

Annex I to ED Decision 2023/023/R  
**'CS-FTL.1, Issue 1 — Amendment 1'**

The text of the amendment is arranged to show deleted, new or amended text as shown below:

- (a) deleted text ~~is struck through~~;
- (b) new or amended text is highlighted in **blue**;
- (c) an ellipsis '[...]' indicates that the rest of the text is unchanged.

The Annex to Decision 2014/002/R of 31 January 2014 of the Executive Director of the Agency is amended as follows:

## CS FTL.1.205 Flight duty period (FDP)

(a) Night duties and late finish duties under the provisions of points ORO.FTL.205 (b) and (d) comply with the following:

- (1) When establishing the maximum FDP for consecutive night duties, the number of sectors is limited to 4 sectors per duty.
- (2) The operator applies appropriate fatigue risk management (appropriate FRM) to actively manage the fatiguing effect of night duties ~~of more than 10 hours~~ and late finish duties in relation to the surrounding duties and rest periods.
- (3) When planning and implementing appropriate FRM measures to reduce fatigue during night duties, the operator distinguishes between the following subtypes of night duties and ranks them based on the probability of occurrence of high levels of fatigue at Top of Descent (TOD):
  - (1) FDPs with a start time between 02:00 and 04:59;
  - (2) FDPs with an end time between 02:00 and 05:59 and a start time at 01:59 or earlier; and
  - (3) FDPs with an end time at 06:00 or later and a start time at 01:59 or earlier.

[...]

## GM1 CS FTL.1.205(a)(2) Flight duty period (FDP)

### APPROPRIATE FATIGUE RISK MANAGEMENT (APPROPRIATE FRM)

The term 'appropriate FRM' is a term chosen to refer to a set of principles and tools that support the operator and their operational personnel in managing particular fatigue hazards and associated risks through the safety risk management (SRM) process within the operator's management system, in full compliance with the duty time, flight time limits and rest requirements defined by Subpart ORO.FTL.

It should be distinguished from the fully-fledged fatigue risk management (FRM) system described under ORO.FTL.120.

An FRM system under ORO.FTL.120 is a scientifically based, data-driven complement or alternative to the prescriptive regulation of flight and duty time and rest requirements, which manages crew fatigue in a flexible manner with due consideration to the risk exposure and the nature of operations. Operators need such FRM system when deviating from the certification specifications or when applying a mix of prescriptive rules and flexible arrangements.

Conversely, an 'appropriate FRM' concept supports implementation of the rules and is applied without deviating from them.

These two distinct methods are also supported by ICAO (ref.: ICAO Doc 9966).

## GM2 CS FTL.1.205(a)(2) Flight duty period (FDP)

### NIGHT DUTIES AND LATE FINISH DUTIES — APPROPRIATE FATIGUE RISK MANAGEMENT (APPROPRIATE FRM)

- (a) The operator should apply appropriate FRM to night duties and late finish duties:
- (1) in the safety risk management process by assessing fatigue-related hazards in relation to a particular duty and mitigating fatigue-related risks and consequences to an acceptable level or to a level as low as reasonably practicable; and
  - (2) in the crew rostering process by applying scientifically based principles.
- (b) For the purpose of applying appropriate FRM, the operator should monitor night duties and late finish duties, and collect data by means of:
- (1) crew fatigue reports;
  - (2) fatigue metrics and associated targets and thresholds;
  - (3) proactive fatigue data collection tools, such as but not limited to sleep-wake diaries or fatigue survey questionnaires, to collect relevant data to feed its fatigue risk assessment process;
  - (4) fatigue predictive tools, such as but not limited to the Prior Sleep Wake Model (described in GM5 CS FTL.1.205(a)(2));
  - (5) the safety assurance process.
- (c) The operator should describe in the operations manual the responsibilities of the management, crew and crew-rostering personnel for the implementation of appropriate FRM to night duties and late finish duties.
- (d) The operator should provide personalised and context-specific training to its crew on fatigue-mitigation strategies, especially on how to obtain more sleep prior to night duties and late finish duties, e.g. by providing advice regarding exposure to daylight, sleep, physical activity, and nutrition.

## GM13 CS FTL.1.205(a)(2) Flight duty period (FDP)

### NIGHT DUTIES AND LATE FINISH DUTIES — APPROPRIATE FATIGUE RISK MANAGEMENT (APPROPRIATE FRM)

- (a) When rostering night duties ~~of more than 10 hours (referred to below as 'long night duties')~~, it is critical for the crew member to obtain sufficient sleep before such duties when ~~he/she~~ **he or she** is adapted to being awake during daytime hours at the local time where ~~he/she~~ **he or she** is acclimatised. To optimise alertness **during** ~~on long~~-night duties, the likelihood of obtaining sleep as close as possible to the start of the FDP should be considered, when rostering rest periods before ~~long~~ night duties, by providing sufficient time to the crew member to adapt to being awake during the night. Rostering practices leading to extended wakefulness before reporting for night duties should be avoided.

Appropriate ~~Fatigue~~ fatigue risk management principles and tools that could be applied to the rostering of long-night duties may include:

- (1) avoiding long-night duties after extended recovery rest periods;
- (2) progressively delaying the rostered ending time of the FDPs preceding long night duties; and
- ~~(3) starting a block of night duties with a shorter FDP; and~~
- (43) avoiding the sequence of early starts and long night duties.

~~(b) — Fatigue risk management principles may be applied to the rostering of long night duties by means of:~~

- ~~(1) — considering operator or industry operational experience and data collected on similar operations;~~
- ~~(2) — evidence-based scheduling practices; and~~
- ~~(3) — bio-mathematical models.~~

(b) When rostering late finish duties, sleep deprivation may arise, leading to the onset of fatigue. To optimise crew alertness during late finish duties, the operator should avoid rostering practices that may lead to sleep debt prior to the reporting for late finish duties.

