<Industry manual/exposition cover page>

Fatigue Management - Appendix 2 - Multi-pilot Operations except for Flight Training

Company Name

<Insert image if required/delete as required>

Version V

Date 03/2025

<Operators are to remove these instructions before finalising their draft.>
**Instructions**

**How to use this Operations Manual Supplement Template**

This template is designed to assist operators in developing an Operations Manual document/section/supplement for compliance with Civil Aviation Order 48.1 (2019) (the order) and relevant Appendix of the order.

When developing the Operations Manual supplement, operators are strongly advised to refer to CAAP 48-01 available from the CASA Fatigue Resources webpage. While the CAAP is advisory in nature, the CAAP is referenced multiple times in the order as the CAAP contains highly relevant information and guidance to assist operators in developing a compliant submission.

Given the range of activities which can be conducted by AOCs and the variance in the size and complexity of aviation organisations, this template is generic in nature and may be of more assistance to smaller or less complex operations.

Each operator using this template will need to amend, delete from, and add to the document as appropriate to suit your operation, procedures, organisational structure and so on. Specific items which need to be amended from the template when developing your individual Operations Manual Supplement include:

* where <XXXX> or similar is shown in the text and/or a blue highlight is used, the text will need to be replaced to reflect the relevant matter e.g. AOC holder’s name; CEO’s name; role in organisation structure; name of the system used; or other specific information particular to your organisation.
* Numerical limits are identified by green highlights. You will need to replace the green highlighted limits with the limits relevant to your operation. The actual limits you select must be informed by your hazard identification and risk assessment procedures and must not fall outside the limits prescribed in the relevant Appendix.
* Text in orange font provides guidance to assist the author when developing the procedures. CASA anticipates a compliant manual will need to contain procedures and processes dealing with the matters in orange. As mentioned, operators will also need to consult CAAP 48-01 for more comprehensive guidance. After an operator has used the orange text to guide the development of appropriate procedures, the orange text should be removed from the finished supplement prior to submission to CASA.
* The tables and forms may need to be labelled to suit your organisation’s operations manual or exposition, with relevant references in the text amended as a result.
* The numbering used in the template may need to be amended to align with the numbering system of your operations manual or exposition.

**Note:** The Definitions are specific to CAO 48.1 (2019) and appear in this template either per the order or from the CAAP 48-01 in which the language has been simplified slightly. These Definitions may not be consistent with terms used elsewhere in your operations manual or exposition but are required to be used.

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Amendment record/revision history

Amendments/revisions of this manual/exposition are recorded below in order of most recent first.

Table 1 Revision history

|  |  |  |  |
| --- | --- | --- | --- |
| Version No. | Date | Parts/sections | Details |
|  |  |  |  |
|  |  |  |  |
| <2.0> | <insert date change is made to each section or page> | <e.g. Section 1.6.3> | <Summary of changes made> |
| 1.0 | <insert date> | All | Initial issue |

References

Acronyms

The acronyms and abbreviations used in this document are listed in the table below.

Table 2 Acronyms

|  |  |
| --- | --- |
| Acronym/abbreviation | Description |
| CASR | Civil Aviation Safety Regulations 1998 |
|  |  |

Definitions

Where these definitions differ in wording from those in Civil Aviation Order 48.1 Instrument 2019 the wording for this CAAP was chosen to simplify complex definitions. The wording in the Instrument takes precedence and was necessary for legal drafting purposes; however, the wording from CAAP was chosen for this template to aid understanding.

Note: If not using this supplement ensure these definitions are captured in the operations manual set of definitions.

Table 3 Definitions

| Term | Definition |
| --- | --- |
| Access | No restriction on, or impediment to, a flight crew member’s (FCM’s) immediate and actual use of a necessity. |
| Adequate sustenance | Food and drink (including clean drinking water) in quantities sufficient to reasonably sustain a person in the person’s circumstances. |
| Augmented crew operation  | Means an aircraft operation in which 1 or more FCMs, additional to the minimum required number of FCMs, are engaged in a flight to allow 1 or more FCMs to be relieved of duty during flight time.  |
| CAO 48.1 | Civil Aviation Order 48.1 Instrument 2019 |
| Call out | Being required by an operator to commence a duty period during a standby. |
| Complex operation | An operation that involves 1 or more of the following:* 1. a flight duty period (FDP) with a displacement time of 2 hours or more
	2. an augmented crew operation
	3. an FDP that commences when the FCM is:
		+ 1. in an unknown state of acclimatisation, or
			2. acclimatised to a location other than the location where the FDP commences.
 |
| Consecutive | A continuous, unbroken, period of time for the duration of the hours or days mentioned. |
| Cumulative duty | The progressive sum of duty periods. |
| Cumulative flight time | The progressive total of flight time accrued by the FCM when acting as a crew member on board any aircraft but excluding flight time accrued during recreational private operations. |
| Crew rest facility | One of the following defined classes of rest facility on board an aircraft that is available to an FCM:* + 1. Class 1 means a bunk or other surface that:
			1. is fit for the purpose of an FCM obtaining sleep in a horizontal sleeping position
			2. is located separate from both the flight deck and passenger compartment in an area that:
			3. is temperature-controlled
			4. allows the FCM to control light
			5. provides isolation from noise and disturbance
		2. Class 2 means a seat in an aircraft cabin that:
			1. is fit for the purpose of an FCM obtaining sleep in a horizontal or near-horizontal sleeping position
			2. is separated from passengers by at least a curtain that provides darkness and some noise mitigation
			3. is reasonably free from disturbance by passengers or crew members
		3. Class 3 means a seat in an aircraft cabin or flight deck that:
			1. is fit for the purpose of an FCM obtaining rest
			2. reclines at least 40 degrees from the vertical plane
			3. provides leg and foot support in the reclined position.
 |
| Day | The period between local midnight at home base and the subsequent local midnight at home base. |
| Displacement time | The difference in local time between:* the place where a pilot commenced an FDP
* the place where the pilot undertakes an off-duty period following the FDP.
 |
| Duty | Any task that a person who is employed as an FCM is required to carry out associated with the business of an operator. |
| Duty period | A period of time that starts when an FCM is required by an operator to report for duty and ends when the FCM is free of all duties. A duty period includes any time spent by the FCM in positioning. |
| Early start | * + 1. Any task that a person who is employed as an FCM is required to carry out associated with the business of an operator.
		2. A period of time that starts when an FCM is required by an operator to report for duty and ends when the FCM is free of all duties. A duty period includes any time spent by the FCM in positioning.
 |
| Fatigue | A physiological state of reduced alertness or capability to perform mental or physical tasks, which:* may impair the ability of the FCM to safely operate an aircraft
* is caused by one or more of the following:
* the FCM’s lack of sleep
* the FCM’s extended wakefulness
* the FCM’s circadian phase at any relevant time
* the FCM’s workload of mental activities, or physical activities at any relevant time.

