

# **ATTACHMENT A. GUIDANCE MATERIAL FOR DEVELOPMENT OF PRESCRIPTIVE FATIGUE MANAGEMENT REGULATIONS**

*Supplementary to Chapter 4, 4.2.10.2, Chapter 9, 9.6 and Chapter 12, 12.5*

## **1. Purpose and scope**

1.1 Flight time, flight duty period, duty period limitations and rest requirements are established for the sole purpose of ensuring that the flight crew and the cabin crew members are performing at an adequate level of alertness for safe flight operations.

1.2 In order to accomplish this, two types of fatigue should be taken into account, namely, transient fatigue and cumulative fatigue. Transient fatigue may be described as fatigue that is dispelled by a single sufficient period of rest or sleep. Cumulative fatigue occurs after incomplete recovery from transient fatigue over a period of time.

1.3 Limitations based upon the provisions of this Part will provide safeguards against both kinds of fatigue because they will recognize:

- a) the necessity to limit flight duty periods with the aim of preventing both kinds of fatigue;
- b) the necessity to limit the duty period where additional tasks are performed immediately prior to a flight or at intermediate points during a series of flights in such a way as to prevent transient fatigue;
- c) the necessity to limit total flight time and duty periods over specified time spans, in order to prevent cumulative fatigue;
- d) the necessity to provide crew members with adequate rest opportunity to recover from fatigue before commencement of the next flight duty period; and
- e) the necessity of taking into account other related tasks the crew member may be required to perform in order to guard particularly against cumulative fatigue.

## **2. Operational concepts**

### **2.1 Flight time**

The definition of flight time, in the context of flight time limitations, applies to flight and cabin crew members.

### **2.2 Duty periods**

All time spent on duty can induce fatigue in flight and cabin crew members and should therefore be taken into account when arranging rest periods for recovery. Standby may be included as duty if it is likely to induce fatigue.

## 2.3 Flight duty periods

2.3.1 The definition of flight duty period is intended to cover a continuous period of duty that always includes a flight or series of flights for a flight or cabin crew member. It is meant to include all duties a crew member may be required to carry out from the moment he or she reports for duty until he or she completes the flight or series of flights and the aeroplane finally comes to rest and the engines are shut down. It is considered necessary that a flight duty period should be subject to limitations because a crew member's activities over extended periods would eventually induce fatigue — transient or cumulative — which could adversely affect the safety of a flight.

2.3.2 A flight duty period does not include the period of travelling time from home to the point of reporting for duty. It is the responsibility of the flight or cabin crew member to report for duty in an adequately rested condition.

2.3.3 Time spent positioning at the behest of the operator is part of a flight duty period when this time immediately precedes (i.e., without an intervening rest period) a flight duty period in which that person participates as a flight or cabin crew member.

2.3.4 An important safeguard is for States and operators to recognize the responsibility of a crew member to refuse further flight duty when suffering from fatigue of such a nature as to adversely affect the safety of flight.

## 2.4 Rest periods

The definition of rest period requires that flight or cabin crew members be relieved of all duties for the purpose of recovering from fatigue. The way in which this recovery is achieved is the responsibility of the flight or cabin crew member. Extended rest periods should be given on a regular basis. Rest periods should not include standby if the conditions of the standby would not enable flight and cabin crew members to recover from fatigue. Suitable accommodation on the ground is required at places where rest periods are taken in order to allow effective recovery.

## 3. Types of limitations

3.1 Limitations are broadly divided by time. For example, many ICAO Contracting States prescribe daily, monthly and yearly flight time limitations, and a considerable number also prescribe quarterly flight time limitations. In addition, many States also prescribe cumulative duty limitations for specified periods such as consecutive days and seven-day periods. It must be understood, however, that these limitations will vary considerably taking into account a variety of situations.

3.2 To take account of unexpected delays once a flight duty period that has been planned within the allowable limitations has commenced, provision should be made for minimizing the extent to which exceeding the limits may be permitted. Similarly, provision should be made for controlling the extent to which any reduction of rest below that ordinarily required may be allowed in cases where flexibility to recover a delayed schedule is sought. The authority to extend a flight duty period or reduce a rest period within the limitations established is vested in the pilot-in-command.

*Note.* — See 4.9.2 and 4.11.2.3 for reporting requirements.

3.3 In formulating regulations or rules governing flight time limitations, the crew complement and the extent to which the various tasks to be performed can be divided among the flight or cabin crew members should be taken into account. In the case where additional flight or cabin crew members are carried and facilities in the aeroplane are such that a flight or cabin crew member can obtain recuperative rest in a comfortable reclining seat, or in a bunk, separated and screened from the flight deck and passengers, and reasonably free from disturbance, planned flight duty periods could be extended.

