, whichever is greater.
		15% of passengers.	30 minutes or the period specified at Condition C, whichever is greater.
Above flight level 350		All passengers.	10 minutes or the period specified at Condition B, whichever is greater.
		15% of passengers.	30 minutes or the period specified at Condition C, whichever is greater.

(5) In Table 6 —

“Condition A” means the whole period during which the aeroplane flies above flight level 100, after the occurrence of a failure to maintain a pressure greater than 700 hPa in the control department and in the compartments in which passengers are carried;

“Condition B” means the whole period during which the aeroplane flies above flight level 150, after the occurrence of a failure to maintain a pressure greater than 700 hPa in the

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control department and in the compartments in which passengers are carried;

“Condition C” means the whole period during which the aeroplane flies above flight level 100 but not above flight level 150, after the occurrence of a failure to maintain a pressure greater than 700 hPa in the control department and in the compartments in which passengers are carried;

“Condition X” means that, at the time when a failure to maintain a pressure greater than 700 hPa in the control department and in the compartments in which passengers are carried occurs, the aeroplane is capable of —

- (a) descending to flight level 150 within 6 minutes, in accordance with the emergency descent procedures specified in the relevant aircraft flight manual and without flying below the minimum altitudes for safe flight specified in the Operations Manual relating to that aeroplane; and
- (b) continuing at or below that flight level to its place of intended destination or any other place at which a safe landing can be made;

“Condition Y” means that, at the time when a failure to maintain a pressure greater than 700 hPa in the control department and in the compartments in which passengers are carried occurs, the aeroplane is capable of —

- (a) descending to flight level 150 within 4 minutes, in accordance with the emergency descent procedures specified in the relevant aircraft flight manual and without flying below the minimum altitudes for safe flight specified in the Operations Manual relating to that aeroplane; and
- (b) continuing at or below that flight level to its place of intended destination or any other place at which a safe landing can be made.

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- (6) An AOC holder must ensure that a large aeroplane —
- (a) that is intended to be operated above flight level 250; or
  - (b) that is not capable of descending from an altitude of up to flight level 250 to flight level 130 within 4 minutes, in accordance with the emergency descent procedures specified in the relevant flight manual and without flying below the minimum altitudes for safe flight specified for the aeroplane in the AOC holder's Operations Manual,

is equipped with suitable and sufficient apparatus to enable the persons for whom oxygen is supplied to use the oxygen, including automatically deployable oxygen equipment with a quantity of oxygen dispensing units that exceeds the number of passenger and cabin crew member seats by at least 10%.

(7) An AOC holder must ensure that, in every large aeroplane that is a pressurised aeroplane and that is to be operated above flight level 250, each flight crew member at a flight duty station has ready access from the crew member's normal seating position to a quick-donning type of oxygen mask which will readily supply oxygen upon demand.

### **Crew protective breathing equipment**

**114.**—(1) An AOC holder must ensure that every large aeroplane is equipped with protective breathing equipment (called in this regulation a PBE) for every crew member that is required for a flight of the aeroplane.

- (2) The PBE provided in accordance with paragraph (1) —
- (a) must protect the eyes, nose and mouth of the person wearing it;
  - (b) must be capable of providing oxygen for a period of at least 15 minutes; and
  - (c) must be located —
    - (i) for a required flight crew member, at the member's assigned duty station in a place that is accessible for immediate use; and

(ii) for a required cabin crew member, at a place that is adjacent to the member's duty station.

(3) Subject to paragraph (4), an AOC holder must ensure every large aeroplane is equipped with a portable PBE located near each portable fire extinguisher required under regulation 102 unless —

(a) the PBE provided for a required cabin crew member is a portable type; and

(b) the portable fire extinguisher is located near to the cabin crew member's station.

(4) When the fire extinguisher required under regulation 102 is located inside a cargo compartment, the additional portable PBE must be stowed outside, but adjacent to the entrance to that compartment.

### **Device to warn flight crew of loss of pressurisation**

**115.** An AOC holder must ensure that every large aeroplane that is a pressurised aeroplane that is to be operated at an altitude above 25,000 ft is equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurisation.

### **Flight recorders — construction, installation and continued serviceability**

**116.—(1)** An AOC holder must ensure that every flight recorder required to be installed on a large aeroplane in accordance with regulations 117, 118, 119 and 120 is constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed.

(2) An AOC holder must ensure that every flight recorder mentioned in paragraph (1) meets the requirements specified by the Director-General of Civil Aviation in Aviation Specifications 2 — Flight Recorders for the respective type of flight recorders in respect of —

(a) crashworthiness and fire protection;

(b) performance;

- (c) parameters or information to be recorded;
- (d) duration of recording; and
- (e) continued serviceability.

*[S 769/2018 wef 24/11/2018]*

### **Flight recorders — flight data recorders (FDRs) and alternatives for aeroplanes**

**117.**—(1) An AOC holder must ensure that every large aeroplane that corresponds to one of the following descriptions is equipped with a flight data recorder of the type specified for an aeroplane of that description:

- (a) for a multi-engine turbine-powered aeroplane with an MCTOM not exceeding 5,700 kg, for which the Certificate of Airworthiness was first issued on or after 1 January 1990 but before 1 January 2016 — an FDR that records at least the first 16 parameters specified in Table 1-1 of the Aviation Specifications 2 — Flight Recorders issued by the Director-General of Civil Aviation;
- (b) for a turbine-engined aeroplane with an MCTOM not exceeding 5,700 kg, for which the Certificate of Airworthiness was first issued on or after 1 January 2016 — one of the following flight data recorders:
  - (i) an FDR that records at least the first 16 parameters specified in Table 1-1 of the Aviation Specifications 2 — Flight Recorders;
  - (ii) a Class C airborne image recorder (AIR) or airborne image recording system (AIRS) that records at least the flight path and speed parameters displayed to the pilot, as defined in the Aviation Specifications 2 — Flight Recorders;
  - (iii) an aircraft data recording system (ADRS) that records at least the first 7 parameters specified in Table 1-3 of the Aviation Specifications 2 — Flight Recorders;



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- (c) for an aeroplane with an MCTOM exceeding 5,700 kg but not exceeding 27,000 kg, for which the Certificate of Airworthiness was first issued on or before 1 January 2005 — an FDR that records at least the first 16 parameters specified in Table 1-1 of the Aviation Specifications 2 — Flight Recorders;
  - (d) for an aeroplane with an MCTOM exceeding 27,000 kg, for which the Certificate of Airworthiness was first issued on or before 1 January 2005 — an FDR that records at least the first 32 parameters specified in Table 1-1 of the Aviation Specifications 2 — Flight Recorders;
  - (e) for an aeroplane with an MCTOM exceeding 5,700 kg, for which the Certificate of Airworthiness was first issued after 1 January 2005 and the application for type certificate was submitted to a Contracting State before 1 January 2023 — an FDR that records at least the first 78 parameters specified in Table 1-1 of the Aviation Specifications 2 — Flight Recorders;
  - (f) for an aeroplane with an MCTOM exceeding 5,700 kg, for which the application for type certification was first submitted to a Contracting State on or after 1 January 2023 — an FDR that records at least the first 82 parameters specified in Table 1-1 of the Aviation Specifications 2 — Flight Recorders.
- (2) Where a large aeroplane is equipped with any FDR, ADRS, AIR or AIRS, the AOC holder must ensure that the FDR, ADRS, AIR or AIRS (as the case may be) does not use any of the following types of recording technology:
- (a) engraving metal foil;
  - (b) frequency modulation;
  - (c) photographic film;
  - (d) magnetic tape.

[S 769/2018 wef 24/11/2018]

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**Flight recorders — cockpit voice recorder (CVR)**

**118.**—(1) An AOC holder must ensure that every aeroplane with an MCTOM exceeding 5,700 kg is equipped with a cockpit voice recorder.

(2) For an aeroplane with an MCTOM exceeding 27,000 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2018, the AOC holder must ensure that —

- (a) the cockpit voice recorder installed in accordance with paragraph (1), and its associated cockpit area microphone components, is provided with an alternate power source;  
*[S 769/2018 wef 24/11/2018]*
- (b) whenever aeroplane power to the cockpit voice recorder ceases (either by normal shutdown or by other loss of power), the alternate power source automatically engages and provides 10 minutes, plus or minus one minute, of operation; and
- (c) the cockpit voice recorder is located as close as practicable to the alternate power source provided.

(3) In paragraph (2), “alternate power source” means a power source that is separate from the power source that normally provides power to the cockpit voice recorder and —

- (a) includes aeroplane batteries or other power sources that meet the requirements of paragraph (2) without compromising electrical power to essential and critical loads; and
- (b) in the case where the CVR function is combined with other recording functions within a single item of equipment, may be used to power the other functions of the equipment.

(4) Where a large aeroplane is equipped with any cockpit voice recorder, the AOC holder must ensure that the cockpit voice recorder does not use any of the following types of recording technology:

- (a) magnetic tape;

(b) wire.

*[S 769/2018 wef 24/11/2018]*

(5) *[Deleted by S 769/2018 wef 24/11/2018]*

### **Flight recorders — data link recorders**

**119.**—(1) An AOC holder must ensure that every large aeroplane that corresponds to one of the following descriptions records the data link communications messages on a crash-protected flight recorder (called in this regulation a data link recorder):

- (a) a large aeroplane for which the Certificate of Airworthiness is first issued on or after 1 January 2016, that utilises any data link communications applications specified by the Director-General of Civil Aviation, and which is required to carry a cockpit voice recorder under regulation 118;
- (b) a large aeroplane —
  - (i) for which the Certificate of Airworthiness is first issued before 1 January 2016;
  - (ii) which is modified on or after 1 January 2016 to install and utilise any of the data link communications applications specified by the Director-General of Civil Aviation;
  - (iii) which is required to carry a cockpit voice recorder under regulation 118; and
  - (iv) which is not modified on or after 1 January 2016 to install any data link communications equipment which complies with —
    - (A) the type design of the aeroplane that is approved by the State of Design before 1 January 2016; or

- (B) a modification to the aeroplane that is approved by the State of Design or the State of Registry before 1 January 2016.

*[S 938/2020 wef 05/11/2020]*

*[S 769/2018 wef 24/11/2018]*

(2) An AOC holder must ensure that the minimum recording duration of the data link communications required for an aeroplane described in paragraph (1)(a) or (b) is equal to the minimum recording duration of the cockpit voice recorder.

(3) An AOC holder must ensure that the recordings of the data link recorder can be correlated to the recorded cockpit audio.

### **Combination recorders**

**120.**—(1) Subject to paragraph (2), an AOC holder may, in lieu of complying with the requirements of regulation 117 or 118 or both, equip every large aeroplane that corresponds to one of the following descriptions with the flight recorder system specified for that aeroplane:

- (a) an aeroplane with an MCTOM exceeding 5,700 kg that is required to be equipped with a flight data recorder and a cockpit voice recorder, may be equipped with 2 combination recorders (FDR/CVR) (one forward and one aft);
  - (b) a multi-engine turbine-powered aeroplane with an MCTOM of 5,700 kg or less that is required to be equipped with either a flight data recorder or a cockpit voice recorder or both, may alternatively be equipped with one combination recorder (FDR/CVR).
- (2) For every aeroplane with an MCTOM exceeding 5,700 kg —
- (a) that has its application for type certification submitted to a Contracting State on or after 1 January 2016; and
  - (b) that is required to be equipped with both a cockpit voice recorder and a flight data recorder,

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the AOC holder must equip the aeroplane with 2 combination recorders (FDR/CVR), one located as close to the cockpit as practicable and the other located as far away as practicable, in addition to the requirements of regulations 117 and 118.

(3) Where a large aeroplane is installed with combination recorders in accordance with paragraph (1)(a), the AOC holder must ensure that the forward combination recorder —

- (a) is a combination recorder with CVR functions; and
- (b) is provided with an alternate power source that meets the requirements of regulation 118(2).

*[S 769/2018 wef 24/11/2018]*

### **Flight crew-machine interface recordings**

**120A.**—(1) An AOC holder must ensure that every aeroplane with an MCTOM exceeding 27,000 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2023 must be equipped with a crash-protected flight recorder that records —

- (a) the information displayed to the flight crew from electronic displays; and

(b) the operation of switches and selectors by the flight crew, that are specified in the Aviation Specifications 2 — Flight Recorders issued by the Director-General of Civil Aviation as matters to be recorded in the flight recorder.

(2) An AOC holder must ensure that, for the recordings made in accordance with paragraph (1) (called in this regulation the flight crew-machine interface recordings) —

- (a) the minimum duration of the flight crew-machine interface recordings is at least for the last 2 hours; and
- (b) the flight crew-machine interface recordings can be correlated to the recorded cockpit audio.

*[S 769/2018 wef 24/11/2018]*

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**Means for flight recorder data recovery**

**121.** An AOC holder must equip every large aeroplane with an MCTOM exceeding 27,000 kg and with an MAPSC exceeding 19 for which the application for type certification is submitted to the appropriate authority of the State of Design on or after 1 January 2021 with —

- (a) a means approved by the Director-General of Civil Aviation to recover flight recorder data; and
- (b) a means to make such data available in a timely manner to the Director-General of Civil Aviation or an appropriate authority when requested.

**Ground proximity warning system**

**122.—**(1) An AOC holder must ensure that every aeroplane (turbine-powered or piston-engined) with an MCTOM exceeding 5,700 kg or an MAPSC exceeding 9 is equipped with a ground proximity warning system which has a forward-looking terrain avoidance function.

(2) The ground proximity warning system required to be carried by a turbine-powered aeroplane in accordance with paragraph (1) —

- (a) must provide an automatic and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface; and
- (b) must provide warnings for all of the following circumstances:
  - (i) excessive descent rate;
  - (ii) excessive terrain closure rate;
  - (iii) excessive altitude loss after take-off or go-around;
  - (iv) unsafe terrain clearance while not in the landing configuration;
    - (A) gear not locked down;
    - (B) flaps not in a landing position;
  - (v) excessive descent below the instrument glide path.

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(3) The ground proximity warning system required to be carried by a piston-engined aeroplane in accordance with paragraph (1) —

- (a) must provide an automatic and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface; and
- (b) must provide warnings for all of the following circumstances:
  - (i) excessive descent rate;
  - (ii) excessive altitude loss after take-off or go-around;
  - (iii) unsafe terrain clearance.

### **Runway overrun awareness and alerting system**

**122A.**—(1) An AOC holder must ensure that every turbine engine aeroplane with an MCTOM exceeding 5,700 kg is equipped with a runway overrun awareness and alerting system (ROAAS).

(2) This regulation does not apply to a turbine engine aeroplane for which a Certificate of Airworthiness is first issued before 1 January 2026.

*[S 823/2022 wef 03/11/2022]*

### **Significant weather detection**

**123.** An AOC holder must ensure that every large aeroplane that is used to carry passengers and is a pressurised aeroplane is equipped with operative weather radar or other significant weather detecting equipment capable of detecting thunderstorms whenever the aeroplane is to be or is being operated —

- (a) in areas where such conditions may be expected to exist along the route in instrument meteorological conditions; or
- (b) at night.

### **Forward-looking wind shear warning system**

**124.**—(1) An AOC holder must ensure that every turbine-powered aeroplane with an MCTOM exceeding 5,700 kg or an MAPSC

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exceeding 9 is equipped with a forward-looking wind shear warning system.

(2) The forward-looking wind shear warning system provided in accordance with paragraph (1) —

- (a) must be capable of providing the pilot with a timely aural and visual warning of wind shear ahead of the aeroplane, and the information required for the pilot —
  - (i) to safely commence and continue a missed approach or go-around; or
  - (ii) to execute an escape manoeuvre if necessary; and
- (b) must provide an indication to the pilot when the limits specified for the certification of automatic landing equipment are being approached, when such equipment is in use.

### **Airborne Collision Avoidance System (ACAS II)**

**125.**—(1) An AOC holder must ensure that every turbine-powered aeroplane with an MCTOM exceeding 5,700 kg or an MAPSC exceeding 19, is equipped with ACAS II.

(2) The ACAS II provided in accordance with paragraph (1) must operate in accordance with the relevant provisions of Volume IV of Annex 10 of the Chicago Convention.

### **Automatic Dependent Surveillance — Broadcast (*out*) (ADS — B (*out*))**

**126.**—(1) An AOC holder must ensure that every large aeroplane is equipped with ADS — B (*out*) capability.

(2) In this regulation, “ADS — B (*out*) capability” means the function by which an aeroplane is capable of automatically transmitting data (such as aircraft identification, position and additional information, as appropriate) in a broadcast mode via a data link.