Note: An individual's level of fatigue and state of alertness can also be influenced by their health, diet, fitness and overall well-being. |
| Fit for purpose | For a crew rest facility, or suitable sleeping accommodation, means that it has ergonomic characteristics that make it suitable for an FCM to obtain sleep or rest (as the case requires). |
| Flight crew member (FCM) | A crew member who is a pilot or flight engineer assigned to carry out duties essential to the operation of an aircraft during flight time. |
| Flight duty period (FDP) | A period of time that:* starts when a person is required, by an operator, to report for a duty period in which they undertake one or more flights as part of an operating crew
* ends at the later of:
* the person’s completion of all duties associated with the flight, or the last of the flights; or
* 15 minutes after the end of the person’s flight, or the last of the flights.
 |
| Flight time | The time when an FCM is acting in the capacity as a crew member on board an aircraft that includes:* in the case of a heavier-than-air aircraft — the total time from the moment at which the aircraft first moves under its own power for the purpose of taking-off, until the moment at which it comes to rest after landing; and
* in the case of a lighter-than-air aircraft — the total time from the moment at which the aircraft first becomes airborne until it comes to rest on the ground, excluding any time during which the aircraft is moored.

Note: Recording flight time from 'push-back' or 'off blocks', rather than from the moment the aircraft first moves under its own power (as per the definition), is acceptable.Likewise, for rotorcraft, recording flight time from the moment the rotor blades start turning until they stop turning is also acceptable. |
| Home base | The location, assigned by the operator to the FCM, from where the FCM normally starts and ends a duty period or a series of duty periods. |
| In-flight rest | In an augmented crew operation, the period of time, or periods of time, during which an FCM has access to a crew rest facility. |
| Local night | A period of eight consecutive hours which includes the hours between 2200 and 0500 local time. |
| Local time | For a location means:* + 1. local time in the time zone of the location, or
		2. local time in a time zone (the alternative local time):
			1. that adjoins the time zone of the location; and
			2. whose nearest boundary is reasonably proximate to the location provided the alternative local time is:
			3. specified in the operator’s operations manual; and
			4. used consistently as local time for the location.
 |
| Multi-pilot operation | A multi-pilot operation is an operation conducted under multi-pilot procedures. However, this does not include contracted recurrent training or contracted checking unless it is conducted as a multi-crew operation within the meaning of regulation 61.010 of CASR. |
| Off-duty period (ODP) | A period of time during which a pilot is free of all duties and standby associated with their employment. |
| Operator | An AOC holder or Part 141 certificate holder. |
| Positioning | Means being transported, as a passenger, to a location, by any mode of transportation, as required by the operator and:* + 1. does not include being transported to or from suitable accommodation after or before an FDP
		2. if undertaken immediately before duty that includes the person flying an aircraft as an FCM (flying duty) — must be considered part of their FDP
		3. if undertaken immediately after the person’s flying duty and no other flying duty is to be conducted in the duty period — is not part of their FDP or off-duty period
		4. is duty and part of the duty period.
 |
| Recreational private operation | Flying conducted by an FCM in a personal capacity, and at and for the FCM’s leisure. A flight conducted by an FCM as a private operation is not a recreational private operation if it is conducted for, or on behalf of, an entity (regardless of whether or not the entity is an operator). |
| Reporting time | The time assigned to a pilot to commence an FDP. |
| Roster | A list made available to a pilot by <XXXX>, setting out the times when the pilot is assigned to undertake duties or standby. |
| Sector | The following meanings:* except for a rotorcraft—any flight consisting of a take-off and a landing, when conducted by a person in the capacity of an FCM
* for a rotorcraft — the period:
* from when the rotor blades start turning until they stop turning; and
* during which an FCM on the rotorcraft conducts 1 or more flights, each consisting of a take-off and a landing.
* each hour, or each part of an hour, of an FDP spent in a synthetic training device.
 |
| Sleep opportunity | A period of time during an ODP when an FCM:* is not meeting the reasonable requirements of bodily functioning, such as:
* eating
* drinking
* washing
* dressing; and
* has access to suitable sleeping accommodation without, under normal circumstances, being interrupted by any requirement of the operator.