3.4 States should consider all relevant factors, which include: the number and direction of time zones crossed; the time at which a flight duty period is scheduled to begin; the number of planned and/or actual sectors within the flight duty period; the

pattern of working and sleeping relative to the circadian rhythm or 24-hour physiological cycle of the flight or cabin crew; the scheduling of days off; the sequence of early reporting times and late releases from duty; mixing early/late/night duties; and flight operation characteristics.

#### 4. Guidelines for establishing prescriptive limitations for fatigue management

##### 4.1 Purpose and scope

4.1.1 The following material comprises a set of parameters that may be considered in the development of prescriptive limitations for fatigue management.

4.1.2 No numerical values are shown in this example because differences of culture between States can lead to different perceptions as to what is acceptable and what is not. In the text that follows, the symbol (\*) is used to indicate where each State may insert a value it considers appropriate to manage fatigue, and square brackets [ ] to indicate a typical value. States are encouraged to examine the numerical values of other States' systems for further guidance.

4.1.3 When deciding what numerical values should be inserted, States should take into account the results of relevant scientific principles and knowledge, past experience in administering such regulations, cultural issues and the nature of operations intended to be undertaken.

4.1.4 States should assess the adequacy of the breadth and scope of all limitations proposed by each operator as applicable to operations before they approve an operator's flight time and duty period limitations and rest scheme.

##### 4.2 Definitions

###### 4.2.1 Operators and crew members

**Augmented flight crew.** A flight crew that comprises more than the minimum number required to operate the aeroplane and in which each flight crew member can leave his or her assigned post and be replaced by another appropriately qualified flight crew member for the purpose of in-flight rest.

**Cabin crew member.** A crew member who performs, in the interest of the safety of passengers, duties assigned by the operator or the pilot-in-command of the aircraft, but who shall not act as a flight crew member.

**Crew member.** A person assigned by an operator to duty on an aircraft during a flight duty period.

**Flight crew member.** A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.

**Operator.** A person, organization or enterprise engaged in or offering to engage in an aircraft operation.

###### 4.2.2 Flight or block times

**Flight time — aeroplanes.** The total time from the moment an aeroplane first moves for the purpose of taking off until the moment it finally comes to rest at the end of the flight.

*Note.*—“Flight time” as here defined is synonymous with the term “block to block” time or “chock to chock” time in general usage which is measured from the time an aeroplane first moves for the purpose of taking off until it finally stops at the end of the flight.

#### 4.2.3 Duty and flight duty

**Duty.** Any task that flight or cabin crew members are required by the operator to perform, including, for example, flight duty, administrative work, training, positioning and standby when it is likely to induce fatigue.

**Duty period.** A period which starts when a flight or cabin crew member is required by an operator to report for or to commence a duty and ends when that person is free from all duties.

**Flight duty period.** A period which commences when a crew member is required to report for duty that includes a flight or a series of flights and which finishes when the aeroplane finally comes to rest at the end of the last flight on which he/she is a crew member.

#### 4.2.4 Rest period and standby

**Rest period.** A continuous and defined period of time, subsequent to and/or prior to duty, during which flight or cabin crew members are free of all duties.

**Standby.** A defined period of time during which a flight or cabin crew member is required by the operator to be available to receive an assignment for a specific duty without an intervening rest period.

#### 4.2.5 General

**Home base.** The location nominated by the operator to the crew member from where the crew member normally starts and ends a duty period or a series of duty periods.

**Positioning.** The transferring of a non-operating crew member from place to place as a passenger at the behest of the operator.

*Note.*—“Positioning” as here defined is synonymous with the term “Deadheading”.

**Reporting time.** The time at which flight and cabin crew members are required by an operator to report for duty.

**Roster.** A list provided by an operator of the times when a crew member is required to undertake duties.

*Note.*—“Roster” as here defined is synonymous with “Schedule”, “Line of Time”, “Pattern”, and “Rotation”.

**Suitable accommodation.** A furnished bedroom which provides for the opportunity of adequate rest.

**Unforeseen operational circumstance.** An unplanned event, such as unforecast weather, equipment malfunction, or air traffic delay that is beyond the control of the operator.