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**Cosmic radiation detection equipment**

**127.**—(1) An AOC holder must ensure that every large aeroplane that is to be flown at an altitude above 49,000 ft carries equipment to measure and indicate continuously the dose rate of total cosmic radiation being received and the cumulative dose for every such flight.

(2) The display unit of the equipment provided for the purposes of paragraph (1) must be readily visible to a flight crew member.

*Division 7 — Maintenance***Maintenance responsibilities**

**128.**—(1) An AOC holder must ensure that every large aeroplane that is registered in Singapore is maintained by —

- (a) the AOC holder's own maintenance organisation that is approved by the Director-General of Civil Aviation in accordance with the Air Navigation Order; or
- (b) an external organisation contracted under a formal maintenance support contract acceptable to the Director-General of Civil Aviation.

(2) Despite paragraph (1), the line maintenance for a Singapore registered large aeroplane may be carried out by a member of the AOC holder's operations personnel if —

- (a) the line maintenance does not require the use of complex tools or equipment that requires extensive setting up, or specialised training; and
- (b) the scope of such line maintenance is specified in the AOC holder's Maintenance Control Manual.

(3) An AOC holder that, as described in paragraph (1)(b), contracts an external organisation to perform all or part of the maintenance of its Singapore registered large aeroplanes must ensure that the contracted external organisation complies with the maintenance requirements of the Air Navigation Order.

(4) An AOC holder must ensure that every large aeroplane that is not registered in Singapore is maintained under an arrangement acceptable to both the Director-General of Civil Aviation and the aeroplane's State of Registry.

(5) An AOC holder must not operate a foreign registered large aeroplane unless that aeroplane has been maintained and released to service under a system acceptable to the aeroplane's State of Registry.

### **Continuing airworthiness information**

**129.** For every large aeroplane in its fleet, the AOC holder must —

(a) obtain and assess airworthiness information from the organisation responsible for the type design of the aeroplane;

*[S 823/2022 wef 03/11/2022]*

(aa) obtain and assess airworthiness information from the organisation responsible for the design of the modification or repair of the aeroplane; and

*[S 823/2022 wef 03/11/2022]*

(b) implement such measures or actions arising from the information as considered necessary.

### **Use of Maintenance Control Manual**

**130.—**(1) An AOC holder must ensure that no Maintenance Control Manual, or any proposed amendment to the Maintenance Control Manual, is used for the maintenance of a large aeroplane unless the Maintenance Control Manual or proposed amendment has been approved by the Director-General of Civil Aviation under regulation 22 of the Air Navigation (119 — Air Operator Certification) Regulations 2018.

(2) An AOC holder must —

(a) provide every member of the maintenance and operations personnel concerned with the maintenance of a large aeroplane with the approved Maintenance Control Manual containing all the instructions and information necessary for the member to perform the member's duties; and

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- (b) ensure that the approved Maintenance Control Manual is readily available to all personnel concerned with the maintenance or operation of a large aeroplane.

*Division 8 — Crew requirements*

**Composition of flight crew**

**131.** For every flight of a large aeroplane, the AOC holder must ensure that —

- (a) the number and composition of the assigned flight crew is not less than the requirements specified in the AOC holder's Operations Manual; and
- (b) the assigned flight crew includes flight crew members in addition to the minimum number specified in the aircraft flight manual or other documents associated with the aeroplane's Certificate of Airworthiness, when necessitated by considerations related to —
- (i) the aeroplane type used;
  - (ii) the type of operation involved; and
  - (iii) the duration of flight between points where flight crews are changed.

**Flight crew qualifications**

**132.** An AOC holder must ensure that every person assigned to flight crew member duty on a large aeroplane —

- (a) meets all requirements for the assigned flight crew duty;
- (b) meets all competency requirements in accordance with Division 10, including route and aerodrome qualification requirements for the intended operation; and
- (c) is currently qualified in accordance with the requirements of Division 9.

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**Flight crew recency**

**133.**—(1) An AOC holder must not assign any person to flight crew member duty as a pilot operating the flight controls of a large aeroplane during take-off and landing unless the person has, in the 90 days immediately preceding the flight —

- (a) operated the flight controls during at least 3 take-offs and 3 landings of a large aeroplane of the same aeroplane type or variant as the aeroplane to be used for the flight, or in an approved flight simulation training device that is representative of that aeroplane type or variant; and

*[S 679/2018 wef 09/10/2018]*

- (b) if the aeroplane is to be flown in accordance with the Instrument Flight Rules, flown a minimum of 3 instrument approaches, or otherwise demonstrated competence through a flight check with a check pilot.

(2) An AOC holder must not assign a person to flight crew member duty as a pilot-in-command of a large aeroplane unless the person has, in the 35 days immediately preceding the flight, carried out at least one take-off and one landing using a large aeroplane of the same aeroplane type or variant to be used for the flight, or an approved flight simulation training device that is representative of that aeroplane type or variant.

*[S 679/2018 wef 09/10/2018]*

(3) An AOC holder must not assign a person to flight crew member duty as a cruise relief pilot of a large aeroplane unless the person has, in the 90 days immediately preceding the flight —

- (a) operated as a pilot-in-command, co-pilot or cruise relief pilot of an aeroplane of the same aeroplane type to be used for the flight; or

*[S 679/2018 wef 09/10/2018]*

- (b) completed the following training and practice:

- (i) flying skill refresher training in an aeroplane of the same aeroplane type to be used for the flight, or in an approved flight simulation training device that is representative of that aeroplane type, that includes training in the procedures for normal, abnormal and

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emergency situations specific to cruise flight of that aeroplane type;

- (ii) if the approach and landing procedure for an aeroplane of the aeroplane type to be used for the flight may be performed by a pilot that is not flying the aeroplane, practice in the approach and landing procedures.

*[S 679/2018 wef 09/10/2018]*

(4) An AOC holder must not assign a person to flight crew member duty as a flight engineer of a large aeroplane unless the person has, in the 90 days immediately preceding the flight, acted as a flight engineer for at least one sector in a large aeroplane of the same aeroplane type to be used for the flight, or in a flight simulation training device that is representative of that aeroplane type.

*[S 679/2018 wef 09/10/2018]*

### **Flight crew duty assignment**

**134.**—(1) For every flight of a large aeroplane, the AOC holder must designate —

- (a) a flight crew member as the pilot-in-command; and
- (b) the number of persons required as additional flight crew members to augment the minimum crew specified in the aircraft's flight manual due to —
  - (i) the aeroplane type operated;
  - (ii) the type of operation to be performed; and
  - (iii) the duration of the flight.

(2) For every flight of a large aeroplane, the AOC holder must assign each flight crew member to the functions which that flight crew member is to carry out in the event of an aircraft emergency, including when an emergency evacuation becomes necessary.

(3) For every flight of a large aeroplane, the AOC holder must ensure that the assigned flight crew includes —

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- (a) if the aeroplane has a separate flight engineer's station, at least one flight engineer who is especially assigned to that station; and
  - (b) if the aeroplane is likely to perform an operation where navigation necessary for the safe conduct of the flight cannot be adequately accomplished by the pilots at the pilot station, at least one flight crew member who holds a flight navigator licence.

(4) Paragraph (3)(a) does not apply when the duties associated with the separate flight engineer station can be adequately performed by a flight crew member who also holds a flight engineer licence without interference with that flight crew member's regular duties.

### **Pilot-in-command experience requirements**

**135.** An AOC holder must ensure that every flight crew member to be designated as the pilot-in-command for a flight of a large aeroplane has acquired at least the minimum flight time specified in its Operations Manual before commencing the training specified in Division 9 for a pilot-in-command.

### **Pilot experience**

**136.** An AOC holder must ensure that every person assigned to flight crew member duty on a large aeroplane as a pilot —

- (a) is suitably trained and qualified as a pilot on the aeroplane type to be used; and
- (b) in the event of the pilot-in-command being incapacitated, is capable of —
  - (i) operating the aeroplane safely under the prevailing and anticipated forecast weather conditions; and
  - (ii) landing the aeroplane at the intended destination or a suitable alternate.

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**Flight crew operating limitations**

**137.**—(1) An AOC holder must specify in its Operations Manual any flight crew operating limitations for a flight crew member on a large aeroplane.

(2) Unless otherwise approved by the Director-General of Civil Aviation under the Air Navigation (98 — Special Operations) Regulations 2018, an AOC holder must ensure that every person who may be assigned duty in the following flight crew member roles is assigned to that role in only one aircraft type or, where there are significant differences between variants of a type, one variant:

- (a) a pilot, not being a pilot who may be assigned to a Mixed Fleet Flying operation in accordance with the Air Navigation (98 — Special Operations) Regulations 2018;
- (b) a flight engineer.

**Composition of cabin crew**

**138.**—(1) Except as provided in paragraph (2), an AOC holder must not use an aeroplane with an MAPSC exceeding 19 for the carriage of one or more passengers, unless the number of cabin crew members carried on board is not less than the greatest of the following:

- (a) one cabin crew member for every 50, or fraction of 50, passenger seats installed on the same deck of the aeroplane;
- (b) if the aeroplane has a single aisle, one cabin crew member for each pair of directly opposing floor level exits, or where the aeroplane has more than one aisle, one cabin crew member for each floor level exit;
- (c) the number of cabin crew members determined by the manufacturer during certification of the aeroplane, except that when the AOC holder's MAPSC is less than the manufacturer's certificated maximum passenger seating capacity by at least 50 seats, the required cabin crew complement may be reduced by one for every whole multiple of 50 seats by which the AOC holder's MAPSC

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falls below the manufacturer's certificated maximum passenger seating capacity.

(2) In the event that a cabin crew member is incapacitated, an AOC holder may operate the aeroplane with one cabin crew member less than the number of cabin crew members required in accordance with paragraph (1) if —

- (a) the remaining number of cabin crew members is not less than that stated in paragraph (1)(b);
  - (b) the flight is departing from a location where no qualified replacement cabin crew member is reasonably available;
  - (c) the passenger carrying capacity of the aeroplane is reduced by 50 seats from the manufacturer's certificated maximum passenger seating capacity for every cabin crew member below the number of cabin crew members specified by the manufacturer for that aircraft type;
  - (d) the operation of the flight with reduced cabin crew is limited to one sector, unless the AOC holder has obtained prior written approval from the Director-General of Civil Aviation to operate a second sector with the same reduced cabin crew;
  - (e) all cabin crew members are trained and familiar with the procedures for reduced cabin crew operation;
  - (f) where the incapacitated crew is the crew-in-charge, the next most qualified cabin crew who meets the requirements to be a crew-in-charge, as specified in regulation 139, is appointed as the crew-in-charge for that sector; and
  - (g) the AOC holder has specified in its Operations Manual the policies and procedures for reduced cabin crew operations.
- (3) Paragraphs (1) and (2) do not apply to the following flights:
- (a) a test flight;
  - (b) a functional check flight;
  - (c) a base training flight;



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- (d) a delivery flight
  - (e) a customer acceptance flight;
  - (f) a flight conducted under a ferry flight authorisation;
  - (g) a flight conducted under a Permit to Fly, subject to any additional conditions relating to cabin crew that may be imposed in that Permit to Fly;
  - (h) any other flight approved by the Director-General of Civil Aviation.
- (4) For flights listed under paragraph (3), an AOC holder must —
- (a) ensure that all persons carried on board are briefed on safety, emergency and evacuation procedures;
  - (b) determine the minimum number of cabin crew members required to effect a safe and expeditious evacuation of the aeroplane; and
  - (c) where more than 19 persons are carried on board (excluding the flight crew), assign at least one cabin crew member subject to the requirement in sub-paragraph (b).
- (5) An AOC holder must establish procedures to ensure that —
- (a) the composition of cabin crew members assigned for each flight of a large aeroplane meets the requirements of these Regulations; and
  - (b) cabin crew members with different levels of experience are appropriately distributed among the AOC holder's flights.
- (6) An AOC holder must ensure that a person is not assigned duty as a cabin crew member for any flight of a large aeroplane unless that person —
- (a) is at least 18 years of age;
  - (b) is medically fit to discharge the duties specified in its Operations Manual; and
  - (c) meets the competency requirements in Division 10.

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(7) Despite this regulation, if it appears to be expedient to do so in the interests of safety, the Director-General of Civil Aviation may direct an AOC holder not to fly any large aeroplane operated by it, or any such aeroplane in such circumstances as the Director-General of Civil Aviation may specify, unless the aeroplane carries such additional persons as cabin crew members as the Director-General of Civil Aviation may specify in the direction.

(8) In this regulation —

“base training flight” means a flight conducted to perform an Operator Proficiency Check or training;

*[S 769/2018 wef 24/11/2018]*

“customer acceptance flight” or “demonstration flight” means a flight conducted for the purpose of demonstrating the capabilities of the aeroplane to a prospective buyer;

“delivery flight” means a flight conducted for the purpose of positioning the aeroplane to a different location;

“functional check flight” means a flight conducted for the purpose of checking the functionality of certain equipment;

“test flight” means a flight conducted for the purpose of testing certain equipment.

### **Cabin crew duty assignment**

**139.**—(1) For every flight of a large aeroplane requiring at least 2 cabin crew members, the AOC holder must designate a cabin crew member to be the crew-in-charge, who is responsible to the pilot-in-command for the operational and safety functions of each cabin crew member in accordance with the procedures specified in its Operations Manual.

(2) When a crew-in-charge is to be designated in accordance with paragraph (1), the AOC holder —

(a) must ensure that the designated crew-in-charge has, unless otherwise approved by the Director-General of Civil Aviation —

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- (i) at least one year's experience with the AOC holder as a cabin crew member of a large aeroplane; and
  - (ii) completed an appropriate course of training; and
- (b) must establish procedures, acceptable to the Director-General of Civil Aviation, to identify the next most suitably qualified cabin crew member to operate as crew-in-charge in the event the nominated crew-in-charge becomes unable to operate.

### **Cabin crew operating limitations**

**140.**—(1) An AOC holder may authorise a person to be assigned duty as a cabin crew member on up to 3 types of large aeroplanes if the safety equipment and emergency procedures are similar on these aeroplane types.

(2) No cabin crew member may be designated crew-in-charge on more than one type of large aeroplane unless otherwise approved by the Director-General of Civil Aviation.

(3) An AOC holder must specify in its Operations Manual any cabin crew operating limitations for a cabin crew member on a large aeroplane.

### **Cabin crew recency**

**141.**—(1) Where a person has not been assigned to any cabin crew member duty on a large aeroplane for a period exceeding 60 days but not exceeding 6 months, the AOC holder must ensure that, before that person is assigned to any cabin crew duty on a large aeroplane, the person —

- (a) completes a recurrent training on the aeroplane type; and
- (b) passes a written test.

(2) Where a person has not been assigned any cabin crew member duty on a large aeroplane for a period exceeding 6 months but not exceeding 12 months, the AOC holder must ensure that, before that person is assigned to any cabin crew duty on a large aeroplane, the person —

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- (a) completes recurrent training on the aircraft type, including crew-in-charge recurrent training programme if the person had been and is to be designated as a crew-in-charge;
- (b) sits for and passes all recurrent and appropriate aircraft type tests; and
- (c) acquires the minimum operating experience specified in regulation 162.
- (3) Where a person has not been assigned any cabin crew member duty on a large aeroplane for a period exceeding 12 months, the AOC holder must ensure that, before that person is assigned to any cabin crew member duty on a large aeroplane, the person —
- (a) completes the full introduction and aircraft type rating training, including crew-in-charge recurrent training programme if the person had been and is to be designated as a crew-in-charge;
- (b) sits for and passes all appropriate tests; and
- (c) acquires the minimum operating experience specified in regulation 162.
- (4) An AOC holder must not assign a person to cabin crew member duties for a flight of any large aeroplane unless the person has, in the 90 days immediately preceding the flight, acted as a cabin crew member for a flight of a large aeroplane of the same type as the aeroplane to be used for the flight.
- (5) Despite paragraph (4), where a person is authorised in accordance with regulation 140(1) to be assigned cabin crew member duty on 3 types of large aeroplanes, the AOC holder must not assign that person to cabin crew member duties for a flight of any of those 3 types of large aeroplanes unless the person meets either of the following criteria:
- (a) the person has, in the 60 days immediately preceding the flight, acted as a cabin crew member for a flight of a large aeroplane of the same type as the aeroplane to be used for the flight;

(b) the person has —

- (i) in the 90 days immediately preceding the flight, acted as a cabin crew member for a flight of a large aeroplane on the same type as the aeroplane to be used for the flight; and
- (ii) in the 60 days immediately preceding the flight, acted as a cabin crew member for a flight of a large aeroplane —
  - (A) which has features similar to the type of the aeroplane concerned; and
  - (B) which is built by the same manufacturer.