Note: Normal circumstances refer to those situations where the operator wishes to preserve the prior sleep opportunity. Abnormal circumstances refer to the case where the operator needs to contact the FCM and it is understood that this will mean that the prior sleep opportunity has been interrupted |
| Split-duty rest period | A predefined period of time during which an FCM:* has access to suitable resting accommodation or suitable sleeping accommodation; and
* is relieved of all duties associated with their employment by the operator.
 |
| Standby | A period of time during which an FCM:* is required by an operator to hold themselves available for duties
* has access to suitable sleeping accommodation
* is free from all duties associated with their employment
 |
| Suitable resting accommodation | A comfortable resting area that:* has a comfortable temperature and minimal noise levels
* contains at least a comfortable chair
* provides access to adequate sustenance at times appropriate to the duty requirements.
 |
| Suitable sleeping accommodation | Accommodation not within an aircraft that is fit for purpose for an FCM to obtain sleep, and that includes all of the following:* a comfortable room, compartment or facility
* a single occupancy, at the discretion of the FCM
* access to clean, tidy and hygienic amenities, including a toilet and hand washing basin
* a bed that is comfortable, flat and horizontal, allowing the occupant to sleep on their stomach, back, and either side
* minimum noise levels, including low occurrence of random noise
* the means to control light, temperature and ventilation
* access to adequate sustenance
 |
| Time zone | A defined region of earth with a uniform local time which differs by one hour, or by part of one hour, from the uniform local time of an adjoining region of the earth. |
| Unforeseen operational circumstance | An unplanned exceptional event that becomes evident after the commencement of the FDP (i.e. un-forecast weather, equipment malfunction, or air traffic delay). |
| Window of circadian low (WOCL) | An FDP that commences between the hours of 0200 and 0559 local time at the location where an FCM commences the FDP.**Note:** An FCM infringes the WOCL if they perform duty during all or any part of the WOCL. |

Reference material

Table 4 Reference material

|  |  |
| --- | --- |
| Document type | Title |
| Civil aviation order | CAO 48.1 Instrument 2019  |
|  |  |

# Flight crew member fatigue management

## Fatigue management policy

<XXXX> is committed to ensuring accumulated fatigue does not reach a level where it results in unsafe working practices and procedures. In terms of pilot fatigue management, we are committed to:

* ensuring that our pilots are aware of the way fatigue builds up, to identify it, manage it and recover from it
* embracing a just safety culture that enables open and fair reporting which allows us to learn and improve our understanding of the impact of fatigue and the best ways to manage it
* fatigue management rostering practices that avoid disruptive roster patterns and minimise the risks associated with fatigued pilots, with the goal of having no flights on which pilots are impaired by fatigue to the extent that safety is impacted.

<XXXX> will not require a pilot to operate an aircraft if the pilot is suffering from fatigue or considering the circumstances of the flight to be undertaken, is likely to suffer from fatigue, which may so impair the pilot’s performance that the safety of the operation may be affected.

This policy and the fatigue management procedures noted in this manual apply to, and are expected to be followed by, (as applicable):

* all pilots employed or engaged by <XXXX> regardless of their employment status
* all staff, (including management), whose work may cause (or impact on) the fatigue of pilots, e.g., with their involvement in pilot rostering, extensions, reporting and continual improvement.

This fatigue management policy and procedures section will be formally reviewed:

* once a year on the anniversary of commencement of operations to this supplement
* upon identification of a fatigue related issue associated with this section including extensions
* upon dissemination of relevant scientific advances improving fatigue management
* if operations change significantly enough to affect rostering, crewing, training or aircraft types
* if there are any amendments to applicable legislation.

The formal review will be conducted by the Chief Pilot (or delegated person) and stored as a record associated with flight and duty times. The review is to ensure continual improvement of the system and its ongoing applicability to current operations.

## Flight duty limitations and fatigue development

<XXXX> complies with CAO 48.1 Instrument 2019 Appendix 2 for Air Transport Services for Multi pilot operations except flight training.

### Responsibilities

#### <XXXX> Responsibilities

The Chief Pilot (or delegated person) has responsibility for implementing and managing the fatigue management system on behalf of <XXXX>. The responsibilities include:

* maintaining a reporting system for fatigue occurrences
* ensuring roster limits are designed and promulgated in accordance with (iaw) the provisions of this manual
* designating and recording a home base for each pilot and ensuring that each pilot is advised of this designation
* ensuring the roster is kept as up-to-date as possible and includes the most accurate account of expected operations for at least the following 7 days
* ensuring records of the following are made and stored for a minimum of 5 years:
	+ the roster – the roster will be backed up daily and considered a reasonable prediction of operations for the following 7 days
	+ ensuring records are maintained of all actual flight duty periods, standby periods, duty periods, split-duty periods. Off-duty periods and actual flight times of each pilot when acting in the capacity of a crew member
	+ extensions and exceedances including details of the situation involved and why the extension was required for the purposes of continual improvement
* authorising extensions in unforeseen operational circumstances (iaw Section 2 Conditions and processes for extensions to limitations)
* maintaining a register of suitable accommodation locations (hotels/motels etc.) applicable to the scope of Company operations
* ensuring pilots are contacted only in accordance with the communication protocol (refer Section 1.2.1.4 Communication protocol)
* ensuring all pilots and relevant staff (including rostering staff) are trained in accordance with Section 1.2.17 Training
* ensuring all pilots are aware of the fatigue management system, its limits and procedures and their responsibilities
* conducting Fatigue Hazard Identification in accordance with Section 1.2.18 Fatigue hazard identification
* conducting an annual formal review and other reviews as required by the Fatigue Management Policies and Procedures (iaw Section 1.1 Fatigue management policy).

Notes:

1. If the duties associated with these responsibilities are delegated to another staff member the details should be documented in this section.

2. This section should be specifically referenced in the general section on Chief Pilot responsibilities (and duty delegate if nominated).

#### Pilot responsibilities

<XXXX> recognise that many factors are outside the control of the individual and unforeseen circumstances will arise from time to time that will affect the individual’s ability to manage their sleep opportunities and level of fatigue. However, pilots have a legal responsibility to appropriately manage fatigue factors (and fitness for duty generally) that it is reasonable to consider are within their control and thereby prepare adequately for each flight duty period. Pilots also have a responsibility to notify the <XXXX> if they believe they are not or unlikely to be fit for a flight.