(c) Obtaining sufficient sleep is a shared responsibility between the operator and its crew members.

(1) The operator could implement various measures, such as:

- (i) identifying those night duties or late finish duties that are safety critical;
- (ii) communicating on the use of available rest facilities at the main base;
- (iii) promoting the optimum use of sleep opportunities among their crew, in particular before crew reporting for night duties or late finish duties;
- (iv) where possible, providing suitable accommodation at or near the crew reporting point, or use augmented crew.

(2) For crew members, it is important to make optimum use of sleep opportunities, as applicable:

- (i) in the afternoon, prior to a night duty;
- (ii) prior to a late finish duty;
- (iii) during FDPs with in-flight rest;
- (iv) during a long turnaround.

## GM4 CS FTL.1.205(a)(2) Flight duty period (FDP)

### CONSECUTIVE NIGHT DUTIES AND CONSECUTIVE LATE FINISH DUTIES — APPROPRIATE FATIGUE RISK MANAGEMENT (APPROPRIATE FRM)

Appropriate FRM that may be applied to consecutive night duties or consecutive late finish duties include:

- (1) rostering a block of identical duties (late finish duties or night duties) rather than rostering mixed duties;
- (2) starting a block of late finish duties or night duties with a shorter FDP;
- (3) rostering not more than one transition between two different types of disruptive duties, between two extended recovery rest periods.

## GM5 CS FTL.1.205(a)(2) Flight duty period (FDP)

### APPROPRIATE FATIGUE RISK MANAGEMENT (APPROPRIATE FRM) — THE PRIOR SLEEP WAKE MODEL

- (a) The Prior Sleep Wake model (PSWM) is a simple method that may be used among other methods to predict the likelihood of accumulating fatigue or sleep debt and to assess crew fitness for duty, based on scientific evidence and principles.

Most evidence suggests that to maintain optimum performance, health, and well-being, individuals should get between 7 and 9 hours of sleep during a 24-hour period.

Many studies have investigated how decreasing levels of sleep and increasing time awake affects performance. In general, research has found that performance begins to become impaired after getting less than 5 hours of sleep over a 24-hour period. Performance also becomes impaired if sleep consistently falls below 6 hours per night on an ongoing basis.

Sleepiness is related to factors such as the time of day, the time since awakening and the duration of prior sleep. As prior sleep decreases and time awake increases, the likelihood of fatigue-related symptoms, errors, and incidents also increases.

The PSWM allows the operator to set minimum and maximum thresholds for sleep and time awake, according to the specific work risk profile of the crew members concerned, to determine whether they have obtained sufficient sleep and are by inference fit for duty. These thresholds should not be treated as targets.

The PSWM also allows crew members to calculate for themselves how much sleep they have had and how long it has been since their last sleep period. The operator may decide that crew members, after assessing their own fitness for duty, report to their supervisor when they do not meet the relevant thresholds. This simple and practical process can flag sleepiness and fatigue before they lead to a safety issue.

When crew members report to a supervisor that they have had insufficient sleep, it is important that clear procedures be in place to manage the risk in a consistent manner.

The PSWM has limitations which operators and crew members need to be aware of. The model does not account for crew circadian rhythm, workload and sleep quality, to name a few. Therefore, where used, the PSWM may be one element of the appropriate FRM, but not the only element. Operators and crew members may use complementary methods and tools to validate predictions about fatigue made by the PSWM or alternative methods and tools having similar characteristics.

(b) The prior sleep-wake score is calculated by means of the following table:

Calculating prior sleep-wake					Score
<b>Step 1: Sleep in prior 24 hours (*)</b>					
Sleep	2 hrs	3 hrs	4 hrs	5+ hrs	
Points	12	8	4	0	
<b>Step 2: Sleep in prior 48 hours (*)</b>					
Sleep	8 hrs	9 hrs	10 hrs	11 hrs	12+ hrs
Points	8	6	4	2	0
<b>Step 3: Predicted hours awake since last sleep until end of duty (**)</b>					
If sleep hours in Step 2 are more than hours awake, score = 0.					
If less, add 1 point per hour awake more than sleep in Step 2.					
					<b>Total</b>

(\*) Sleep in prior 24 (48) hours means the sleep duration in the 24 (48) hours prior to the start of a rostered duty period. Sleep in this context is a sleep period during a continuous, uninterrupted and defined rest period, following a duty or prior to a duty, during which a crew member is free of all duties, standby and reserve. It excludes in-flight rest and controlled rest.

(\*\*) Predicted hours awake refer to the period from wake-up from the last sleep period to the end of the rostered duty period.

(c) Fitness for duty is assessed by means of the following table:

Total score from the previous table	Risk level	Approved controls
0	Acceptable	No additional controls necessary except in the presence of higher-level indicators of fatigue (i.e. symptoms, errors, or incidents).
1-4	Minor	Inform line supervisor and document in daily logbook. Self-monitor for fatigue-related symptoms and apply individual controls such as strategic use of

		caffeine, task rotation, working in pairs, additional rest breaks.
5-8	Moderate	Inform local manager and document in a fatigue report. Implement additional fatigue controls such as task reallocation, napping, and increased level of peer and supervisory monitoring.
9+	Significant	Call manager before driving to work. Document in a fatigue report on next work shift. Do not engage in safety-critical tasks (including driving to work), and do not return to work until sufficiently rested as per sleep/time awake rules.