(6) For a person who does not meet the criteria in paragraph (4) or (5) to be assigned cabin crew member duty, the AOC holder must ensure that the person successfully completes the aircraft type test for a cabin crew member before the person is assigned cabin crew member duties on a large aeroplane of any type.

### **Task specialists**

**142.** An AOC holder may assign to a task specialist the functions to be carried out in the event of an aircraft emergency if the task specialist —

- (a) is assigned duty on that flight of a large aeroplane; and
- (b) is appropriately trained to undertake the assigned functions.

### *Division 9 — Training*

#### **Training programmes — general**

**143.—(1)** An AOC holder must have a ground and flight training programme for its operations personnel that is approved by the Director-General of Civil Aviation.

(2) The ground and flight training programme established for the purposes of paragraph (1) —

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- (a) must ensure that every person who is assigned to be a member of the AOC holder's operations personnel is adequately trained and competent to perform the person's assigned duties; and
- (b) must include —
- (i) recurrent training that takes place at least annually;
  - (ii) assessments of competence in the person's assigned duties as a member of the operations personnel; and
  - (iii) the syllabus for each type of training to be conducted.
- (3) An AOC holder must ensure that every person who is to be assigned duty as a crew member for a flight of a large aeroplane is trained in accordance with the approved training programme.
- (4) An AOC holder must ensure that details of its approved training programme form Part D of its Operations Manual.
- (5) An AOC holder must ensure that every person responsible for providing training —
- (a) is appropriately qualified to do so; and
  - (b) is provided with a copy of the current training manual or equivalent and any other document relevant for the person to provide training.
- (6) An AOC holder must ensure that the approved training programme is conducted safely and without unacceptable risk to the equipment, personnel or third parties.
- (7) An AOC holder must ensure that all training in aircraft procedures is carried out in —
- (a) a large aeroplane of the type to be used by the crew member; or
  - (b) an appropriate training equipment.

### **Training equipment**

**144.**—(1) An AOC holder may use a flight simulation training device to complete any part of the recurrent training segment of its training programme if the flight simulation training device —

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- (a) is an approved flight simulation training device;
  - (b) is specified in its Operations Manual;
  - (c) is of an appropriate type for the training being undertaken;  
and
  - (d) is only used for those parts of the training programme for  
which its use has been specifically approved.

*[S 679/2018 wef 09/10/2018]*

(2) An AOC holder may use simulation equipment or apparatus to represent a large aeroplane or environment to conduct the training specified in regulation 150 if —

- (a) the AOC holder has obtained an approval from the Director-General of Civil Aviation for the use of simulation equipment or apparatus before such use; and
- (b) the simulation equipment or apparatus is used in accordance with the approval mentioned in sub-paragraph (a) under the supervision of a person approved by the Director-General of Civil Aviation to supervise such use.

(3) When conducting training that requires equipment or resources that are not used solely for training, an AOC holder must ensure that there is sufficient access to the equipment or resources such that the training may be completed —

- (a) without planned interruption; and
- (b) in an environment that is conducive to the objective and safety of the training.

### **Flight simulation training device**

**145.**—(1) An AOC holder must ensure that every flight simulation training device that is being used by its personnel to accrue flight time or training credit for any purpose in these Regulations —

- (a) is an approved flight simulation training device;

- (b) is representative of the aeroplane type or the particular variant of the aeroplane type (if applicable) that it is intended to simulate; and
- (c) is appropriate for the specific manoeuvre, procedure or crew member function that it is being used for.

*[S 679/2018 wef 09/10/2018]*

(2) An AOC holder must ensure that each flight simulation training device mentioned in paragraph (1) —

- (a) maintains the performance, functional and other characteristics that are required for the approval in paragraph (1);
- (b) is modified to conform with any modification made to the aeroplane being simulated that results in changes to the performance, functional or other characteristics required for the approval; and
- (c) is given a functional pre-flight check before being used for the day.

(3) An AOC holder must ensure that any discrepancy discovered during a training or check flight is logged by the appropriate flight crew supervisor or instructor at the end of the flight.

(4) An approved flight simulation training device may be used by more than one AOC holder if each AOC holder intending to use that flight simulation training device has the Director-General of Civil Aviation's specific approval for such use.

### **Training instructors**

**146.**—(1) An AOC holder must have a process for appointing training instructors that is approved by the Director-General of Civil Aviation.

(2) The process required under paragraph (1) must specify —

- (a) the minimum knowledge, qualifications and experience required of an appointed training instructor;
- (b) the scope and type of training, practice or supervision that an appointed training instructor is entitled to provide; and



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(c) the aeroplane type that an appointed training instructor is entitled to give instruction or supervision on.

(3) Each training instructor appointed in accordance with the process mentioned in paragraph (1) must be provided with a copy of —

- (a) the training programme;
- (b) the competency assessment programme; and
- (c) the relevant parts of the AOC holder's Operations Manual.

### **Crew member training programme**

**147.** An AOC holder must ensure the training programme provided in accordance with regulation 143(1) to a person who may be assigned duty as a crew member of a large aeroplane contains the following segments:

- (a) introduction training;
- (b) transition training;
- (c) upgrade training;
- (d) recurrent training.

### **Pilot training**

**148.—**(1) An AOC holder must ensure that the training programme established and maintained for a person who may be assigned duty in a large aeroplane in a flight crew member role equips the person with sufficient knowledge of —

- (a) the functions that the person is responsible for in that flight crew member role; and
- (b) the relation of those functions to the functions of other crew members of the aeroplane, particularly with regards to procedures in abnormal and emergency situations.

(2) The training programme mentioned in paragraph (1) must consist of ground and flight training on every type of aeroplane that the person may be assigned duty in that flight crew member role.

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(3) The training programme mentioned in paragraph (1) must include —

- (a) training in procedures for normal situations and all types of abnormal or emergency situations;
- (b) upset prevention and recovery training;
- (c) training in knowledge and skills related to visual and instrument flight procedures for the intended area of operation, and charting; and
- (d) the use of the AOC holder's standard operating procedures.

(4) An AOC holder must ensure that the training programme specifies the minimum standards of qualification and experience required of a pilot for every type of flying operation conducted by the AOC holder, including the pre-requisite experience to undergo transition training or other role-specific training.

(5) When the training programme mentioned in paragraph (1) is being established for a flight crew member role as a pilot of a large aeroplane, the AOC holder must ensure that at least the following factors are taken into account:

- (a) the person's flying experience as a pilot;
- (b) the availability and experience of other crew members;
- (c) the influence of terrain and obstructions on departure and approach procedures at the aerodromes and alternate aerodromes that may be used;
- (d) any specific instrument approach procedures that may be required;
- (e) the type and dimensions of runways that may be used, in relation to the performance characteristics of the aeroplane;
- (f) any seasonal meteorological conditions and the reliability of meteorological observations, reports and forecasts in the route network;

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- (g) any likely air traffic procedures that may be encountered and in particular, those procedures that may be outside the person's previous experience as a pilot;
  - (h) the influence of terrain and local geographic features on route conditions and the extent of assistance available from navigational aids and air-to-ground communication facilities;
  - (i) the extent to which ground instruction and training devices may familiarise the person with unusual aerodrome procedures and features of the route.

(6) An AOC holder must provide recurrent training at least annually to ensure that a person who may be assigned flight crew member duty as a pilot of a large aeroplane maintains knowledge and competency of —

- (a) the AOC holder's operational procedures; and
- (b) the AOC holder's aircraft systems and procedures.

(7) To avoid doubt, the pilot training mentioned in these Regulations does not include any training that leads to an endorsement of new ratings for the pilot.

### **Cabin crew training**

**149.**—(1) An AOC holder must ensure that, before a person is assigned duty as a cabin crew member for a flight of a large aeroplane on a commercial air transport operation, the person has satisfactorily completed the appropriate ground and flight training for the aeroplane type being used for the operation.

(2) An AOC holder must ensure that the training established and maintained for a person who may be assigned duty as a cabin crew member on a large aeroplane addresses, as appropriate, the following matters:

- (a) the authority structure of the aeroplane crew;
- (b) the assignment of crew members, including their functions and responsibilities during emergencies;

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- (c) the procedures for passenger handling, including emergency procedures and procedures to be followed in dealing with special classes of passengers according to its Operations Manual;
  - (d) the passenger briefings;
  - (e) the proper use of cabin equipment and controls;
  - (f) the location of safety and emergency equipment available for use by cabin or other crew members;
  - (g) the location and use of oxygen equipment;
  - (h) the location and use of all normal and emergency exits, including evacuation slides and escape ropes;
  - (i) the use of all safety and emergency equipment available on the aeroplane, in accordance with regulation 150;
  - (j) the awareness of dangerous goods in accordance with regulation 153;
  - (k) the knowledge of human performance as related to passenger cabin safety duties, including flight crew and cabin crew coordination;
  - (l) the applicable regulations and supporting documentation;
  - (m) the AOC holder's documentation system and related procedures.

### **Safety and Emergency Procedures training**

**150.**—(1) An AOC holder must ensure that every person to be assigned duty as a crew member on a large aeroplane undergoes introduction and recurrent training in safety and emergency procedures appropriate to the nature of the operations being carried out (called in this regulation SEP training).

(2) The SEP training provided in accordance with paragraph (1) must enable every person mentioned in that paragraph —

- (a) to competently execute those safety duties and functions of a cabin crew member which the person is assigned to

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perform in the event of an emergency or in a situation requiring emergency evacuation;

- (b) to be capable of competently using the emergency and life-saving equipment required to be carried on the aeroplane;
- (c) to be aware of other crew members' assignments and functions in the event of an emergency so far as is necessary for the fulfilment of the person's own duties as a cabin crew member; and
- (d) if assigned to a large aeroplane operated above 3,000 m (10,000 ft) —
  - (i) to know the effects of a lack of oxygen; and
  - (ii) to know the physiological phenomena accompanying a loss of pressurisation when the aeroplane is a pressurised aeroplane.

(3) An AOC holder must not assign a person to crew member duties on any flying operations or aircraft flying training until the person has completed the introduction SEP training.

### **Crew resource management training requirement**

**151.**—(1) An AOC holder must ensure that each crew member training segment that is provided in accordance with the training programme required by regulation 143 includes theoretical and practical training in crew resource management skills appropriate to the crew member role or class of crew members participating in the training segment.

(2) For flight crew members, this training and evaluation must be conducted in an approved flight simulation training device that is representative of the aeroplane type to be flown, where available.

*[S 679/2018 wef 09/10/2018]*

### **Threat and error management**

**152.** An AOC holder must ensure that the training programme provided to a person who may be assigned duty as a crew member for

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a flight of a large aeroplane includes training in human performance and human factors and the principles of threat and error management.

### **Dangerous goods training**

**153.**—(1) An AOC holder must establish and maintain introduction and recurrent dangerous goods training that is approved by the Director-General of Civil Aviation.

(2) The dangerous goods training mentioned in paragraph (1) is for every person who may be assigned duty as a crew member, or a member of the AOC holder's operations personnel, for a flight of a large aeroplane in accordance with the relevant Annexes to the Chicago Convention and the ICAO TI.

### **Crew member introduction segment**

**154.**—(1) An AOC holder must ensure that every person who may be assigned duty as a crew member for a flight of a large aeroplane but —

- (a) who is currently not qualified to act in that capacity; or
- (b) who is currently not on the AOC holder's roster to be assigned duty in that capacity for any operation authorised by the AOC holder's air operator certificate,

completes the introduction segment of the AOC holder's training programme (provided in accordance with regulation 143) in a structured manner.

(2) An AOC holder may vary the syllabus of the introduction segment mentioned in paragraph (1) for a specific person if —

- (a) the details of the variation are recorded in the person's training record; and
- (b) the AOC holder certifies the variation made and the reasons for the variation in the person's training record.

### **Crew member transition segment**

**155.**—(1) An AOC holder must ensure that every person, who is qualified and is on the AOC holder's roster to be assigned duty as a crew member on a flight of a large aeroplane for a commercial air

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transport operation authorised by the AOC holder's air operator certificate, completes the transition segment of the AOC holder's training programme in accordance with the training programme required by regulation 143 if —

- (a) the person is to be assigned crew member duty on an aeroplane type, or a variant of an aeroplane type, which is different from the aeroplane type or variant that the person is currently being assigned duty on; or
- (b) the AOC holder is introducing a new procedure or new equipment on the aeroplane type or variant that the person is currently being assigned duty on.

(2) The transition segment mentioned in paragraph (1) must address —

- (a) the use of all safety and emergency equipment and procedures applicable to the aeroplane type or variant; and
- (b) any new procedure or new equipment that is to be introduced on the aeroplane type or variant that the person is currently being assigned duty on.

(3) To avoid doubt, any training that relates to a pilot's aircraft type rating training must be conducted only by a training organisation that is approved in accordance with paragraph 20(13)(c) of the Air Navigation Order.

(4) Unless otherwise approved by the Director-General of Civil Aviation, a person who is on the AOC holder's roster to be assigned duty as a cabin crew member for a flight of a large aeroplane must acquire the minimum operating experience specified in regulation 162 on the new aeroplane type before commencing duties on an aeroplane of the new aeroplane type.

### **Crew member upgrade segment**

**156.**—(1) An AOC holder must ensure that every person, who is on the AOC holder's roster to be assigned duty as a crew member on a flight of a large aeroplane for a commercial air transport operation authorised by the AOC holder's air operator certificate, completes the upgrade segment of the AOC holder's training programme (provided

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in accordance with regulation 143) before the person is assigned duty as a crew member in a role with more responsibilities (called in this regulation the upgraded crew member role).

- (2) The upgrade segment mentioned in paragraph (1) —
- (a) must address the use of all safety and emergency equipment and procedures applicable to the upgraded crew member role on the aeroplane for which the upgrade is sought; and
  - (b) must include training —
    - (i) on human factors and crew resource management, with particular emphasis on the changes brought about by the upgraded crew member role; and
    - (ii) in supervisory skills.

### **Crew member recurrent segment**

**157.**—(1) An AOC holder must ensure every person, who is on the AOC holder's roster to be assigned duty as a crew member on a flight of a large aeroplane, is adequately trained, current and proficient in the aeroplane, crew member role and type of operation, that the person may be assigned duty in.

(2) An AOC holder must ensure that every person, who is on the AOC holder's roster to be assigned duty as a crew member for a flight of a large aeroplane completes the recurrent segment of the AOC holder's training programme provided in accordance with regulation 143 —

- (a) in a structured manner (including passing a written test); and
- (b) at least once every 12 months.

### **Consolidation**

**158.**—(1) For every person who may be assigned duty as a crew member by an AOC holder, the AOC holder must ensure that, after the person completes an introduction, aircraft type transition or upgrade segment of the AOC holder's training programme, the



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person undergoes consolidation by acquiring, under appropriate supervision —

- (a) if the duty to be assigned is that as a cabin crew member, appropriate operating experience in accordance with regulation 162;
- (b) if the duty to be assigned is that as a flight engineer, appropriate line-operating flight time in accordance with regulation 161; and
- (c) if the duty to be assigned is that as a pilot —
  - (i) appropriate operating experience in accordance with regulation 159; and
  - (ii) appropriate line-operating flight time in accordance with regulation 160.

(2) An AOC holder must specify in its Operations Manual the combined total of the operating experience and line-operating flight time required under paragraph (1)(c) by a person who is to be assigned duty as a pilot.

### **Pilot operating experience**

**159.**—(1) An AOC holder must ensure that every person who may be assigned duty on a flight of a large aeroplane as a pilot —

- (a) holds the appropriate licences and ratings required by the State of Registry; and
- (b) has acquired at least the minimum operating experience after satisfactory completion of the appropriate ground and flight training in accordance with the Air Navigation Order for the aeroplane type and crew member role that the person is to be assigned.

(2) The minimum operating experience required in paragraph (1)(b) must be acquired in commercial air transport operating conditions —

- (a) in the crew member role that the person is to be assigned duty in;

- (b) in the type or variant of the aeroplane that the person is to be assigned duty on; and
- (c) under the supervision of an instructor appointed in accordance with regulation 146 and who is acting as the pilot-in-command for the duration of the flight.

### **Pilot line-operating flight time**

**160.**—(1) For every person who may be assigned duty by an AOC holder on a flight of a large aeroplane as a pilot, the AOC holder must ensure that, after the person completes an introduction or transition segment of its training programme, the person acquires the line-operating experience specified in the approved training programme under the supervision of an instructor appointed in accordance with regulation 146.