<XXXX> expects the following from its pilot in respect of fatigue management. All pilots must:

* participate in the Company provided training and work towards a detailed understanding of the underlying causes, effects, mitigation strategies applicable to both fatigue and alertness management
* take advantage of sleep and rest opportunities provided to achieve required restorative sleep or rest, in order to be sufficiently alert for subsequent flight duties
* monitor their fatigue state and advise the Chief Pilot (or delegated person) via the communications protocol (refer Section 1.2.1.4 Communication protocol) as soon as possible once you believe that you might not be available or could have an unacceptable fatigue risk level
* complete a fatigue occurrence report (Form OR) when you believe that fatigue has led to an unacceptable reduction in safety margins or would have led to an unacceptable reduction in safety margins had some additional mitigating action not been taken
* accurately record actual flight and duty times (refer Section 1.2.13 Recording flight and duty times)
* notify the Chief Pilot (or delegated person) via the communications protocol as soon as it becomes apparent that flight and duty time limits might be exceeded (e.g. due to unforeseen operational circumstances)
* if working on a contract basis, provide details of previous FDPs, ODPs and cumulated flight and duty time so that rosters can be built that do not exceed any limits
* if they become aware of any errors in rosters, or the possibility of exceeding cumulative limits bring these to the attention of the Chief Pilot (or delegated person)
* be aware of obligations relating to extensions and reassignments, including when to refuse, consideration of alertness and authorisation requirements
* notify the Chief Pilot (or delegated person), of their personal circumstances or any changes to their circumstances situation, if they believe that, because of its nature, duration, effects or for any other reason, it might impact on their ability to meet the operator’s fatigue risk management policies or their obligations. This could include factors such as: a new baby, being a caregiver, secondary employment, travelling a long distance to report for duty. Once notified this will be noted as a continuing state of affairs for the pilot and does not require repetition reporting (unless circumstances change)
* be aware of the obligations to utilise rest opportunities appropriately during augmented crew operations
* be aware of the obligations to utilise off duty periods appropriately to facilitate faster acclimatisation when undertaking trans meridian duties or recovery from these FDP periods.

#### Alertness consideration table (Form ACTab)

It is recommended that the alertness consideration table Form ACTab be used to assist a pilot in assessing their alertness before an FDP or extension. This table is for assistance to increase the awareness of the Pilot and operator to the individual’s current fatigue status. If the pilot feels they are too fatigued to commence or continue in an FDP or to undertake an extension, then they must report fatigued and discontinue the FDP. Similarly, while <XXXX> may use the Form ACTab to assist in discussing the pilot’s level of fatigue, the form, similar to any predictive fatigue tool, should not be used as a means to apply any pressure pilots to continue an FDP or undertake an extension.

Alternatives to Form ACTab (Appendix B) may be found on the iOS App Store or the Google Play Store. For example: Fatigue SAFE, Fatigue App. These applications could be used as a starting point in the assessment of an individual's fatigue level.

#### Communication protocol

All communications between <XXXX> and a pilot while the pilot is off duty must be in accordance with the following communication protocol:

* <XXXX> will endeavour to contact pilots outside of their prior sleep opportunity
* if the pilot needs to be contacted during or close to their prior sleep opportunity the preferably method is by SMS. A voice message may also be left if the message is deemed too complex for SMS. If there is any doubt about mobile phone reception coverage at a location the message can be left with the hotel reception
* the pilot should ensure that their mobile phone is on ‘silent’ during all prior sleep opportunity periods to, as best as possible, ensure uninterrupted restorative sleep
* when an FCM is interrupted during sleep opportunity, this may affect the FCM’s fitness for duty before the commencement of, or during, the next FDP
* the pilot must check their SMS messages and reply to any SMS or voice message notifying the pilot of a delay, before leaving the location of the prior sleep opportunity
* an SMS sent and shown as delivered or the leaving of a voice message is deemed to be notification however the pilot shall still reply to the SMS before leaving the location of the prior sleep opportunity to confirm they understand the message
* the pilot will check with the hotel reception for messages prior to checking out at locations where mobile phone reception is in doubt
* the timing and content of SMS messages (and phone calls) regarding delays will be logged in the rostering system

Note: SMS is only one method of contact; any effective method that did not interrupt sleep would be acceptable.

All required or urgent communications between a pilot and <XXXX> during an ODP or FDP will be in accordance with the following communication protocol:

* in the first instance the pilot will contact the Chief Pilot (or delegated person) as soon as practicable on the duty phone number
* if no answer is received, the pilot will leave a detailed voice message including their name and aircraft registration (if appropriate) and send an SMS message notifying that a voice message has been left
* if the message relates to an extension request, the pilot must ensure they receive a response approving the extension prior to extending.

All required or urgent communications between the Chief Pilot (or delegated person) and a pilot during an FDP will be in accordance with the following communication protocol:

* in the first instance the Chief Pilot (or delegated person) will contact the pilot on the mobile phone number supplied by the pilot
* if no answer is received, the Chief Pilot (or delegated person) will leave a detailed voice message and send an SMS message notifying that a voice message has been left
* if the message relates to an extension request, the Chief Pilot (or delegated person) will gather sufficient information about the nature of the extension and the level of fatigue of the pilot to ensure they can adequately assess whether safety will be impacted before approving the extension.

### Prior Sleep Opportunity

When rostered for an FDP or period of standby at home base the pilot will have at least 8 consecutive hours sleep opportunity in the preceding 12 hours before the commencement of their duty. Unless a unique arrangement has been agreed to between the pilot and the Chief Pilot (or delegated person) and recorded, the sleep opportunity provided before an FDP will not include the 2 hours immediately before the commencement of an FDP. Any unique arrangement is to be recorded as part of the Flight and Duty Records (1.2.19– Flight and duty records).