### 4.3 The State’s responsibilities

4.3.1 The objective of any prescriptive limitations for fatigue management regulations is to ensure that flight and cabin crew members remain sufficiently alert so that they can operate to a satisfactory level of performance and safety under all circumstances. The fundamental principle is for every flight and cabin crew member to be adequately rested when he/she

begins a flight duty period and, whilst flying, be sufficiently alert to operate to a satisfactory level of performance and safety in all normal and abnormal situations.

4.3.2 The purpose of this example is to illustrate how limitations might be defined regarding variables likely to influence flight and cabin crew member alertness (e.g., allowable flight hours, duty and flight duty periods, and minimum rest periods) that may be applied when flight and cabin crew rosters are planned. Provision can be made so that some of these limitations could be exceeded, but only on such occasions as could not reasonably have been foreseen when the flight was planned.

4.3.3 This is only one example of how prescriptive limitations for fatigue management may be defined.

#### 4.4 The operator's responsibilities

4.4.1 Operators should reflect in their operations manuals those elements of this example that are appropriate to the operations they undertake. If operations are planned that cannot be managed within the limitations published in the example, a variation may be requested. In this case, and before a variation is approved, an operator should demonstrate to the State of the Operator that the variation provides an equivalent level of safety and that objections on grounds of safety are taken into account.

4.4.2 Duty rosters should be prepared and published sufficiently in advance to provide flight and cabin crew members the opportunity to plan adequate rest. Consideration should be given to the cumulative effects of undertaking long duty hours interspersed with minimum rest, and of avoiding rosters that result in the serious disruption of an established pattern of working and sleeping. Rosters should cover a period of at least (\*) days.

4.4.3 Flights should be planned 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. Minimum rest periods needed to provide adequate rest should be based upon the actual operation.

4.4.4 In order to avoid any detriment to a flight or cabin crew member's performance, opportunities to consume a meal must be arranged when the flight duty period exceeds (\*) hours.

4.4.5 The operator should nominate a home base for each flight and cabin crew member, from where the flight and cabin crew member will normally start and end a duty period or a series of duty periods. The home base should be assigned with a degree of permanence.

4.4.6 The operator should not require a flight crew member to operate an aeroplane if it is known or suspected that the flight crew member is fatigued to the extent that the safety of flight may be adversely affected.

#### 4.5 Flight crew members' responsibilities

4.5.1 A flight crew member should not operate an aeroplane when he or she knows that he or she is fatigued or feels unfit to the extent that the safety of flight may be adversely affected.

4.5.2 Flight crew members should make best use of the facilities and opportunities that are provided for rest and for the consumption of meals, and should plan and use rest periods to ensure that they are fully rested.

#### 4.6 Flight and cabin crew members

The text that follows specifies limitations that apply to operations by flight and cabin crew members.

## 4.7 Limitations for flight times and duty periods

### 4.7.1 *Maximum flight time*

4.7.1.1 The maximum flight time may not exceed:

- a) (\*) hours in any flight duty period;
- b) (\*) hours in any [7] consecutive days or (\*) hours in any [28] consecutive days; and
- c) (\*) hours in any [365] consecutive days.

4.7.1.2 The limitations in 4.7.1.1 b) and c) may alternatively be calculated in calendar week, month or year. In such a case other limitations over a period of two or three calendar months should be specified.

### 4.7.2 *Maximum duty hours for flight crew and cabin crew*

4.7.2.1 Duty hours may not exceed:

- a) (\*) hours in any [7] consecutive days or in a week; and
- b) (\*) hours in any [28] consecutive days or in a calendar month.

Duty includes all tasks carried out at the behest of the operator. These include, but are not limited to: pre-flight preparation; conduct of the flight (whether or not this is commercial air transport); post-flight actions; training given or received (classroom, flight simulator or aeroplane); rostered office/management time; and positioning. Standby should be included to the extent that it is likely to induce fatigue.

### 4.7.3 *Maximum flight duty period for flight and cabin crew*

4.7.3.1 The maximum flight duty period should be (\*) hours.

4.7.3.1.1 This limitation should allow variation to account for matters known to impact fatigue such as: the number of sectors planned; the local time at which duty begins; the pattern of resting and sleeping relative to the crew member's circadian rhythm; the organization of the working time; and the augmentation of the flight crew.

4.7.3.2 Crew report times should realistically reflect the time required to complete pre-flight duties, both safety- and service-related (if appropriate), and a standard allowance of (\*) minutes is to be added at the end of flight time to allow for the completion of checks and records. For record purposes, the pre-flight report time should count both as duty and as flight duty, and the post-flight allowance should count as duty.