(2) A person may be assigned duty as a pilot only for a flight of an aeroplane of the same type as the aeroplane that the person was operating while completing line-operating experience unless refresher training is provided and satisfactorily passed.

### **Flight engineer operating requirements**

**161.**—(1) An AOC holder must ensure that every person who may be assigned the functions of a flight engineer on a flight of a large aeroplane —

- (a) holds the requisite licences and ratings in accordance with the Air Navigation Order; and
- (b) completes the appropriate training as approved by the Director-General of Civil Aviation.

(2) An AOC holder must ensure that a person, who is recently qualified as a flight engineer, operates exclusively on the type and variant of the aeroplane that the person is to be assigned duty as a flight engineer while acquiring the required line-operating experience unless training that is approved by the Director-General of Civil Aviation is provided and satisfactorily passed.

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### **Cabin crew operating experience**

**162.**—(1) For every person who is to be assigned duty on a flight of a large aeroplane as a cabin crew member, the AOC holder must ensure that, in the 2 weeks immediately after the person completes the cabin crew member training required under regulation 149, the person operates at least 2 sectors as supernumerary crew on the aeroplane type and in the crew member role that the person will be assigned to, unless the Director-General of Civil Aviation otherwise approves.

(2) Where a person is operating as a supernumerary cabin crew member in accordance with paragraph (1), that person must not be counted as part of the minimum crew complement required under Division 8.

### **Manoeuvres requiring flight simulation training device**

**163.**—(1) An AOC holder must ensure that every person, who is on the AOC holder's roster to be assigned duty as a flight crew member for a flight of a large aeroplane, carries out emergency and abnormal manoeuvres during flight crew training or competency checking.

(2) Subject to paragraph (3), an AOC holder must carry out flight crew training in the following manoeuvres in an approved flight simulation training device that is representative of the aeroplane type to be flown:

- (a) any manoeuvre that needs to be carried out in close proximity to the surface;
- (b) any manoeuvre that involves the need to simulate failure of an aircraft system;
- (c) any manoeuvre that involves actions that cannot be realistically carried out in the aeroplane;
- (d) any manoeuvre that, if mishandled, creates an unacceptable risk to the aeroplane, crew members or third parties.

*[S 679/2018 wef 09/10/2018]*

(3) Where no approved flight simulation training device that is representative of the aeroplane type to be flown is available, the AOC

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holder may carry out the flight crew training in the manoeuvres listed under paragraph (2) in the aeroplane to be flown if the AOC holder —

- (a) has developed procedures to simulate such manoeuvres to the limit defined by the aeroplane manufacturer beyond which the safety of the aeroplane, crew members or third parties may be compromised (called in this regulation the defined limit); and
- (b) continues the training in the manoeuvres past that defined limit through ground briefing.

*[S 679/2018 wef 09/10/2018]*

### **Training records**

**164.**—(1) An AOC holder must maintain accurate records of all required training undertaken by every person who is a member of its operations personnel, including all crew members and all of the instructors who provided such training.

(2) The approved training programme must include specimen forms for recording any training undertaken.

(3) The training records maintained in accordance with paragraph (1) must include —

- (a) the date that the training was carried out;
- (b) the details of the training conducted;
- (c) the name and qualifications of the instructor responsible for carrying out the training; and
- (d) the date and particulars of any decision to suspend or stop training a crew member.

(4) An AOC holder must maintain the training records for every person who is currently being assigned duty as a crew member in accordance with the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018.

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*Division 10 — Crew member competency*

**Competency assessment programme**

**165.**—(1) For every person who is to be assigned duty as a crew member of a large aeroplane, an AOC holder must implement a competency assessment programme that comprises the relevant components prescribed in this Division.

(2) The competency assessment programme established in accordance with paragraph (1) must take into account all of the following areas, as applicable to the responsibilities of the person being assessed:

- (a) the applicable provisions of any subsidiary legislation made under the Act containing details of the person's responsibilities in the crew member role to be assigned to the person;
- (b) the operations specifications associated with the AOC holder's air operator certificate;
- (c) the AOC holder's Operations Manual;
- (d) the technical details of each aeroplane type and variant operated, including aeroplane systems, performance and operating procedures that may be relevant to the person's responsibilities as a crew member;
- (e) any special operations involving the aeroplane on which the person is being assigned duty as a crew member;
- (f) any new equipment, procedures, and techniques.

(3) An AOC holder must include details of the competency assessment programme established and implemented in accordance with paragraph (1) in its Operations Manual for the approval of the Director-General of Civil Aviation.

(4) An AOC holder must ensure that every person who may be assigned duty as a crew member is assessed in accordance with the approved competency assessment programme.

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**Operator Proficiency Check (OPC)**

**166.**—(1) An AOC holder must establish and maintain an assessment (called in these Regulations an Operator Proficiency Check) to assess a person's competency in the person's expected role and duties as a pilot for a flight of a large aeroplane before the person is assigned such duty.

(2) The Operator Proficiency Check established in accordance with paragraph (1) must include an assessment of a person's competency as a pilot —

- (a) in performing manoeuvres and procedures under normal, abnormal and emergency circumstances with the use of instruments and equipment provided; and
- (b) in relation to the instrument approach-to-land systems of the type in use at the aerodrome of intended landing and any alternate aerodromes.

(3) An AOC holder must conduct the Operator Proficiency Check as part of the normal flight crew complement for every person who may be assigned duty as a pilot of a large aeroplane.

(4) Where a person has passed the AOC holder's Operator Proficiency Check, that pass (called in this regulation an OPC pass) —

- (a) is valid for a period of 6 calendar months, starting from the day that the person passes the Operator Proficiency Check; and
- (b) may be renewed for a further 6 calendar months, starting on the day immediately after the expiry of the existing OPC pass, if the person completes and passes an Operator Proficiency Check that is conducted after a period of 4 calendar months has elapsed from the commencement of the validity of the existing OPC pass.

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- (5) The Operator Proficiency Check must be conducted —
- (a) in an approved flight simulation training device that is representative of the aeroplane type or variant to be operated by the person being assessed; or  
*[S 679/2018 wef 09/10/2018]*
  - (b) in an aeroplane of the type or variant to be operated by the person being assessed, during flight in actual or simulated instrument flight conditions when the aeroplane is not carrying any passenger, cargo or mail.
- (6) Where an AOC holder is assessing a person for competency as a pilot to operate a large aeroplane in accordance with the Instrument Flight Rules, the Operator Proficiency Check must be conducted without external visual reference.

### **Operator Line Check**

**167.**—(1) An AOC holder must establish and maintain an assessment (called in these Regulations an Operator Line Check) to assess a person's competency in carrying out normal line operations, as specified in its Operations Manual, as a pilot for a flight of a large aeroplane before the person is assigned such duty.

(2) The Operator Line Check established in accordance with paragraph (1) must include an assessment of a person's competence as a pilot of an aeroplane of the type or variant that the person is to be assigned to operate —

- (a) in the relevant pre-flight and post-flight procedures; and
- (b) in the use of equipment provided on the aeroplane.

(3) The Operator Line Check established in accordance with paragraph (1) must include an assessment of the person's competency in both the duties of pilot-flying and pilot-monitoring if the AOC holder requires every person assigned to flight crew member duty as a pilot-in-command or a co-pilot to carry out the duties of both roles.

(4) An AOC holder must conduct the Operator Line Check as part of the normal flight crew complement for every person who may be assigned duty as a pilot for a flight of a large aeroplane.

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(5) Where a person has passed an AOC holder's Operator Line Check, that pass (called in this regulation an OLC pass) —

- (a) is valid for a period of 12 calendar months, starting from the day the person passes the Operator Line Check; and
- (b) may be renewed for a further 12 calendar months, starting on the day immediately after the expiry of the existing OLC pass, if the person completes and passes an Operator Line Check that is conducted in the last 3 calendar months of the validity of the existing OLC pass.

(6) Unless the person being assessed is the holder of a valid OLC pass, the Operator Line Check must be conducted —

- (a) in an approved flight simulation training device that is representative of the aeroplane type or variant to be operated by the person being assessed; or

*[S 679/2018 wef 09/10/2018]*

- (b) in an aeroplane of the type or variant to be operated by the person being assessed, during flight in actual or simulated instrument flight conditions when the aeroplane is not carrying any passenger, cargo or mail.

(7) For a person who holds a valid OLC pass, the AOC holder may conduct the Operator Line Check during flight when the aircraft is carrying a passenger, cargo or mail.

### **Safety and Emergency Procedures Checks**

**168.**—(1) An AOC holder must establish and maintain an assessment (called in these Regulations a Safety and Emergency Procedures Check) to assess a person's competency in all the matters covered by the SEP training before a person is assigned duty as a crew member for a flight of a large aeroplane.

(2) The Safety and Emergency Procedures Check established in accordance with paragraph (1) must include an assessment of the person's competency in the safety requirements and emergency procedures of each aeroplane type and variant that the person may be assigned duty in.



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(3) Where a person has passed a Safety and Emergency Procedures Check, that pass (called in this regulation a SEPC pass) —

- (a) is valid for the remainder of the month in which the person passes the Safety and Emergency Procedures Check and a further period of 12 calendar months (which starts on the first day of the calendar month after the person passes the Safety and Emergency Procedures Check); and
- (b) may be renewed for a further 12 calendar months, starting on the day immediately after the expiry of the existing SEPC pass, if the person completes and passes a Safety and Emergency Procedures Check in the last 3 calendar months of the validity of the existing SEPC pass.

#### **Area, route and aerodrome competence**

**169.**—(1) An AOC holder must not designate a person as the pilot-in-command for any flight of a large aeroplane unless the person has, in the 12 months immediately preceding the commencement of the flight, demonstrated to the satisfaction of the AOC holder, that the person has adequate knowledge of —

- (a) the route to be taken;
- (b) the aerodromes of take-off and landing; and
- (c) any alternate aerodromes.

(2) The knowledge required under paragraph (1) includes knowledge of —

- (a) the terrain and minimum safe altitudes;
- (b) any seasonal meteorological conditions that may apply;
- (c) any meteorological, communication and air traffic facilities, services and procedures along the route which the flight is to take;
- (d) the search and rescue procedures; and
- (e) any navigational facilities and procedures, including any long-range navigational procedures, associated with the route along which the flight is to take.

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(3) To determine if a person's knowledge of the matters mentioned in paragraphs (1) and (2) is sufficient to render the person competent to perform the duties of a pilot-in-command, an AOC holder must take into account the person's flying experience in conjunction with the following:

- (a) the experience of other persons who are to be assigned as flight crew members for the flight;
- (b) the influence of terrain and obstructions on departure and approach procedures at the aerodromes of take-off and intended landing, and at any alternate aerodrome;
- (c) the similarity of the instrument approach procedures and let down aids to those procedures and aids that the person is familiar with;
- (d) the dimensions of runways which may be used in the course of the flight in relation to the performance limits of the aeroplane type to be used on the flights;
- (e) the reliability of meteorological forecasts and the probability of difficult meteorological conditions in the areas to be traversed;
- (f) the adequacy of available information regarding the aerodrome of intended landing and any alternate aerodrome;
- (g) the nature of air traffic control procedures and familiarity of the person with such procedures;
- (h) the influence of terrain on route conditions and the extent of the assistance which may be obtained en-route from navigational aids and air-to-ground communication facilities;
- (i) the extent to which the person may become familiar with unusual aerodrome procedures and features of the route by means of ground instruction and training devices.

(4) An AOC holder may treat a person as having met the requirements in paragraph (1) if the person, in the 12 months immediately preceding the commencement of the flight for which the

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AOC holder is intending to assign the person as the pilot-in-command (called in this paragraph the present flight) —

- (a) had previously qualified under paragraph (1) to act as a pilot-in-command on a flight between the same places, and on the same route, as the present flight; and
- (b) has acted as a pilot, check pilot or observer in the flight crew department of a flight between the same places, and on the same route, as the present flight.

(5) An AOC holder must establish a process, for the qualification and re-qualification of a pilot for the purposes of this regulation, that is approved by the Director-General of Civil Aviation.

(6) The process established in accordance with paragraph (5) must include —

- (a) the recording of the date and particulars of any decision taken by an AOC holder pursuant to paragraph (1); and
- (b) the evidence upon which any such decision was based on.

### **Dangerous goods tests**

**170.**—(1) If a person is to be assigned duty in a role that requires that person to undergo dangerous goods training in accordance with regulation 153, the AOC holder must ensure that the person has passed a test that verifies the person's understanding of the person's responsibilities in respect of dangerous goods before the AOC holder assigns the person to operational duties.

(2) An AOC holder must conduct the test mentioned in paragraph (1) after each introduction and recurrent training segment.

### **Check pilot qualifications**

**171.**—(1) An AOC holder must ensure that every person who performs the functions of a check pilot in the AOC holder's competency assessment programme —

- (a) is type rated in the aeroplane used to conduct the operation;
- (b) is familiar with the types of operations conducted by the AOC holder;

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- (c) is currently qualified to the level of assessment being undertaken; and
- (d) has completed introduction and recurrent training requirements applicable to the assessment carried out.
- (2) Where the competency assessment is carried out in an approved flight simulation training device, the AOC holder must ensure that the person performing the functions of a check pilot —
- (a) has satisfactorily completed a competency check as a pilot-in-command in a type of operation for which the person is acting as a check pilot;
- (b) has an appropriate flight instructor rating; and
- (c) has completed introduction and recurrent training requirements applicable to the assessment carried out.

*[S 679/2018 wef 09/10/2018]*

(3) An AOC holder must establish a process of selecting and training suitably qualified check pilots for the conduct of the various pilot competency checks.

(4) The process mentioned in paragraph (3) must be approved by the Director-General of Civil Aviation as part of the AOC holder's competency assessment programme.

### **Flight instructor and check pilot competency checks**

**172.**—(1) An AOC holder must ensure it has sufficient numbers of suitably qualified supervisory flight instructors or supervisory check pilots to ensure competency of the appointed instructors and check pilots.

(2) An AOC holder must ensure that every supervisory flight instructor and every supervisory check pilot receives instruction and maintains proficiency as appropriate in —

- (a) the methods of imparting instruction on how to operate, and how to ensure the safe operation of, a particular make and series of aircraft, or variant;
- (b) the methods of recovery from mishandled, abnormal, and emergency manoeuvres;

- (c) the operation of the aeroplane, equipment, or flight simulation training device used and, in operational flight, procedures and manoeuvres under normal, abnormal, and emergency conditions; and
- (d) the elements of crew resource management and the methods of evaluating crew resource management skills.

### **Safety and Emergency Procedures Check Examiners**

**173.**—(1) Before allowing a person to conduct the AOC holder's Safety and Emergency Procedures Check, the AOC holder must ensure that the person is suitably qualified and has been approved by the Director-General of Civil Aviation.

(2) On application by an AOC holder, the Director-General of Civil Aviation may approve any person nominated by the AOC holder to conduct the AOC holder's Safety and Emergency Procedures Check, subject to such conditions as the Director-General of Civil Aviation considers fit.

### **Pilot competency checks**

**174.**—(1) Where a person is being assessed for the person's competency as a pilot, an AOC holder must ensure that the competency assessment programme established under regulation 165 includes —

- (a) an Operator Proficiency Check;
- (b) an Operator Line Check;
- (c) a Safety and Emergency Procedures Check;
- (d) an assessment of route and aerodrome competence, as specified in regulation 169; and
- (e) such additional right hand seat or left hand seat checking as may be required.

(2) An AOC holder must appoint a sufficient number of check pilots to conduct the competency assessments listed under paragraph (1).

(3) A check pilot appointed in accordance with paragraph (2) must be qualified, in accordance with regulation 171 or through an arrangement with the Director-General of Civil Aviation, to conduct the competency assessments.

(4) An AOC holder must ensure that, before a person is assigned duty as a pilot of a large aeroplane, the person has completed and passed the competency checks required under paragraph (1) in the role and in the aircraft type that the person is to be assigned.

### **Cabin crew competency**

**175.** An AOC holder must not assign a person to duty as a cabin crew member of a large aeroplane unless the person —

- (a) has satisfactorily completed the cabin crew training in accordance with regulation 149; and
- (b) has a valid SEPC pass in accordance with regulation 168.

### **Competency checks of other crew members**

**176.—**(1) An AOC holder must establish the proficiency level required of a crew member role that is not the role of a pilot or a cabin crew member.