When rostering away from home base the pilot will have at least 8 consecutive hours sleep opportunity in the preceding 10 hours before the commencement of their duty (including standby). For the purposes of calculating sleep opportunity, it will not include 1 hour before the commencement of an FDP.

If for any reason a pilot does not achieve the required sleep opportunity period, they cannot commence the assigned FDP until it is achieved. They must inform the Chief Pilot (or delegated person) as soon as it is known that the sleep opportunity period cannot be achieved.

Table 5 Sleep opportunity requirements

| Where | Hours of sleep opportunity immediately preceding FDP or Standby | Notes |
| --- | --- | --- |
| Away from base | 8 consecutive hours within the 10 hours preceding the FDP. | If reporting time is delayed by less than 10 hours the sleep opportunity remains associated with the original FDP commencement time. |
| Home base | 8 consecutive hours within the 12 hours preceding the FDP. | If reporting time is delayed by 10 or more hours the sleep opportunity is calculated from the new FDP or Standby commencement time. |

### Duty time, FDP, flight time and cumulative limits

For <XXXX> an FDP is a period of time which starts when a pilot is required by <XXXX> to report for a duty period in which one or more flights as a crewmember are undertaken and ends not less than 15 minutes after the end of the pilot’s final flight as a crew member.

Notes:

1. The minimum time according to CAO 48.1 Instrument 2019 that the FDP can end after the final flight is 15 minutes after shutdown, however the operator should choose a time that reflects their operations and that typically enables the pilot to complete all safety critical actions such as post flight inspections and necessary paperwork associated with the flight.

2. In order to determine maximum FDP limits, Flights crew members state of acclimatisation would need to be determined. These procedures are outlined in Appendix D.

Any period of duty that precedes a flight as a crew member such as a positioning flight, a period of simulator flying, management duties, administrative tasks, maintenance tasks etc., will be included in the FDP unless it is separated from the flight by a period of time sufficient for a prior sleep opportunity (refer Section 1.2.2 Prior sleep opportunity).

Any period of duty after an FDP (after the final flight) and before the ODP such as positioning, management tasks etc., will be taken into account when determining the minimum ODP.

Below are the maximum FDPs for acclimatised FCMs.

Table 6 Maximum FDP (in hours) for an acclimatised FCM according to number of sectors and acclimatised time at the start of the FDP

| Acclimatised time at start of FDP | Maximum FDP hours according to sectors flown |
| --- | --- |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 1-3 | 4 | 5 | 6 | 7 | 8*+* |
| **0000 – 0459** |  |  |  |  |  |  |
| **0500-0559**  |  |  |  |  |  |  |
| **0600-0659** |  |  |  |  |  |  |
| **0700-1259** |  |  |  |  |  |  |
| **1300-1359**  |  |  |  |  |  |  |
| **1400-1459** |  |  |  |  |  |  |
| **1500-2359** |  |  |  |  |  |  |

Notes:

1. The maximum FDP hours in the table above need to be determined by each organisation after taking the hazard identification and risk mitigation processes into account. The resulting limits cannot exceed the limits within Appendix 2 of CAO 48.1.

2. A separate table can be used to list limits for sub-groups of pilots such as new pilots, pilots at different bases, or for different conditions such as above certain temperatures or at different times of the year, for example dry and wet season limits.

3. An acclimatised FCM must not be assigned flight time longer than 10.5 hours except in augmented crew operation.

4. Refer to CAAP 48.1-01 section 4.1 and Appendix F for detailed guidance.

Table 7 Maximum FDP for an FCM in an unknown state if acclimatisation according to the number of sectors and duration of the off-duty period immediately before the FDP

| Duration of the off-duty period immediately before the FDP | Maximum FDP hours according to sectors to be flown |
| --- | --- |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 1-3 | 4 | 5 | 6 | 7 | 8+ |
| **Less than 30 hours** | 10 | 90.5 | 9 | 8.5 | 8 | 7.5 |
| **30 hours or more**  | 12 | 11.5 | 11 | 10.5 | 10 | 9.5 |

**Notes:**

1. An FCM in an unknown state of acclimatisation must not be assigned a flight time longer than 10.5 hours except in augmented crew.
2. An FCM may only be assigned 4 consecutive FDPs in an unknown state of acclimatisation after which the FCM must have an adaptation period sufficient to become reacclimatised in accordance with paragraph 7.4 CAO 48.1.

Table 8 Cumulative limits on flight and duty times

|  |  |
| --- | --- |
| Period | Flight Time Limit (must not exceed) |
| 28 Consecutive Days | 100 hours  |
| 365 Consecutive Days  | 1000 hours |
| Period - projected to end of assigned FDP or standby | Limits  |
| Any consecutive 168 hours (7 Days) | Maximum 60 hours duty |
| Any consecutive 336 hours (14 Days) | Maximum 100 hours duty |
| Any consecutive 168 hours (7 Days) | Minimum of 36 consecutive hours off-duty that must include at least 2 local nights |
| 28 Days | Must have had at least 6 days off-duty in the 28 consecutive days before commencing the FDP or standby |

### Increase in FDP limits by split duty

Split-duty rest periods will only be assigned as part of the rostered FDP. The split-duty rest period must have a designated rest location and must not result in exceeding cumulative limits.

**Note:** In the following example, the operator has suitable resting accommodation facilities at the base facility but does not have suitable sleeping accommodation.