4.7.3.3 The maximum flight duty period for cabin crew may be longer than that applicable to the flight crew by the difference in reporting time between flight crew and cabin crew.

4.7.3.4 Flight duty periods may be extended in unforeseen operational circumstances by no more than (\*) hour(s) only at the discretion of the pilot-in-command. Before exercising this discretion, the pilot-in-command should be satisfied that all members of the crew required to operate the aeroplane consider themselves fit to do so.

#### 4.7.4 *Flights operated by augmented crews and the provision of in-flight relief*

4.7.4.1 The composition and number of flight crew members carried to provide in-flight relief, and the quality of rest facilities provided, should determine the amount by which the basic flight duty period limitations may be extended. A sensible balance should be kept between the division of in-flight duty and rest. The number of the cabin crew should be determined taking into account the rest facilities provided and other parameters linked to the operation of the flight.

4.7.4.2 The operator should ensure that flight and cabin crew members are notified prior to commencement of the rest period preceding the flight of the role they are required to undertake (i.e., main or relief crew), so that they can plan their pre-flight rest accordingly.

### 4.8 Minimum rest periods

4.8.1 The minimum rest period immediately before commencing a flight duty period may not be less than (\*) hours.

4.8.1.1 Rest provisions should be introduced to take into account the impact of time zone crossings and night operations.

4.8.1.2 Longer rest periods should be granted on a regular basis to preclude cumulative fatigue.

4.8.1.3 Minimum rest periods may be reduced in unforeseen operational circumstances by no more than (\*) hour(s) only at the discretion of the pilot-in-command.

4.8.1.4 Travelling time spent by a flight or cabin crew member in transit between the place of rest and the place of reporting for duty is not counted as duty, even though it is a factor contributing to fatigue. Excessive travelling time undertaken immediately before commencing a flight duty period could therefore detract from a flight or cabin crew member's ability to counter fatigue arising whilst on duty, and should therefore be taken into account when deciding where pre-flight rest should be taken.

### 4.9 Discretion that may be exercised by the pilot-in-command

4.9.1 The pilot-in-command, at his or her discretion in consideration of special circumstances that could lead to unforeseen levels of fatigue and after discussion with flight or cabin crew members affected, may reduce an actual flight duty period and/or increase a minimum rest period (see 4.8.1.3) in order to remove any adverse effect on flight safety.

4.9.2 The pilot-in-command should report to the operator the use of discretion to extend or reduce duty or rest.

### 4.10 Miscellaneous provisions

#### 4.10.1 *Standby*

4.10.1.1 The start time and end time of standby should be defined and notified at least (\*) hours in advance, and the maximum length of any standby should not exceed (\*) hours.

4.10.1.2 Where airport standby is immediately followed by a flight duty period, the relationship between such airport standby and the assigned flight duty should be defined. In such a case, airport standby, if it is likely to induce fatigue, should be considered as part of a duty period and should be taken into account to calculate the minimum rest preceding a subsequent flight duty period.

4.10.1.3 When flight and cabin crew members are required to be on standby at an accommodation arranged by the operator, then adequate rest facilities should be provided.

#### 4.10.2 Available

When flight and cabin crew members are required to be available for contact over a brief period of time to receive instructions concerning a possible change of roster, that requirement should not prevent that crew member from having a rest period before reporting for duty. The time spent being available should not be counted as duty.

#### 4.10.3 Positioning

All time spent positioning counts as duty, and positioning followed by operating without an intervening rest period also counts as flight duty. However, positioning should not count as an operating sector when planning or calculating a flight duty period.

### 4.11 Records

4.11.1 To enable the operator to ascertain that the fatigue management scheme is functioning as intended and as approved, records should be kept for (\*) months of the duties performed and rest periods achieved so as to facilitate inspection by the operator's authorized personnel and audit by the State of the Operator.

4.11.2 The operator should ensure that these records include for each flight and cabin crew member, at least:

- a) the start, duration and end of each flight duty period;
- b) the start, duration and end of each duty period;
- c) rest periods; and
- d) flight time.

4.11.3 The operator should also keep records of occasions when a pilot-in-command has exercised his or her discretion (as described in 4.9.1). If discretion has to be applied for similar reasons on more than (\*) per cent of occasions when a particular route or route pattern is flown, it is likely that the intention of this guidance is not being met and undue fatigue may result. Arrangements should be made to change the schedule or the crewing arrangements so as to reduce the frequency at which such events occur. A State may require that, in addition, copies of certain records should be submitted.

4.11.4 Flight crew members should maintain a personal record of their daily flight time.