(2) For every crew member role mentioned in paragraph (1), the AOC holder must —

- (a) establish a competency assessment programme to assess the competency of a person in that crew member role and in the aeroplane type that the person is to be assigned that crew member role; and
- (b) ensure that the competency assessment programme established in accordance with sub-paragraph (a) includes checks appropriate to ensuring the continued competency of a person in the crew member role.

(3) An AOC holder must ensure that the competency assessment checks provided in accordance with paragraph (2)(b) includes an assessment of a person's knowledge of the crew member role, including —

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- (a) the authority of the pilot-in-command;
  - (b) the crew member's assignments, functions, and responsibilities during emergencies, including evacuation of persons who may need assistance;
  - (c) the safety and emergency procedures;
  - (d) the first-aid equipment and practice;
  - (e) awareness of any dangerous goods; and
  - (f) where the crew member role to be assigned involves the use of radio equipment on the flight, a competency assessment of the required skills.

### **Competency and testing records**

**177.**—(1) An AOC holder must maintain accurate and up-to-date records (called in this regulation a competency and testing record) of all competency assessments and testing for every person who may be assigned duty as a crew member on a large aeroplane.

(2) For each person whom an AOC holder maintains a competency and testing record in accordance with paragraph (1), the record must include the following details:

- (a) the date that the competency test or assessment was carried out;
- (b) the details of the test or assessment, including the result;
- (c) the name and qualifications of the examiner responsible for carrying out the test or assessment;
- (d) the date and particulars of any decision to require the person —
  - (i) to undertake further training;
  - (ii) to retake a test or an assessment; or
  - (iii) to cease acting as a crew member until such training, testing or assessment has been completed;
- (e) the date that a person was last assigned duty in the crew member role for which the test or assessment is necessary;

- (f) a statement that the AOC holder is satisfied that the person is competent to perform the person's duties in the assigned crew member role.

(3) An AOC holder must retain the competency and testing records of every person who may be assigned duty as a flight crew member or a cabin crew member of a large aeroplane for the period specified in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018.

*Division 11 — Fatigue of crew*

**Fatigue risk management programme**

**178.**—(1) An AOC holder must establish and implement a fatigue risk management programme for every flight of a large aeroplane, for the purpose of managing fatigue-related safety risks and with the aim of ensuring that every person assigned to duty on such a flight as a flight crew member or a cabin crew member is performing at an adequate level of alertness.

(2) The fatigue risk management programme established in accordance with paragraph (1) must be one of the following:

- (a) a system as specified in Part 1 of the Fifth Schedule with prescribed flight time, flight duty period, duty period limitations and rest period requirements for all of the AOC holder's operations under these Regulations;

*[S 769/2018 wef 24/11/2018]*

- (b) a Fatigue Risk Management System (FRMS) in accordance with Part 2 of the Fifth Schedule for all of the AOC holder's operations under these Regulations;
- (c) an FRMS in accordance with sub-paragraph (b) for part of its operations and the requirements of sub-paragraph (a) for the remainder of its operations under these Regulations.

(3) The fatigue risk management programme established in accordance with paragraph (1) must include, for each person who is assigned duty as a crew member for a flight of a large aeroplane —

- (a) an opportunity for the person to consume a meal when the flight duty period exceeds 5 hours; and



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- (b) the nomination of a home base for the person where the home base is assigned with a degree of permanence.
- (4) An AOC holder must not implement its fatigue risk management programme, or any change to an approved fatigue risk management programme, unless —
- (a) the programme or the change has been approved by the Director-General of Civil Aviation; and
  - (b) the details of the approved programme or the approved change have been included in its Operations Manual.
- (5) An AOC holder must establish, and include in the fatigue risk management programme, details of the following:
- (a) the assignment to an appropriate member of the operations personnel the responsibility for issuing instructions and making decisions on matters of flight, duty and rest periods and for processing discretion reports;
  - (b) the discretion which may be exercised by a pilot-in-command, and the extent to which the pilot-in-command is authorised, in an unforeseen operational circumstance, to deviate from the AOC holder's limitations on flight duty periods or minimum rest periods;  
*[S 674/2022 wef 15/08/2022]*
  - (c) the related reporting by the pilot-in-command each time the pilot-in-command exercises the discretion mentioned in sub-paragraph (b);  
*[S 674/2022 wef 15/08/2022]*
  - (d) the minimum period before a flight duty period, which must be at least 8 hours, during which a crew member must abstain from consuming any psychoactive substances;  
*[S 180/2019 wef 31/03/2019]*
  - (e) the precautions to be taken by a person who is assigned duty as a crew member when the person is taking medication.
- (6) On application by an AOC holder, the Director-General of Civil Aviation may, in exceptional circumstances, approve variations to a

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prescribed requirement of the AOC holder's fatigue risk management programme if the AOC holder —

- (a) has conducted a risk assessment on the proposed variation using a process acceptable to the Director-General of Civil Aviation;
- (b) has ensured that the proposed variation provides a level of safety at least equivalent to that achieved through the prescribed requirements through the risk assessment process; and
- (c) has provided full details of the proposed variation and the corresponding risk assessment to the Director-General of Civil Aviation.

### **Responsibilities of AOC holder for fatigue management**

**179.**—(1) An AOC holder must ensure that a copy of the approved fatigue risk management programme is distributed to every person —

- (a) who is assigned duty as a crew member on a flight of a large aeroplane; or
- (b) who is a member of the operational personnel and is concerned with managing the roster and the scheduling of crew members.

(2) An AOC holder must take all reasonably practicable steps to ensure that every person who is assigned duty as a crew member for a flight of a large aeroplane complies with the provisions of the approved fatigue risk management programme.

(3) An AOC holder must —

- (a) prepare and publish duty rosters sufficiently in advance to provide each person who may be assigned duty as a crew member with the opportunity to plan adequate rest;
- (b) plan for every flight of a large aeroplane to be completed within the allowable flight duty period taking into account the time necessary for pre-flight duties, the flight and turn-around times, and the nature of the operation;

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- (c) not permit a crew member to operate a large aeroplane if the AOC holder knows or suspects that the crew member is fatigued to the extent that the safety of the flight may be adversely affected;
  - (d) ensure that every person who may be assigned duty as a flight crew member, a cabin crew member or a member of its operational personnel in charge of crew scheduling and activation —
    - (i) is trained on the approved fatigue risk management programme; and
    - (ii) is familiar with the effects of fatigue on safe performance of duties;
  - (e) when a crew member is away from home base, provide the crew member with suitable accommodation on the ground for rest to allow for effective recovery;
  - (f) maintain records of flight time, flight duty periods, duty periods, and rest periods for every person who may be assigned duty as a flight crew member or a cabin crew member of a large aeroplane, for the period specified in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018; and
  - (g) whenever a pilot-in-command exercises a discretion to extend a flight duty period under unforeseen operational circumstances by more than 2 hours, submit a report containing details of the flight involved and the associated circumstances to the Director-General of Civil Aviation before the end of 30 days after its occurrence.

*[S 674/2022 wef 15/08/2022]*

*[S 769/2018 wef 24/11/2018]*

### **Continuous assessment of fatigue risk**

**180.**—(1) An AOC holder must monitor the fatigue of its crew members and ensure that its approved fatigue risk management programme remains effective.

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(2) An AOC holder must assess the effectiveness of the fatigue risk management programme (including any approved changes to the programme) in mitigating fatigue risks to an acceptable level whenever the AOC holder —

- (a) introduces a new fatigue risk management programme;
- (b) undertakes a new route; or
- (c) makes changes to an established operating pattern which a crew member is accustomed to.

### **Use of controlled rest on flight deck**

**181.**—(1) An AOC holder may allow controlled rest on the flight deck as a fatigue mitigation response to unexpected fatigue experienced by a flight crew member during a flight of a large aeroplane only if —

- (a) the flight is of sufficient length such that taking a controlled rest does not interfere with the flight crew member's required operational duties; and
- (b) the controlled rest takes place during low workload phases of flight.

(2) An AOC holder must not use controlled rest on the flight deck for the following purposes:

- (a) as a substitute for proper pre-flight sleep;
- (b) as a substitute for augmented crew and associated inflight rest;
- (c) as a scheduling tool;
- (d) as a method for extending crew duty periods.

(3) An AOC holder must monitor the use of controlled rest on the flight deck to evaluate whether existing fatigue mitigation strategies are adequate.

(4) The pilot-in-command of a large aeroplane must report to the AOC holder when controlled rest on the flight deck has been availed.

(5) An AOC holder must, on a regular basis, submit to the Director-General of Civil Aviation a report containing all the instances when controlled rest was availed to.

(6) An AOC holder must establish procedures for controlled rest on the flight deck and include these procedures in the Operations Manual.

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*Division 12 — Manuals, logs and records*

**Operations Manual**

**182.**—(1) An AOC holder must ensure that its Operations Manual contains all the details required in the Fourth Schedule.

(2) An AOC holder must establish procedures to ensure that its Operations Manual being used by its personnel contains current information.

**Maintenance Control Manual**

**183.**—(1) An AOC holder must ensure that its Maintenance Control Manual contains the following details:

- (a) a description of the administrative arrangements between the AOC holder and the maintenance organisation, if the AOC holder has the engineering or maintenance support, or both, contracted out;
- (b) a description of the maintenance procedures and the procedures for completing and signing of certificates of maintenance review and release to service if the maintenance is not contracted out;
- (c) the name and duty of every person assigned by the AOC holder to ensure that all maintenance is carried out in accordance with the Maintenance Control Manual;
- (d) a reference to every maintenance programme that the AOC holder is required to comply with;
- (e) a description of the methods used for the completion and retention of maintenance records;
- (f) a description of the AOC holder's reliability or condition monitoring programme and the associated reporting procedures;
- (g) a description of the AOC holder's procedures for assessing continuing airworthiness information and implementing resulting actions;

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- (h) a description of the AOC holder's procedures for implementing action resulting from mandatory continuing airworthiness information;
  - (i) a description of the AOC holder's manner of establishing and maintaining a system of analysis and continued monitoring of the performance and efficiency of the maintenance programme, in order to correct any deficiency in that programme;
  - (j) a description of aeroplane types and models to which the Maintenance Control Manual applies;
  - (k) a description of the AOC holder's procedures for ensuring that defects, damages or unserviceability affecting airworthiness are recorded and rectified;
  - (l) a description of the procedures for informing the Director-General of Civil Aviation of significant in-service occurrences.

(2) An AOC holder must establish procedures to ensure that the Maintenance Control Manual being used by the personnel concerned contains current information.

### **Operational flight plan**

**184.**—(1) Subject to paragraph (2), an AOC holder must ensure that the operational flight plan used for every flight of a large aeroplane, and the entries made during flight, contain all of the following items:

- (a) the aircraft registration;
- (b) the aircraft type and variant;
- (c) the date of flight;
- (d) the flight identification;
- (e) the names of flight crew members;
- (f) the place of departure;
- (g) the time of departure;
- (h) the place of arrival;

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- (i) the time of arrival;
  - (j) the type of operation;
  - (k) the route and route segments with checkpoints or waypoints with codings and frequencies of radio aids, distances, time and tracks;
  - (l) the planned cruising speed and flying times between checkpoints or waypoints, including estimated time of arrival, revised estimated time of arrival and actual time of arrival at each reporting point and each turning point;
  - (m) the safe altitudes and minimum levels;
  - (n) the planned altitudes and flight levels;
  - (o) the fuel calculations (including a fuel log, if not separately maintained, for recording inflight fuel checks);
  - (p) the amount of fuel on board when an engine is started;
  - (q) the destination alternate aerodrome, and the take-off alternate aerodrome and the en-route alternate aerodrome where applicable, including the information required in sub-paragraphs (l), (m), (n) and (o) for those aerodromes;
  - (r) the initial ATS Flight Plan clearance and any subsequent re-clearance;
  - (s) all in-flight re-planning calculations;
  - (t) the relevant meteorological information;
  - (u) the altimeter settings at points of departure and destination;
  - (v) the air traffic control clearance;
  - (w) the taxi, airborne, landing and engine-off times.
- (2) An AOC holder may omit from the operational flight plan any item listed in paragraph (1) —
- (a) that is readily available in other documentation or from an acceptable source; or
  - (b) that is irrelevant to the type of operation being carried out.



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(3) An AOC holder must describe the operational flight plan and its use in the Operations Manual.

(4) An AOC holder must ensure that all entries on the operational flight plan for a particular flight of a large aeroplane cannot be altered after the flight.

### **Fuel and oil records**

**185.**—(1) An AOC holder must maintain fuel records to enable the Director-General of Civil Aviation to ascertain that, for every flight of a large aeroplane, the requirements of regulations 45 and 47 are complied with.

(2) An AOC holder must maintain oil records to enable the Director-General of Civil Aviation to ascertain from a large aeroplane's oil consumption trends that the aeroplane has sufficient oil to complete each flight.

### **Document retention period**

**186.** An AOC holder must ensure that the documents, information or records specified in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018 are stored for their respective retention periods specified in that Schedule.

### **Cosmic radiation records**

**187.** For every flight of a large aeroplane during which the aeroplane is operated at an altitude above 49,000 ft, the AOC holder must keep a record of the total dose of cosmic radiation which the aeroplane is exposed during the flight and the name of every person assigned as a crew member for that flight.

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PART 3  
MISCELLANEOUS

**Financial penalties**

**188.**—(1) Subject to paragraphs (2) and (3), where the Authority is of the opinion that an AOC holder is contravening, has contravened or has failed to comply with any provision in Part 2 being a contravention that is not an offence under the Act, the Authority may impose on the AOC holder a financial penalty not exceeding the higher of the following:

- (a) \$500,000;
- (b) 5% of the AOC holder's annual revenue derived from the regulated activity.

(2) Before exercising any power under paragraph (1), the Authority must give written notice to the AOC holder concerned —

- (a) stating that the Authority intends to impose on the AOC holder a financial penalty under this regulation;
- (b) specifying each instance of non-compliance that is the subject of the financial penalty; and
- (c) specifying the time (being not less than 14 days after the service of the notice on the AOC holder) within which written representations may be made to the Authority with respect to the non-compliance that is the subject of the financial penalty.

(3) The Authority may, after considering any written representations under paragraph (2)(c), decide to impose such financial penalty under paragraph (1) as the Authority considers appropriate.

(4) Where the Authority has made any decision under paragraph (3) against any AOC holder, the Authority must serve on the AOC holder concerned a notice of its decision.

(5) To avoid doubt, this regulation does not affect the operation of section 4C, 4D or 4E of the Act.

(6) In this regulation —

“annual revenue” means the amount of money received by an AOC holder in the calendar year during which the AOC holder contravened or failed to comply with a provision in Part 2 being a contravention that is not an offence under the Act;

*[S 769/2018 wef 24/11/2018]*

“regulated activity” means the flights or operations regulated under these Regulations.

### **Grant of approvals or acceptance**

**189.**—(1) To avoid doubt, an approval or acceptance required by these Regulations granted by the Director-General of Civil Aviation, under the Air Navigation (119 — Air Operator Certification) Regulations 2018, when the AOC holder’s Operations Manual, Maintenance Control Manual or other manual is approved, is not an aviation safety instrument.

(2) Where the Director-General of Civil Aviation is required to grant an approval or acceptance, the application —

- (a) must be made by the relevant person in such form and manner as the Director-General of Civil Aviation may specify; and
- (b) must provide such information as the Director-General of Civil Aviation may require.

(3) The Director-General of Civil Aviation may grant an approval or acceptance subject to such conditions as the Director-General of Civil Aviation considers necessary or expedient.

(4) The Director-General of Civil Aviation may withdraw an approval or acceptance, or impose, add, delete, substitute or modify conditions in respect of any such approval or acceptance if —

- (a) the Director-General of Civil Aviation considers such action necessary to ensure compliance with these Regulations or any other relevant aviation safety subsidiary legislation; or

- (b) the Director-General of Civil Aviation is satisfied that there is or likely to be a failure to comply with these Regulations or any other relevant aviation safety subsidiary legislation.

(5) In this regulation, “relevant person” means the employee of an AOC holder who is responsible for applying to the Director-General of Civil Aviation for a specific approval or acceptance under these Regulations.

*[S 769/2018 wef 24/11/2018]*

## PART 4

### SAVING AND TRANSITIONAL PROVISIONS

#### **Definition of this Part**

**190.** In this Part, “Air Operator Certificate Requirements” means the Air Operator Certificate Requirements issued under paragraph 87(5) of the Air Navigation Order.