Table 9 Split duty times and limits

| Location | Minimum rostering time | FDP limits |
| --- | --- | --- |
| Suitable resting accommodation. | Roster a minimum of 2 consecutive hours with access to suitable resting accommodation plus time for commuting. | Can be increased by up to half the time that the pilot has access to suitable resting accommodation up to a maximum of 2 hours. |
| Suitable sleeping accommodation.**Note:** The pilot is responsible for ensuring the home always meets this standard. | Roster a minimum of 4 consecutive hours plus time for commuting.At home base allow enough time for a 1-hour commute to home and back-30 minutes each way.**Note:** Pilots should notify Chief Pilot (or delegated person) if this commute time is insufficient. | FDP can be increased up to 4 hours providing the maximum does not exceed 16 hours.Remaining FDP after split can be a maximum of 6 hours. |
| If a split-duty rest period covers any period between 2300 to 0529 local time. | The split duty rest period will include enough time for both the commute and to provide sufficient time for 7 hours access to the suitable sleep accommodation.In this case:* max FDP can be increased to 16 hours
* remaining FDP after split can be a maximum of 6 hours
* there is no reduction in FDP for purposes of cumulative duty or minimum ODP.
 |  |

### Increase in FDP and flight time limits in an augmented crew operation

Similar to the requirements for the determination for acclimatisation, an extreme range of variables are also involved in dealing with the augmented crew concept. CASA can’t deal with the complexity of these procedures within the confines of a generic Operations manual template. Instead, to deal with augmented crew operations (if the operator did such operations), the operator should consider their existing procedures and review these to ensure they deal with the following matters:

The limits in the operations manual must not exceed the FDP limits for acclimatised FCMs (Appendix 2, Table 5.1) and FCMs in an unknown state of acclimatisation (Appendix 2, Table 5.2). These limits are highlighted in the tables below

Table 10 Maximum FDP (in hours) for an acclimatised FCM in an augmented crew operation according to class of crew rest facility, number of additional FCMs and acclimatised time at the start of the FDP

| Acclimatised time at start of FDP | Maximum FDP according to class of crew rest facility and number of additional FCMs |
| --- | --- |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Class 1 | Class 2 | Class 3 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Additional FCMs* | 1 | 2 | 1 | 2 | 1 | 2 |
| **0700-1059**  | 16 | 18  | 15 | 16.5 | 14 | 15  |
| **1100-1559**  | 16 | 18  | 15 | 16.5  | 13 | 14  |
| **1600-0459**  | 16  | 18  | 15  | 16.5  | 12  | 13  |
| **0500-0659**  | 16 | 18  | 15 | 16.5  | 13  | 14  |

Table 11 Maximum FDP (in hours) for an FCM in an unknown state of acclimatisation in an augmented operation according to class of crew rest facility, number of additional FCMs and duration of off-duty period immediately before the FDP

| Duration of off-duty period immediately before the FDP | Maximum FDP according to class of crew rest facility and number of additional FCMs |
| --- | --- |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Class 1 | Class 2 | Class 3 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Additional FCMs* | 1 | 2 | 1 | 2 | 1 | 2 |
| **Less than 30 hours**  | 16  | 18  | 15  | 16.5  | 12  | 13  |
| **30 hours or more**  | 16  | 18  | 15  | 16.5  | 14  | 15  |

The procedures must ensure that the minimum time an FCM requires the in-flight crew rest facility, in accordance with clause 5 of Appendix 2, is available. These times are only minimums and substantially longer times in in-flight rest may be required to maintain or restore adequate alertness. As a guide, these minimums assume that the majority of the FDP is flight time, and the available rest/sleep time (cruise phase) is fully utilised and reasonably evenly distributed among FCMs. Therefore, the procedures in the operations manual should reflect this goal of fully utilising available in-flight periods for gaining in-flight rest. It is for this reason that the number of sectors is limited for an augmented crew operation to ensure FDPs contain longer sector lengths that allow adequate time for rest/sleep.

Procedures for assigning FCMs to an augmented crew FDP must ensure that the FCMs that are part of the operating crew at the end of the FDP are the same FCMs who commenced the first sector of the FDP.

For safety reasons, this is a critical condition. If, for example, a medical emergency required the disembarkation of an FCM during the FDP, for the flight to continue all of the FCMs must be replaced with a new crew, commencing a new FDP.

It is considered that managing differing FDP limits and lengths of duty and flight time, as well as allocation of in-flight rest, for each FCM is potentially too difficult for a crew and, in particular, the captain to manage safely. Given the likely pressure to support the crew and achieve the task, having one or more crew members with a significantly different fatigue level could create disparity (i.e. in the approach to extensions). Extensions should be a decision that considers the fatigue level of each FCM independently; however, when only one FCM needs the extension, the other crew members may not support the decision to not extend.

Additionally, one fatigue mitigator for a crew is the general extrapolation of the FCM’s level of fatigue to the crew. When one crew member identifies that they feel fatigued, they should bring it up with the crew for discussion and management and/or start to monitor the rest of the crew more closely. If a crew includes significantly different duty times, understanding when each is fatigued becomes far more difficult and less likely to be managed effectively. This added level of complexity should be managed under an FRMS.

To use augmented crew operations, the operations manual must detail required augmented crew procedures. Appropriate augmented crew procedures should include:

* the requirement to designate a pilot responsible for making command decisions at all times that the PIC is accessing in-flight rest
* the requirement for a comprehensive briefing prior to FCMs rotating into and out of in-flight rest
* a means for prioritising the in-flight rest requirements so that they do not take priority over the need to optimise the crew experience levels on the flight deck for managing planned and unplanned operational threats
* designation of a responsible person among the crew for scheduling in-flight crew rest and reassessing crew rest schedules (in the event of unforeseen operational circumstances, particularly in-flight diversions or air returns)
* management of the possible effects of sleep inertia on performance when awakening from deep sleep
* procedures that ensure other crew members are aware of the necessity to respect the in-flight rest requirement and avoid interrupting and reduce unnecessary noise that could disturb the sleep of FCMs utilising in-flight rest.