#### **Saving and transitional provisions**

**191.—**(1) Any person who, immediately before 1 October 2018 —

- (a) is assigned duty as a crew member for a flight of a large aeroplane on or after 1 October 2018;
- (b) has the training, experience and practice and passed periodical tests required under paragraph 27(2) of the Air Navigation Order for that crew member role, as specified in Part B of the Ninth Schedule to the Air Navigation Order and the Air Operator Certificate Requirements; and
- (c) satisfies the AOC holder that the person is competent to perform such duty,

is treated, on or after 1 October 2018, as being qualified and competent in accordance with regulation 132, 133(1), (2) or (3), 138(6), 139(2) or 141, as applicable, to be assigned such crew member duty.

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- (2) Any person who, immediately before 1 October 2018 —
- (a) is assigned to operate the flight controls of a large aeroplane during the take-off or landing of a flight, on or after 1 October 2018, in accordance with the Instrument Flight Rules; and
  - (b) has the training, experience and practice and passed periodical tests required under paragraph 27(2) read with paragraph 1(2)(e)(ii) of Part B of the Ninth Schedule to the Air Navigation Order,

is treated, on or after 1 October 2018, as meeting the criteria specified in regulation 133(1) to operate the flight controls during the take-off or landing of such a flight.

(3) Any person who, immediately before 1 October 2018, has passed an assessment specified in the Air Operator Certificate Requirements that is equivalent to —

- (a) an Operator Proficiency Check established under regulation 166;
- (b) an Operator Line Check established under regulation 167;  
or
- (c) a Safety and Emergency Procedures Check established under regulation 168,

that pass is treated, on or after 1 October 2018, as a pass under regulation 166(4), 167(5) or 168(3) respectively and is valid for the period specified for that pass in regulation 166, 167 or 168, as applicable.

(4) Any person who, immediately before 1 October 2018, is qualified under the Air Operator Certificate Requirements to act as a check pilot is treated, on or after 1 October 2018, as being qualified in accordance with regulation 174(3) to perform that role.

(5) Any person who, immediately before 1 October 2018, is qualified and approved under the Air Operator Certificate Requirements to act as a safety and emergency procedures check examiner, is treated, on or after 1 October 2018, as being qualified and approved in accordance with regulation 173 to perform that role.

(6) An AOC holder who, immediately before 1 October 2018, has an approval for an equipment in accordance with paragraph 12, 14 or 44 of the Air Navigation Order, is treated, on or after 1 October 2018 as if granted a corresponding approval under regulation 80, 82 or 83.

## FIRST SCHEDULE

Regulation 2

### DEFINITIONS

“Acclimated” means the state of being a crew member who has spent at least 3 consecutive local nights free of duty within a particular time zone.

*[S 212/2020 wef 01/04/2020]*

“Acclimated time”, in relation to a crew member, means the local time in the time zone to which the crew member is acclimated.

*[S 212/2020 wef 01/04/2020]*

“Adequate”, in relation to an alternate aerodrome, means an aerodrome —

- (a) where the landing performance requirements can be met;
- (b) which is expected to be available, if required; and
- (c) which has the necessary facilities and services, such as air traffic control, lighting, communications, meteorological services, navigation aids, rescue and firefighting services and at least one suitable instrument approach procedure.

“Aerodrome elevation” means the elevation of the highest point of the landing area.

“Aircraft operating manual” means a manual, acceptable to the State of the Operator and part of the Operations Manual, that contains —

- (a) the procedures for normal, abnormal and emergency situations;
- (b) the checklists;
- (c) the limitations of the aircraft;
- (d) the aircraft’s performance information;
- (e) the details of the aircraft systems; and
- (f) any other material relevant to the operation of the aircraft.

“AOC holder” means the holder of an air operator certificate issued under the Air Navigation (119 — Air Operator Certification) Regulations 2018.

FIRST SCHEDULE — *continued*

“Approved aircraft configuration” means an aircraft configuration approved by —

- (a) the competent authority of the State of Design; or
- (b) the Authority.

“Approved flight simulation training device” means a flight simulation training device for which the AOC holder has a specific approval, granted under paragraph 23A of the Air Navigation Order, to use for the purpose that it is being used for under these Regulations.

*[S 679/2018 wef 09/10/2018]*

“Augmented flight crew” means a flight crew that comprises more members than the normal operating flight crew number required to operate the aeroplane, and in which each flight crew member, for the purpose of in-flight rest, can leave their assigned post and be replaced by another appropriately qualified flight crew member.

“Automatic dependent surveillance” or “ADS” means a surveillance technique in which an aircraft automatically provides, via a data link, data derived from on-board navigation and position-fixing systems, including aircraft identification, four-dimensional position and additional data as appropriate.

“Automatic dependent surveillance — broadcast (ADS-B)” means the means by which an aircraft, an aerodrome vehicle and another object can automatically transmit, receive, or transmit and receive, data such as identification, position and additional data, as appropriate, in a broadcast mode via a data link.

“Check pilot” means a pilot appointed by an AOC holder to conduct flight crew competency assessments on the AOC holder’s flight crew.

“Configuration deviation list” or “CDL” means a list established by the organisation responsible for the type design with the approval of the State of Design which —

- (a) identifies any external parts of an aircraft type which may be missing at the commencement of a flight; and
- (b) contains any associated operating limitations and performance correction where necessary.

FIRST SCHEDULE — *continued*

“Contaminated”, in relation to a runway, means the runway has more than 25% of the runway surface area (whether isolated or not) within the required length and width of the runway surface being used is covered by the following:

- (a) surface water or slush more than 3 mm (0.125") deep;
- (b) loose snow, equivalent to more than 20 mm (0.75") of water;
- (c) compacted snow or ice, including wet ice.

“Controlled flight” means any flight which is subject to an air traffic control clearance.

“Co-pilot” means a pilot serving in any piloting capacity other than as pilot-in-command, but does not include a pilot who is on board an aircraft for the sole purpose of receiving flight instruction.

“Cosmic radiation” means the ionising and neutron radiation of galactic and solar radiation that the aeroplane is exposed to.

“Cruise relief pilot” means a flight crew member who is assigned to perform pilot tasks during cruise flight such that the pilot-in-command or a co-pilot may obtain planned rest.

“Day off” means an extended rest period to cater to the requirement of managing cumulative fatigue during which a crew member is free of all duties.

“Dry”, in relation to a runway, means a runway that is clear of contaminants and visible moisture within the required length and width of the runway surface being used.

“Duty” means any task that a flight or cabin crew member is required by an AOC holder to perform, including, for example, flight duty, administrative work, training, positioning and standby when the doing of that task is likely to induce fatigue.

“Duty period” means a period which starts when a flight or cabin crew member is required by the AOC holder to report for or to commence a duty and ends when that crew member is free from all duties.

“Early start”, in relation to a duty period, means a scheduled departure that commences in the period 0500 to 0659 hours acclimated time.

*[S 212/2020 wef 01/04/2020]*

“Extended diversion time operations” or “EDTO” means any operation by an aeroplane with 2 or more turbine engines where the diversion time to an



FIRST SCHEDULE — *continued*

en-route alternate aerodrome is greater than the threshold time established by the Authority in these Regulations.

“EDTO critical fuel” means the fuel quantity necessary to fly to an en-route alternate aerodrome from the most critical point on the route upon considering the most limiting system failure.

“Fatigue Risk Management System” or “FRMS” means a data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience, that aims to ensure relevant personnel are performing at adequate levels of alertness.

“Flight data analysis” means a process of analysing recorded flight data in order to improve the safety of flight operations.

“Flight duty period” means a period which commences when a flight or cabin crew member is required to report for any duty that includes a flight or series of flights and which finishes when the aircraft finally comes to rest and the engines are shut down at the end of the last flight on which he or she is a crew member.

*[S 769/2018 wef 24/11/2018]*

“Ground handling” means the services necessary for an aeroplane’s arrival at or departure from an aerodrome other than air traffic services.

“Home base” means the location, nominated by the AOC holder in respect of a crew member, from which the crew member normally starts and ends a duty period or a series of duty periods.

“Human factors principles” means principles which —

- (a) apply to aeronautical design, certification, training, operations and maintenance; and
- (b) seek safe interface between the human and other system components by giving proper consideration to human performance.

“ICAO TI” means the Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284), approved and issued in accordance with the procedure established by the Council of the International Civil Aviation Organization.

“Integrity”, in relation to aeronautical data, means a degree of assurance that an aeronautical data and its value has not been lost nor altered since the data origination or authorised amendment.

FIRST SCHEDULE — *continued*

“Intentionally transmitting PED” means a PED that transmits electromagnetic signals on a specific frequency as part of its intended function.

“Late finish”, in relation to a duty period, means a scheduled arrival that ends in the period 0100 to 0159 hours acclimated time.

[S 212/2020 wef 01/04/2020]

“Line maintenance” means maintenance activities required to prepare an aircraft for flight including —

- (a) pre-flight inspections and servicing;
- (b) daily inspections;
- (c) minor scheduled maintenance; and
- (d) defect rectification.

“Local night” means a period of 8 hours falling between 2200 hours and 0800 hours local time.

“Maximum diversion time” means the maximum allowable range, expressed in time, from a point on a route to an en-route alternate aerodrome.

“Mode S” means a transponder system that establishes selective and addressed interrogations with aircraft within its coverage for identification and altitude reporting.

“Normal operating flight crew” means the minimum flight deck crew required for public transport operation in compliance with the Air Navigation Order and the Certificate of Airworthiness.

“Performance Class A operations” means commercial air transport flights operated in accordance with the Performance Class A requirements in the Aviation Specifications 1 (AS-1) issued by the Director-General of Civil Aviation using —

- (a) a multi-engine aeroplane powered by turbo-propeller engines with an MAPSC exceeding 9; or
- (b) a multi-engine turbine-powered aeroplane.

“Performance Class C operations” means commercial air transport flights operated in accordance with the Performance Class C requirements in AS-1 issued by the Director-General of Civil Aviation using an aeroplane powered by at least one reciprocating engine with an MAPSC exceeding 9 or an MCTOM exceeding 5,700 kg.

FIRST SCHEDULE — *continued*

- “Performance data” means material which provides the necessary data to establish the performance of the aeroplane.
- “Positioning” means the transporting of a crew member from place to place as a passenger on surface or air transport at the behest of the AOC holder.
- “Pre-flight inspection” means an inspection carried out before flight in accordance with the aircraft flight manual or an AOC holder’s Operations Manual, or as specified in the approved maintenance programme.
- “Reporting time” means the time at which a crew member is required by the AOC holder to report for duty.
- “Rest period” means a continuous and defined uninterrupted period of time, subsequent to or prior to duty or both, during which an individual who is a flight or cabin crew member is free of all duties, and which period commences —
- (a) one hour after that individual is free of all duties, when the rest is subsequent to a duty period; or
  - (b) when the individual is away from base, at the time the individual reaches the accommodation designated for the rest period or one hour after that individual is free of all duties, whichever results in a shorter duration.
- “Roster” means a list provided by an AOC holder containing the times when an individual acting as a crew member is required to undertake duties, and which includes, but is not restricted to, the following times:
- (a) flight time;
  - (b) flight duty period;
  - (c) standby duty;
  - (d) rest period;
  - (e) day off.
- “Standby duty” means a defined period of time (at the airport, hotel or at home) during which a crew member is required by the AOC holder to be available to receive an assignment for a specific duty without an intervening rest period.
- “Suitable accommodation” means a furnished bedroom which provides for the opportunity of adequate rest or sleep.
- “Task specialist” means a crew member who is not part of the flight crew or cabin crew and who carries out duties on board the aircraft which are essential to the purpose of the flight.

FIRST SCHEDULE — *continued*

“Threshold time” means the range, expressed in time, established by the Director-General of Civil Aviation to an en-route alternate aerodrome, whereby any time beyond requires an approval granted under the Air Navigation (98 — Special Operations) Regulations 2018 for EDTO operations is required.

“Unforeseen operational circumstance” —

(a) means an unplanned event, such as aircraft unserviceability, industrial action, operational contingencies and other such unforeseeable occurrences; and

(b) excludes circumstances that are known sufficiently in advance such as scheduled charters or planned runway shortening.

“Unintentionally transmitting PED” means a PED that emits electromagnetic signals as a by-product of its operations.

“Wet”, in relation to a runway, means a runway that is neither dry nor contaminated.

“Window of circadian low”, in relation to a take-off or landing, means the period 0200 to 0459 hours acclimated time.

[S 212/2020 wef 01/04/2020]

## SECOND SCHEDULE

Regulation 80(2)

## EQUIPMENT AND INSTRUMENTS THAT DO NOT REQUIRE APPROVAL

1. An arctic protective clothing.
2. A book on survival appropriate to the area over which the aeroplane is being operated.
3. A bucket.
4. A canopy installed on a life raft.
5. A cooking implement kept on the life raft (such as cooking utensils or a stove).
6. A dye marker.
7. An equipment for making distress signals.
8. Any first-aid equipment.
9. [Deleted by S 212/2020 wef 01/04/2020]
10. An ice saw.

SECOND SCHEDULE — *continued*

11. An inflation pump.
12. An independent portable light.
13. A lifeline or any other means of attaching one life raft to another.
14. A life raft repair kit.
15. [*Deleted by S 212/2020 wef 01/04/2020*]
16. A means of maintaining buoyancy for a life raft.
17. A means of making sea water drinkable.
18. A megaphone.
19. A paddle or other means of propulsion.
20. A raft knife.
21. A sea anchor.
22. A signalling mirror.
23. A sleeping bag.
24. A snow shovel.
25. A survival ELT.
26. A whistle.

## THIRD SCHEDULE

Regulations 106(2) and 108(4)

## EMERGENCY EQUIPMENT

*This Schedule specifies the emergency equipment, mentioned in Division 6, to be carried on a large aeroplane.*

**Life rafts**

1.—(1) A large aeroplane must be equipped with life rafts appropriate to the area that the flight covers.

(2) A life raft must contain the following equipment:

- (a) a means of maintaining buoyancy;
- (b) a sea anchor;
- (c) a lifeline and a means of attaching one life raft to another;

THIRD SCHEDULE — *continued*

- (d) if the life raft has a capacity of 6 or less, paddles or other means of propulsion;  
*[S 212/2020 wef 01/04/2020]*
- (e) a canopy to protect the occupants;
- (f) a life raft repair kit;
- (g) a bailing bucket;
- (h) an inflation pump;
- (i) *[Deleted by S 212/2020 wef 01/04/2020]*
- (j) a raft knife;
- (k) a life raft survival pack that is equipped in accordance with paragraph 2.

**Life rafts survival pack**

2. A life raft survival pack must contain the following equipment:

- (a) an independent waterproof portable light;  
*[S 212/2020 wef 01/04/2020]*
- (b) marine type pyrotechnic distress signals;
- (c) a means of making sea water drinkable;
- (d) for every 4 persons the life raft is designed to carry —
  - (i) any readily distributable energy supplement with an energy value of about 400 kJ;
  - (ii) one litre of fresh water in durable containers, of which a proportion may be provided by the means provided for under sub-paragraph (c);
- (e) first-aid equipment;
- (f) a signalling mirror;
- (g) a whistle;
- (h) a dye marker;
- (i) *[Deleted by S 212/2020 wef 01/04/2020]*
- (j) a book on survival appropriate for the area over which the aeroplane is operated.

THIRD SCHEDULE — *continued***Survival equipment**

3. Where a large aeroplane is required to carry survival equipment in accordance with regulation 106, the aeroplane must carry the following items:

- (a) for operations in polar conditions, the equipment required in accordance with the Air Navigation (98 — Special Operations) Regulations 2018;
- (b) for operations in tropical conditions:
  - (i) a survival ELT;
  - (ii) pyrotechnic distress signals;
  - (iii) first-aid equipment;
  - (iv) for every 4 persons, any readily distributable energy supplement with an energy value of about 400 kJ; and one litre of fresh water in durable containers.

## FOURTH SCHEDULE

Regulation 182

## CONTENTS OF OPERATIONS MANUAL

**Operations Manual Contents**

1. An AOC holder must ensure that its Operations Manual contains the contents described in this Schedule and is organised according to the following structure:

- (a) Part A — General;
- (b) Part B — Aircraft operating information;
- (c) Part C — Routes and aerodromes;
- (d) Part D — Training.

## PART A

## GENERAL

2. Part A of an AOC holder's Operations Manual must contain the following elements:

- (a) the instructions outlining the responsibilities of each crew member role and the roles of the other members of the operating personnel pertaining to the conduct of flight operations;

FOURTH SCHEDULE — *continued*

- (b) the flight and duty time limitations and rest schemes for flight and cabin crew members;
- (c) a list of the navigational equipment to be carried including any equipment required for an operation with performance-based navigation;
- (d) where relevant to an AOC holder's operations, the long-range navigation procedures, engine failure procedure for EDTO and the nomination and utilisation of alternate aerodromes;
- (e) the circumstances in which a radio listening watch is to be maintained;
- (f) the method for determining minimum flight altitudes;
- (g) the methods for determining aerodrome operating minima;
- (h) the safety precautions to be taken when refuelling with passengers on board;
- (i) the ground handling arrangements and procedures;
- (j) the procedures for a pilot-in-command when an accident is observed;
- (k) the composition of the flight crew for each type of operation including the designation of the succession of command;
- (l) the specific instructions for the computation of the quantities of fuel and oil to be carried, taking into account all circumstances of an operation including the possibility of loss of pressurisation and the failure of one or more engines while en-route;
- (m) the conditions under which oxygen must be used and the amount of oxygen determined in accordance with Division 6;
- (n) the instructions for mass and balance control;
- (o) the instructions for the conduct and control of ground de-icing or anti-icing operations;
- (p) the specifications for the operational flight plan;
- (q) the standard operating procedures for each phase of flight;
- (r) the instructions on the use of normal checklists and the timing of their use;
- (s) the departure contingency procedures;
- (t) the instructions on the maintenance of altitude awareness and the use of automated or flight crew altitude call-out;



FOURTH SCHEDULE — *continued*

- (u) the instructions on the use of autopilots and auto throttles in instrument meteorological conditions;
- (v) the instructions on the clarification and acceptance of air traffic control clearances, particularly where terrain clearance is involved;
- (w) the departure and approach briefings;
- (x) the procedures for familiarisation with areas, route and aerodromes;
- (y) the stabilised approach procedure;
- (z) any limitations on high rates of descent near the surface;
- (za) the conditions required to commence or to continue an instrument approach;
- (zb) the instructions for the conduct of precision and non-precision instrument approach procedures;
- (zc) the allocation of flight crew duties and procedures for the management of crew workload during instrument approach and landing operations at night and under instrument meteorological conditions;
- (zd) the instructions, training and awareness programmes, as appropriate for —
  - (i) the avoidance of controlled flight into terrain and policy for the use of the ground proximity warning system;
  - (ii) the prevention of and recovery from loss of control of aircraft in-flight; and
  - (iii) the avoidance of level busts or unauthorised, or uncommanded, vertical deviation equal to or more than 300 ft, or 200 ft while in RVSM airspace, if applicable;
- (ze) the policy, instructions, procedures and training requirements for the avoidance of collisions and the use of the airborne collision avoidance system (ACAS);
- (zf) the information and instructions relating to the interception of civil aircraft including —
  - (i) the procedures for pilots-in-command of intercepted aircraft; and
  - (ii) the visual signals for use by intercepting and intercepted aircraft;
- (zg) for any aeroplane intended to be operated at an altitude above 49,000 ft (15,000 m) —

FOURTH SCHEDULE — *continued*

- (i) information which will enable the pilot to determine the best course of action to take in the event of exposure to solar cosmic radiation; and
- (ii) the procedures in the event that a decision to descend is taken, covering —
  - (A) the necessity of giving the appropriate air traffic services unit prior warning of the situation and of obtaining a provisional descent clearance; and
  - (B) the action to be taken in the event that communication with the appropriate air traffic services unit cannot be established or is interrupted; and
- (iii) the procedures to maintain records such that the total cosmic radiation dose received by each crew member over a period of 12 consecutive months can be determined;
- (zh) the information on the safety management system and related flight safety programs as are relevant to flight operations;
- (zi) the information and instructions on the carriage of dangerous goods;
- (zj) the security instructions and guidance;
- (zk) a checklist of the procedures to be followed —
  - (i) when searching for a bomb in case of suspected sabotage; and
  - (ii) when inspecting an aeroplane for concealed weapons, explosives or other dangerous devices,when a well-founded suspicion exists that the aeroplane may be the object of an act of unlawful interference, supported by guidance on the course of action to be taken should a bomb or suspicious object be found and information on the least-risk bomb location specific to the aircraft;
- (zl) the instructions and training requirements for the use of head-up displays and enhanced vision systems equipment if applicable;
- (zm) the instructions and training requirements for the use of the Electronic Flight Bag if applicable.

FOURTH SCHEDULE — *continued*

## PART B

## AIRCRAFT OPERATING MATTERS

3. Part B of an AOC holder's Operations Manual must contain the following elements:

- (a) the aeroplane's certification limitations and operating limitations;
- (b) the procedures for normal, abnormal and emergency situations and checklists to be used by the flight crew in such situations;
- (c) the operating instructions and information on climb performance with all engines operating;
- (d) the flight planning data for pre-flight and in-flight planning with different thrust, power and speed settings;
- (e) the maximum crosswind and tailwind components for each aeroplane type operated and the reductions to be applied to these values having regard to —
  - (i) gusts;
  - (ii) low visibility;
  - (iii) runway surface conditions;
  - (iv) crew experience;
  - (v) use of autopilot;
  - (vi) abnormal or emergency circumstances; or
  - (vii) any other relevant operational factors;
- (f) the instructions for aircraft loading and securing of load;
- (g) the aircraft systems, associated controls and instructions for their use;
- (h) the minimum equipment list and configuration deviation list for the aeroplane types operated and specific operations authorised, including any equipment required for an operation with performance-based navigation;
- (i) the checklist of emergency and safety equipment and instructions for the use of the equipment;
- (j) the emergency evacuation procedures, including type specific procedures, crew coordination, assignment of crew's emergency positions and the emergency duties assigned to each crew member;

FOURTH SCHEDULE — *continued*

- (k) the procedures for normal, abnormal and emergency situations to be used by the cabin crew, the checklists relating to such procedures and aircraft systems information as required, including a statement related to the necessary procedures for the coordination between flight and cabin crew;
- (l) the survival and emergency equipment for different routes and the necessary procedures to verify its normal functioning before take-off, including procedures to determine the required amount of oxygen and the quantity available;
- (m) the ground-air visual signal code for use by survivors.

## PART C

## ROUTES AND AERODROMES

4. Part C of an AOC holder's Operations Manual must contain the following elements:

- (a) a route guide for each flight to ensure that the flight crew will have information relating to —
  - (i) information relating to communication facilities, navigation aids, aerodromes, instrument approaches, instrument arrivals and instrument departures as applicable for the operation; and
  - (ii) such other information as the AOC holder may deem necessary for the proper conduct of flight operations;
- (b) the minimum flight altitudes for each route to be flown;
- (c) the aerodrome operating minima for each of the aerodromes that are likely to be used as aerodromes of intended landing or as alternate aerodromes;
- (d) the increase of aerodrome operating minima in case of degradation of approach or aerodrome facilities;
- (e) the instructions for determining aerodrome operating minima for instrument approaches using head-up displays and enhanced vision systems;
- (f) the information necessary for compliance with all flight profiles required by regulations, including but not limited to, the determination of —

FOURTH SCHEDULE — *continued*

- (i) take-off runway length requirements for dry, wet and contaminated conditions, including those dictated by system failures which affect the take-off distance;
- (ii) take-off climb limitations;
- (iii) en-route climb limitations;
- (iv) approach climb limitations and landing climb limitations;
- (v) landing runway length requirements for dry, wet and contaminated conditions, including systems failures which affect the landing distance; and
- (vi) supplementary information, such as tire speed limitations.

## PART D

## TRAINING

5. Part D of an AOC holder's Operations Manual must contain details of the training programme for a person who may be assigned duty on a large aeroplane in the following crew member roles:

- (a) a flight crew member;
- (b) a cabin crew member;
- (c) a flight dispatcher who is employed in conjunction with an AOC holder's method of flight supervision;
- (d) any other crew member as applicable.

## FIFTH SCHEDULE

Regulation 178

## FATIGUE RISK MANAGEMENT PROGRAMMES

## PART 1

## BASIC REQUIREMENTS FOR FATIGUE RISK MANAGEMENT

**Types of fatigue**

1. An AOC holder must take into account the following types of fatigue in its fatigue risk management programme:

- (a) transient fatigue, which is fatigue that may be dispelled by a single sufficient period of rest or sleep;

FIFTH SCHEDULE — *continued*

- (b) cumulative fatigue, which occurs after incomplete recovery from transient fatigue over a period of time.

**Flight Duty Period (FDP)**

2.—(1) The flight duty period of a person assigned duty as a crew member for a flight of a large aeroplane —

- (a) commences when the person is required to report for duty in advance of the stipulated report time for a scheduled flight, to carry out a task at the behest of the AOC holder;
- (b) includes the time the person spent on positioning at the behest of the AOC holder when this positioning immediately precedes a flight in which that person participates as a crew member; and
- (c) does not include the time spent by the person to commute from the crew member's place of rest to the point of reporting for duty.

(2) In the planning of duty periods and flight duty periods, an AOC holder must consider all relevant factors, which includes —

- (a) the number and direction of time zones crossed;
- (b) the time at which a flight duty period is scheduled to begin;
- (c) the number of planned and actual sectors within the flight duty period;
- (d) the pattern of working and sleeping relative to the circadian rhythm, or the 24-hour physiological cycle of the crew;
- (e) the scheduling of days off;
- (f) the sequence of early reporting times and late releases from duty;
- (g) the mixing of early, late and night duties;
- (h) the flight operation characteristics;
- (i) the allocation of work patterns which avoid such undesirable practices, for example alternating day and night duties or the positioning of crew such that a serious disruption of established sleep and work patterns occur;
- (j) the planning of days off and notifying crew well in advance of their duty periods;
- (k) the basic roster concepts which ensure adequate rest prior to flight;
- (l) the crew complement and the extent to which various tasks to be performed can be divided among the crew; and

FIFTH SCHEDULE — *continued*

- (m) the availability of facilities onboard the aeroplane for a crew member to obtain recuperative rest.

**Minimum rest period**

3.—(1) Subject to sub-paragraph (2), the minimum rest period provided for a crew member subsequent to or prior to a scheduled flight duty period must be —

- (a) not less than 10 hours if the rest period includes a local night;
- (b) not less than 12 hours if the rest period does not include a local night;
- (c) if the preceding duty period exceeded 10 hours but is not more than 16 hours, at least as long as the preceding duty period rounded to the next whole hour; and
- (d) if the preceding duty period exceeded 16 hours, at least 24 hours and inclusive of a local night.

(2) The pilot-in-command has the discretion to reduce a minimum rest period in unforeseen operational circumstances by no more than 2 hours if the requirement for a local night, where required, is satisfied.

**Duty with take-off or landing within the window of circadian low**

4.—(1) An AOC holder who has assigned a person to crew member duty on a relevant aircraft for a series of flight duty periods that encompass an early start, a late finish, or a take-off or landing in the window of circadian low must provide that person with —

- (a) a rest period of 24 hours (inclusive of a local night) prior to the person commencing duty for the first flight duty period in the series; and
- (b) except as provided in sub-paragraph (2), the appropriate minimum rest period specified in paragraph 3 between and after each flight duty period in the series of flight duty periods.

(2) Where a crew member completes 2 consecutive flight duty periods that each includes an early start, a late finish, or a take-off or landing in the window of circadian low, the AOC holder must provide the crew member with a rest period of 24 hours (inclusive of a local night) prior to the person commencing the next flight duty period that encompasses an early start, a late finish, or a take-off or landing in the window of circadian low.

*[S 212/2020 wef 01/04/2020]*

FIFTH SCHEDULE — *continued***Day off**

5.—(1) A day off for a crew member must be at least 34 hours free of all duties including a local night and commences —

- (a) one hour after the crew member completes a duty period; or
- (b) if the crew member is away from base, either one hour after the crew member is free of all duties, or the time taken to reach the accommodation designated for the day off, whichever is lesser.

(2) A planned minimum rest period may be included as part of a day off.

(3) When days off are rostered on consecutive days, each subsequent day off following that described in sub-paragraph (1) must be a period of at least 24 hours and include a local night.

(4) An AOC holder must ensure that every person who may be assigned duty as a crew member on a large aeroplane —

- (a) does not work more than 7 consecutive days between days off;
- (b) is rostered to have at least 2 days off every 2 consecutive weeks; and
- (c) has at least 8 days off every 4 consecutive weeks except that a minimum of 6 days off in a consecutive 4-week period is permissible if the shortfall of the remaining days off has been or will be made good in the preceding or following consecutive 4-week period.

(5) When a crew member has been away from home base for any period of 7 days or more, a period of at least 82 hours (including 3 local nights) at home base must be provided to re-acclimate the crew member to home base before the start of the next flight duty period.

(6) In the event that a flight is disrupted or delayed due to unforeseen circumstances, the ensuing day off may be reduced by 4 hours if the shortfall is made up in the next allocation of a day off and is in compliance with sub-paragraph (4).

**Standby duty**

6.—(1) An AOC holder must inform a crew member of the start time and end time of that crew member's standby duty.

(2) The length of any standby duty must not exceed —

- (a) 18 hours for a flight crew member; and
- (b) 24 hours for a cabin crew member.



FIFTH SCHEDULE — *continued*

(3) When a person is on standby duty as a crew member is at the airport (called in this paragraph airport standby) and subsequently undertakes a flight duty immediately thereafter, the standby duty period —

- (a) is part of the minimum rest period if the airport standby is provided with adequate rest facilities in accordance with sub-paragraph (4); or
- (b) is part of the flight duty period of this subsequent flight if the airport standby is provided without adequate rest facilities.

(4) A rest facility at an airport must provide an environment that is conducive to rest or sleep and comprise, as a minimum, an independent, screened off rest area with a horizontal sleeping surface.

(5) When an AOC holder requires a person to be on standby as a crew member at an accommodation, the AOC holder must ensure adequate rest facilities are provided at the accommodation.

(6) When an AOC holder activates a person who is on standby as a crew member —

- (a) the standby duty ceases from the moment the crew member is activated for duty; and
- (b) the duty period commences from the moment that crew member reports for duty at the designated reporting point.

(7) Only 20% of the total time spent on standby at home or in local accommodation will be counted in the total period of standby for the purpose of determining cumulative duty limits under paragraph 12.

**Provision of adequate time**

7.—(1) An AOC holder must ensure each crew member is provided with adequate time to complete that crew member's duties, which includes ensuring that the crew member's reporting time realistically reflects the time required to complete all assigned pre-flight duties.

(2) A minimum of 90 minutes must be provided for the completion of pre-flight checks and post-flight checks, which must include allocating a minimum of one hour to the completion of pre-flight checks.

(3) To avoid doubt, the completion of pre-flight checks and post-flight checks includes the completion of any necessary documentation.

**Positioning**

8. Positioning is not considered as an operating sector when planning or calculating a flight duty period.

FIFTH SCHEDULE — *continued***Mixed simulator and aircraft flying**

9.—(1) When a person who may be assigned duty as a flight crew member flies in an approved flight simulation training device, either undergoing or conducting training, and then within the same duty period flies as a crew member on a commercial air transport, training or test flight, all the time spent in the flight simulation training device is counted in full towards the subsequent flight duty period.

*[S 679/2018 wef 09/10/2018]*

(2) The flight duty period for flight in an approved flight simulation training device is calculated from the reporting time of the simulator detail even though flying in an approved flight simulation training device does not count as a sector for the purpose of paragraph 14.

*[S 679/2018 wef 09/10/2018]*

**Delayed reporting time**

10. When a crew member is informed of a delay to the reporting time before leaving the place of rest, the flight duty period is calculated as follows:

- (a) where the delay is less than 4 hours, the maximum permitted flight duty period is based on the original reporting time but the flight duty period starts at the actual reporting time;
- (b) where the delay is 4 hours or more, the maximum permitted flight duty period is based on the actual reporting time but the flight duty period starts 4 hours after the original reporting time;
- (c) where the AOC holder informs a crew member of a delay in reporting time of 10 hours or more before the crew member is scheduled to leave the place of rest and that crew member is not further disturbed by the AOC holder until a mutually agreed hour, then that elapsed time is considered a continuation of the rest period.

**Limits on flight time**

11. An AOC holder must take into account the maximum number of flying hours a flight crew member may perform, as specified in regulation 107 of the Air Navigation (91 — General Operating Rules) Regulations 2018, when scheduling a person's duty as a flight crew member.

**Limits on duty hours**

12.—(1) An AOC holder must ensure that the duty hours of any person who may be assigned duty as a flight crew member do not exceed —

- (a) 90 hours in any consecutive 14 days; and

FIFTH SCHEDULE — *continued*

(b) 180 hours in any consecutive 28 days.