### Delayed reporting time

The decisions and procedures in delayed reporting are illustrated in the decision flow chart below. Key outcomes to manage risk are:

* if notifying before the prior sleep opportunity, notification will be as early as possible so that pilot may arrange their rest accordingly
* if notification is after the prior sleep opportunity, notification should be before a pilot commences their journey to work. In the case of a pilot at home base this is deemed to be 2 hours prior to the FDP commencing and in the case of a pilot at an away base location, 1 hour prior to the start of the FDP
* notification shall be in accordance with the communication protocol (refer Section 1.2.1.4 Communication protocol)
* the new roster will be updated and republished as soon as practicable.

The timing and content of SMS messages (and phone calls) regarding delays will be logged in the rostering system as per the communication protocol (refer Section 1.2.1.4 Communication protocol) and form part of the flight and duty records (refer Section 1.2.13 Recording flight and duty times).



Figure 1 Delayed reporting chart

The Delayed reporting limits table (refer table 12) is used for determining the maximum FDP when reporting times are delayed. The hours of multiple delays need to be combined to calculate the maximum FDP.

Table 12 Delayed reporting limits

| Delay | Determining maximum FDP for delayed FDP reporting time (use maximum FDP limits in table FD) |
| --- | --- |

|  |  |  |
| --- | --- | --- |
| Single or multiple delay/s that total < 4 hours | If the new maximum FDP limit is higher or the same at the original maximum FDP limit, retain original maximum FDP limit | If the new maximum FDP limit is lower than original maximum FDP limit, use the new, lower maximum FDP limit |
| Single or multiple delay/s that total between 4 – 10 hours | Step 1: If maximum FDP limit at 4-hour mark is higher than original maximum FDP limit (or the same), use **original maximum FDP limit** | Step 1: If maximum FDP limit at 4-hour mark is lower than original maximum FDP limit, use **maximum FDP limit at 4-hour mark** |
|  | Step 2: Reduce maximum FDP limit worked out at step 1 by the amount of time the new reporting time is later than the 4-hour mark | Step 2: Reduce maximum FDP limit worked out at step 1 by the amount of time the new reporting time is later than the 4-hour mark |

|  |  |
| --- | --- |
| A single delay of 10 hours or longer | Use new maximum FDP limit from the maximum FDP table for the delayed reporting time |

**Note:** If there are one or more delays then the following FDP must not exceed 16 hours unless the FDP is augmented crew operations or contains a split rest period.

### Reassignment

A reassignment will only be made to meet operational requirements such as changes in tasking requirements, positioning, delayed operations due to weather, maintenance or, the rostered pilot being unavailable (e.g. illness, fatigue, emergency).

The Chief Pilot (or delegated person) can authorise a reassignment. In deciding whether or not to modify an FDP with a reassignment the Chief Pilot (or delegated person) will consider:

* availability of alternate pilots, and
* impact on future rostering/planning for that pilot.

After commencing an FDP, a pilot can be reassigned a longer FDP but the reassignment must:

* ensure the pilot considers themselves fit for the modified FDP. They must undertake a personal alertness assessment
* the reassigned FDP must not exceed maximum FDP or flight time limit as prescribed in Table FD (refer Section 1.2.3 Duty time, FDP, flight time and cumulative limits)
* consider any additional sectors and adjust the maximum FDP accordingly
* not exceed cumulative, or ODP limits
* not cause the FCM to exceed the limit on infringing the WOCL
* be recorded in the flight and duty records.

### Standby limits

Standby is a period when the pilot is free of all duties and so pilots are not to be contacted during standby unless it is for the purposes of advising of an impending FDP.

Standby must only be undertaken in suitable sleeping accommodation. At home base this is taken to be the pilot’s home, so no assessment of suitability is required. For any accommodation away from home base the accommodation will meet the criteria in Section 1.2.16 Accommodation.

The following standby limits will apply:

* • a pilot will not be held on standby for greater than a 14-hour period
* if called out from standby after a 4-hour period on standby, the maximum FDP limit that applies to that FCM is reduced by the length of time they are on standby in excess of 4 hours
* if called out from standby, the maximum combined duration of standby plus the subsequent FDP is 16 hours (except where the subsequent FDP includes a split-duty rest period at suitable sleeping accommodation of at least four (4) consecutive hours)
* if not called-out from standby, the pilot will have a minimum ODP of at least 10 hours after the standby period
* a standby that is terminated by advising the pilot via the communication protocol (refer Section 1.2.1.4 Communication protocol), is taken to have been completed and the pilot will have at least 10 consecutive hours off duty from the time they were notified.

### Positioning

For operational reasons the Chief Pilot (or delegated person) may request a pilot to position to another location following a flight. The time spent in positioning is to be added to the preceding FDP when determining the subsequent minimum off-duty period (refer also to 1.2.10- Off Duty Periods).

If requested to position prior to a flight in which they will be acting as a crew member and the positioning is not separated from that flight by at least a prior sleep opportunity, the positioning is included in the FDP and will be taken into account when determining whether the FDP can be achieved within the maximum FDP limit.

### Off-duty periods

Following an FDP an FCM has an ODP of at least the duration as determined by the relevant calculation below:

If the FCM is acclimatised (to any location) and the FDP and any duty time is ≤ 12 hours:

* If at home base:
	+ 12 hours +
	+ one (1) hour for each time zone crossed in excess of two (2) east and three (3) west.
* If away from home base:
	+ 10 hours +
	+ one (1) hour for each time zone crossed in excess of two (2) east and three (3) west.

If the FCM is acclimatised (to any location) and the FDP and any duty time is > 12 hours:

* + 12 hours +
	+ 1.5 times the amount the FDP and any duty time exceeded 12 hours +
	+ one (1) hour for each time zone crossed in excess of two (2) east and three (3) west.

If the FCM is in an unknown state of acclimatisation:

* + 14 hours +
	+ 1.5 times the amount the FDP and any duty time exceeded 12 hours +
	+ one (1) hour for each time zone crossed.