(2) An AOC holder must ensure that the duty hours of any person who may be assigned duty as a cabin crew member do not exceed —

(a) 100 hours in any consecutive 14 days; and

(b) 200 hours in any consecutive 28 days.

**Discretion by a pilot-in-command to extend flight duty period or reduce minimum rest period**

13.—(1) An AOC holder may grant the pilot-in-command the discretion to extend a flight duty period under unforeseen operational circumstances by no more than 3 hours under the following circumstances:

(a) before exercising this discretion, the pilot-in-command —

(i) has carried out a fatigue risk assessment; and

(ii) is satisfied that all members of the crew required to operate the aeroplane consider themselves fit to do so;

(b) the safety of the flight will not be prejudiced;

(c) the extended flight duty period does not exceed the maximum permitted flight duty period by more than 3 hours except in an emergency.

(2) For the purposes of sub-paragraph (1)(c), an emergency is a situation which, in the judgment of the pilot-in-command, presents a serious risk to the health or safety of the persons on board the aeroplane.

(3) An AOC holder must ensure that the pilot-in-command reports to the AOC holder any exercise of discretion by the pilot-in-command —

(a) to extend a flight duty period under sub-paragraph (1); or

(b) to reduce a minimum rest period under paragraph 3(2).

*[S 674/2022 wef 15/08/2022]*

(4) If the discretion to extend any flight duty period or reduce any minimum rest period is exercised for similar reasons on more than 20% of occasions when a particular route or route pattern is flown, an AOC holder must review the schedule or the crewing management —

(a) to ensure that the intent of its fatigue risk management programme is being met; and

FIFTH SCHEDULE — *continued*

(b) to reduce the frequency at which such events occur.

[S 823/2022 wef 03/11/2022]

[S 674/2022 wef 15/08/2022]

**Maximum Permitted Flight Duty Periods — Flight Crew**

14.—(1) Subject to sub-paragraph (2) and paragraphs 13(1) and 15, an AOC holder must ensure that every person who may be assigned duty as a flight crew member on an aeroplane that is operated with a normal flight crew complement of 2 pilots, does not exceed the maximum permitted flight duty period specified in —

(a) Table A, where the time difference (if any) between the person's acclimated time and the local time at the place of commencement of the person's flight duty period does not exceed 2 hours; or

Table A: Maximum permitted flight duty period for flight crew

	Local time of start	Total sectors to be flown							
		1	2	3	4	5	6	7	8 or more
Maximum flight duty period (hours)	0600 – 0759	13	12 ¼	11 ½	10 ¾	10	9 ¼	9	9
	0800 – 1459	14	13 ¼	12 ½	11 ¾	11	10 ¼	9 ½	9
	1500 – 2159	13	12 ¼	11 ½	10 ¾	10	9 ¼	9	9
	2200 – 0559	11	10 ¼	9 ½	9	9	9	9	9

[S 212/2020 wef 01/04/2020]

(b) Table B, in any other case.

Table B: Maximum permitted flight duty period for flight crew

Total sectors to be flown	1	2	3	4	5	6 or more
Maximum FDP (hours)	12 ½	12	11	10 ½	10	9

[S 212/2020 wef 01/04/2020]

FIFTH SCHEDULE — *continued**[S 212/2020 wef 01/04/2020]*(c) *[Deleted by S 212/2020 wef 01/04/2020]**[S 212/2020 wef 01/04/2020]*

(1A) An AOC holder must ensure that every person who may be assigned duty as a flight crew member on a single pilot aeroplane does not exceed the maximum permitted flight duty period specified in Table C.

**Table C:** Maximum permitted flight duty period for flight crew

<i>Local time of start</i>	<i>Total sectors to be flown</i>				
	<i>Up to 4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8 or more</i>
0600 – 0759	10	9 ¼	8 ½	8	8
0800 – 1459	11	10 ¼	9 ½	8 ¾	8
1500 – 2159	10	9 ¼	8 ½	8	8
2200 – 0559	9	8 ¼	8	8	8

*[S 212/2020 wef 01/04/2020]*

(2) When the assigned flight crew for a flight of a large aeroplane only consists of 2 pilots, the flight duty period calculated with reference to Table A or B must be adjusted by counting long sectors as more than one sector in the following manner:

<i>Single sector length (block time) as</i>	<i>Count as (sectors)</i>	
	<i>Table A</i>	<i>Table B</i>
Over 7 but not over 9 hours	2	3
Over 9 but not over 11 hours	3	4
Over 11 hours	4	5

**Maximum Permitted Flight Duty Periods — Augmented Flight Crew**

15.—(1) An AOC holder may extend the maximum permitted flight duty period specified in paragraph 14(1) in accordance with sub-paragraph (2) when all the following conditions are met:

- (a) the flight crew is augmented with appropriate composition and number of flight crew members to provide in-flight relief;
- (b) there are appropriate in-flight rest facilities for use by the flight crew members;

FIFTH SCHEDULE — *continued*

- (c) there is an appropriate division of in-flight duties and rest among the crew members.
- (2) When all the conditions in sub-paragraph (1) are met, the maximum permitted flight duty period may be extended as follows:
- (a) if augmented with one flight crew member and appropriate rest facilities are available for one pilot, up to a maximum flight duty period of 15 hours;
  - (b) if augmented with 2 flight crew members and appropriate rest facilities are available for 2 pilots, up to a maximum flight duty period of 18 hours.
- (3) For the purpose of sub-paragraph (2) —
- (a) in an augmented flight crew, a flight crew member may leave the flight crew member's assigned post and be replaced by another appropriately qualified flight crew member for the purpose of in-flight rest; and
  - (b) no extension of flight duty period is permitted even with augmented flight crew if no rest facilities are available.
- (4) An AOC holder must ensure that horizontal rest facilities are available in an aeroplane before the aeroplane is used for a long haul flight with augmented flight crew, particularly if the flight duty period includes the time span from 0100 to 0659 hours (local time at the point of departure).

**Flight Duty Period for Cabin Crew**

- 16.—(1) An AOC holder may require a person assigned to duty as a cabin crew member of any large aeroplane to report at a time that is earlier than the cabin crew member's scheduled reporting time for pre-flight briefing only if the earlier time is not more than 60 minutes before the reporting time for a flight crew member.
- (2) The maximum permitted flight duty period for a cabin crew member is the same as that applicable to a flight crew member (as specified in paragraph 14), plus the difference in reporting time specified in sub-paragraph (1).
- (3) An AOC holder must not assign a person to duty as a cabin crew member for a flight duty period of more than 14 hours, excluding the difference in reporting time between flight crew and cabin crew as described in sub-paragraph (1), without providing in-flight rest facilities.
- (4) An AOC holder may assign a cabin crew member a flight duty period of up to 19 hours only if —

- (a) horizontal rest facilities are available in the aeroplane;

FIFTH SCHEDULE — *continued*

- (b) the division of duty and rest is appropriately distributed among all cabin crew members on a flight; and
- (c) the cabin crew member is provided with a minimum in-flight rest period of —
  - (i) 3 hours for a flight duty period of up to 16 hours; or
  - (ii) 4 hours for a flight duty period of up to 19 hours is provided.

*[S 679/2018 wef 09/10/2018]*

(5) If horizontal rest facilities are not available in the aeroplane due to unforeseen circumstances, and the in-flight rest has to be taken in a suitable seat, the minimum in-flight rest period specified in sub-paragraph (4)(c) must be increased by one hour.

**Records**

17.—(1) An AOC holder must keep records of the duties performed and rest periods achieved in respect of every person who is assigned duty as a flight crew member, or as a cabin crew member, for the duration specified in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018.

(2) An AOC holder must ensure that these records include, but are not limited to —

- (a) for a person assigned duty as a flight crew member —
  - (i) the start, duration and end of each flight duty period;
  - (ii) the start, duration and end of each duty period;
  - (iii) rest periods and days off; and
  - (iv) flight time;
- (b) for a person assigned duty as a cabin crew member —
  - (i) the start, duration and end of each flight duty period;
  - (ii) the start, duration and end of each duty period; and
  - (iii) rest periods and days off.

(3) An AOC holder must maintain records of occasions when a pilot-in-command has exercised the pilot-in-command's discretion to extend a duty period or reduce a rest period.

FIFTH SCHEDULE — *continued*

## PART 2

## FATIGUE RISK MANAGEMENT SYSTEM (FRMS)

**FRMS**

18.—(1) An AOC holder's FRMS must be approved by the Director-General of Civil Aviation before the FRMS may take the place of all or any of the basic fatigue risk management regulations prescribed in Part 1.

(2) Before the Director-General of Civil Aviation approves an AOC holder's FRMS, the Director-General of Civil Aviation must be satisfied that the proposed FRMS will provide a level of safety equivalent to or better than the requirements prescribed in Part 1.

(3) An AOC holder must —

- (a) establish maximum values for flight times, flight duty periods and duty periods, and minimum values for rest periods;
- (b) decrease the maximum values and increase the minimum if the AOC holder's data indicates these values are too high or too low respectively; and
- (c) not increase any maximum values or decrease in minimum values unless the AOC holder has —
  - (i) evaluated accumulated FRMS experience and fatigue-related data to justify such changes; and
  - (ii) the Director-General of Civil Aviation's approval.

(4) The values established under sub-paragraph (3) must —

- (a) be based upon scientific principles and knowledge;
- (b) be subject to safety assurance processes; and
- (c) be acceptable to the Director-General of Civil Aviation.

(5) An AOC holder must, as a minimum —

- (a) incorporate scientific principles and knowledge within the FRMS;
- (b) identify fatigue-related safety hazards and the resulting risks on an ongoing basis;
- (c) ensure that remedial actions, necessary to effectively mitigate the risks associated with the hazards, are implemented promptly;
- (d) provide for continuous monitoring and regular assessment of the mitigation of fatigue risks achieved by such actions;



FIFTH SCHEDULE — *continued*

- (e) provide for continuous improvement to the overall performance of the FRMS; and
  - (f) integrate the FRMS into the AOC holder's safety management system.
- (6) An AOC holder's FRMS must include the following:
- (a) FRMS policy and documentation;
  - (b) fatigue risk management processes;
  - (c) FRMS safety assurance processes;
  - (d) FRMS promotion processes.
- (7) An AOC holder must maintain records for all its flight and cabin crew members pertaining to the duties performed and rest periods achieved for the duration specified in the Sixth Schedule to the Air Navigation (91 — General Operating Rules) Regulations 2018.

**FRMS Policy and Documentation**

19.—(1) An AOC holder must include the FRMS policy and define the scope of FRMS operations in the Operations Manual.

(2) An AOC holder must define its FRMS policy to reflect the shared responsibility of management, flight and cabin crew members, and other involved personnel.

(3) The FRMS policy referred to in sub-paragraph (2) must —

- (a) clearly state the safety objectives of the FRMS;
- (b) declare management commitment to —
  - (i) effective safety reporting;
  - (ii) the provision of adequate resources for the FRMS; and
  - (iii) continuous improvement of the FRMS;
- (c) require clear lines of accountability for management, flight and cabin crews, and all other involved personnel are identified; and
- (d) require periodic reviews to ensure the FRMS policy remains relevant and appropriate.

(4) The FRMS policy must be signed by the accountable manager of the organisation and communicated, with visible endorsement, to all the relevant areas and levels of the organisation.

(5) An AOC holder must develop and keep current FRMS documentation that describes and records —

FIFTH SCHEDULE — *continued*

- (a) the FRMS policy and objectives;
- (b) the FRMS processes and procedures;
- (c) the accountabilities, responsibilities and authorities for these processes and procedures;
- (d) the mechanisms for ongoing involvement of management, flight and cabin crew members, and all other involved personnel;
- (e) the FRMS training programmes, training requirements and attendance records;
- (f) the scheduled and actual flight times, duty periods and rest periods with significant deviations and reasons for deviations noted; and
- (g) the FRMS outputs including findings from collected data, recommendations, and actions taken.

**Fatigue risk management processes***Identification of hazards*

20.—(1) An AOC holder must develop and maintain 3 fundamental and documented processes for fatigue hazard identification:

- (a) a predictive process;
  - (b) a proactive process; and
  - (c) a reactive process.
- (2) The predictive process mentioned in sub-paragraph (1)(a) —
- (a) must identify fatigue hazards by examining crew scheduling and taking into account factors known to affect sleep and fatigue and their effects on performance;
  - (b) may include, but is not limited to, methods of examination such as —
    - (i) AOC holder or industry operational experience and data collected on similar types of operations;
    - (ii) evidence-based scheduling practices; and
    - (iii) bio-mathematical models.
- (3) The proactive process mentioned in sub-paragraph (1)(b) —
- (a) must identify fatigue hazards within current flight operations;

FIFTH SCHEDULE — *continued*

- (b) may include, but is not limited to, methods of examination such as —
- (i) self-reporting of fatigue risks;
  - (ii) crew fatigue surveys;
  - (iii) relevant flight and cabin crew performance data;
  - (iv) available safety databases and scientific studies; and
  - (v) analysis of planned versus actual time worked.
- (4) The reactive process mentioned in sub-paragraph (1)(c) —
- (a) must identify the contribution of fatigue hazards to reports and events associated with potential negative safety consequences in order to determine how the impact of fatigue could have been minimised; and
  - (b) may be triggered by any of the following:
    - (i) fatigue reports;
    - (ii) confidential reports;
    - (iii) audit reports;
    - (iv) incidents; and
    - (v) flight data analysis events.

*Risk assessment*

(5) An AOC holder must develop and implement risk assessment procedures that determine the probability and potential severity of fatigue-related events and identify when the associated risks require mitigation.

(6) The risk assessment procedures developed in accordance with sub-paragraph (5) must review the fatigue hazards identified under the processes in sub-paragraphs (2), (3) and (4), and correlate each identified hazard to —

- (a) the current operational processes;
- (b) the probability of the hazard occurring;
- (c) the possible consequences upon its occurrence; and
- (d) the effectiveness of existing safety barriers and controls in preventing its occurrence.

FIFTH SCHEDULE — *continued**Risk mitigation*

- (7) An AOC holder must develop and implement procedures to mitigate the risks identified in sub-paragraph (6).
- (8) The risk mitigation procedures required under sub-paragraph (7) include:
- (a) the selection of appropriate mitigation strategies;
  - (b) the implementation of the selected mitigation strategies; and
  - (c) the monitoring of the implementation and effectiveness of the selected mitigation strategies.

**FRMS safety assurance processes**

21.—(1) An AOC holder must develop and maintain FRMS safety assurance processes —

- (a) to provide for continuous FRMS performance monitoring, analysis of trends, and measurement to validate the effectiveness of the fatigue safety risk controls;
  - (b) to provide a formal process for the management of change; and
  - (c) to provide for the continuous improvement of the FRMS.
- (2) The sources of data for performance monitoring under sub-paragraph (1)(a) may include, but are not limited to —
- (a) hazard reporting and investigations;
  - (b) audits and surveys; and
  - (c) reviews and fatigue studies.
- (3) The formal processes mentioned in sub-paragraph (1)(b) must include —
- (a) the identification of changes in the operational environment that may affect FRMS;
  - (b) the identification of changes within the organisation that may affect FRMS; and
  - (c) the consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes.
- (4) The improvements mentioned in sub-paragraph (1)(c) must include —
- (a) the elimination or modification of risk controls that have had unintended consequences or that are no longer needed due to changes in the operational or organisational environment;

FIFTH SCHEDULE — *continued*

- (b) routine evaluations of facilities, equipment, documentation and procedures; and
- (c) the determination of the need to introduce new processes and procedures to mitigate emerging fatigue-related risks.

**FRMS promotion processes**

22.—(1) An AOC holder must establish and implement processes which promote the implementation of FRMS and support —

- (a) the ongoing development of the FRMS;
  - (b) the continuous improvement of the overall performance of the FRMS; and
  - (c) the attainment of optimum safety levels.
- (2) The processes mentioned in sub-paragraph (1) must include —
- (a) training programmes to ensure competency commensurate with the roles and responsibilities of management, flight and cabin crew, and all other involved personnel under the planned FRMS; and
  - (b) an effective FRMS communication plan that —
    - (i) explains FRMS policies, procedures and responsibilities to all relevant stakeholders; and
    - (ii) describes communication channels used to gather and disseminate FRMS-related information.

Made on 21 June 2018.

LEE HSIEN YANG  
*Chairman,*  
*Civil Aviation Authority of*  
*Singapore.*

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