If the calculation above results in an ODP requirement of more than 14 hours, the ODP may be reduced to not less than 14 hours, provided that:

* the reduced ODP is undertaken away from home base
* the first FDP was not extended past the FDP limit as provided for under this operation manual
* no other duties were undertaken following the first FDP before the ODP commences
* the FCM commences the second FDP in an acclimatised state
* the ODP following the second FDP is a recovery period of at least 36 consecutive hours including two (2) local nights.

Where an FCM’s FDP (the last FDP) does not exceed 10 hours, their following ODP (ODP 2) may be reduced to no less than 9 hours, provided that:

* the ODP undertaken immediately before the last FDP (ODP 1) was at least 12 hours (including a local night)
* the FCM is acclimatised at the start of the ODP 2
* the ODP 2 is undertaken over a local night
* the ODP 2 is not undertaken at home base
* the ODP following the FDP after ODP 2 is at least 12 hours, including a local night.

**Note:** If <XXXX> takes advantage of this 9-hour reduction provision, the Chief Pilot (or delegated person must ensure the procedures reflect the requirement for the FCM’s 8-hour sleep opportunity to be met in the 10 hours prior to the FDP that starts after the reduced ODP. The FCM must still have enough time to travel to and from the suitable sleeping accommodation, meet the reasonable requirements of bodily functioning (i.e. eating, drinking, washing and dressing) and get a minimum of 8 hours sleep opportunity.

The following longer-term limits also apply:

* The FCM must have had at least 36 consecutive hours off-duty, including two (2) local nights, in the 168 hours before the projected end time of the assigned FDP
* The FCM must have had at least 6 days off-duty in the 28 consecutive days before commencing the FDP or standby.

### Limits on infringing the WOCL and early starts

When rostering duties that infringe the WOCL or are early starts, the following limits apply:

* 3 consecutive early start FDPs, and
* 3 consecutive infringements of the WOCL, and
* despite the above restrictions a pilot may be rostered up to 5 consecutive early starts provided the duration of the 4th and 5th consecutive early starts are reduced
* the normal FDP limit for the 4th consecutive early start must be reduced by 2 hours, and the normal FDP limit for the 5th consecutive early start must be reduced by 4 hours
* an operator must develop rostering procedures and guidelines that track infringements of the WOCL and early starts. These procedures must also identify and track those FDPs that infringe the WOCL due to a reassignment or extension.

**Notes:**

1**.** The definition of ‘WOCL’ and ‘early start’ depend on the FCM’s state of acclimatisation.

2. If the FCM is in an acclimatised state, the FCM’s WOCL is based on the local time at the location where they are acclimatised.

3. If the FCM is in an unknown state of acclimatisation, the WOCL is based on the local time at the location where they were last acclimatised.

4. This same concept is applied to determining whether an FDP is an ‘early start’.

### Access to sustenance

Where an FDP is to exceed 5 hours <XXXX> will provide the pilot the opportunity for a meal break during that FDP. Not more than 5 hours will elapse between opportunities to access adequate sustenance. At home base a fridge has been provided specifically for food/beverage storage to facilitate access to adequate sustenance.

### Recording flight and duty times

Flight and duty records (refer Section 1.2.19) are stored in the <system> and each pilot is responsible for recording accurate flight and duty times and other relevant information in the system as soon as practicable after each duty and not more than 24 hours after the duty has been completed. If the pilot cannot record the relevant information within 24 hours, they should contact the Chief Pilot (or delegated person) with the details to maintain the accuracy of the rostering system.

**Notes:**

1.The operator should make reference to how a manual system is operated if an electronic recording system is not in use. Particular reference on how limits will be monitored and kept within published parameters needs to be outlined in the procedures.

2. The operator should insert the most appropriate maximum time to record flight and duty times.

Pilots will be trained in the rostering and recording <system> as part of the specific fatigue management processes and procedures training (refer Section 1.2.17 Training).

If a pilot becomes aware of any errors in rostering (or the possibility of exceeding cumulative limits) these must be brought to the attention of the Chief Pilot (or delegated person) as soon as possible.

The rostering and recording system will be backed up at least weekly and records (including electronic files) kept for 5 years.

**Note:** The operator should insert the most appropriate time for backup that suits their operations.

### Reporting

#### Fatigue occurrence reporting

<XXXX> hazard reporting system includes fatigue occurrence reporting. If any of the following occur, a fatigue occurrence report (Form OR) must be submitted to the Chief Pilot (or delegated person):

* a pilot has not commenced an FDP (or an FDP has not been completed) due entirely, or in part, to fatigue. This includes when the FDP is completed but only after some additional mitigating action such as adding an extra crew member, reducing the workload of the duty, delaying the reporting time and creating the opportunity for an unscheduled inflight rest
* following an FDP if the FCM believes (upon reflection) that the level of fatigue they, or other crew members, were experiencing meant sufficient safety margins had not been maintained throughout the flight(s)
* when the FCM notices something in their operating environment that is likely to impact on their, or other crew members’, alertness to such an extent that safety margins could be reduced to unsatisfactory levels
* when an incident or event has occurred where fatigue may, or may not, have been a contributing safety factor. Additionally, an incident report form (Form ZZZ) will be submitted with the fatigue details completed including the pilot’s sleep history for the previous 72 hours. The incident report form (with fatigue related issues) and/or the fatigue occurrence report will be stored as part of the Flight and Duty Records or if confidential, stored appropriately by the Chief Pilot (or delegated person).

**Note:** Incident and accident reporting should also be contained in the operations manual and may refer explicitly to this section and vice versa.

#### Extensions reporting

All extensions or exceedances to FDPs or flight time limits require an extension report to be filled out (Form ER) and provided to the Chief Pilot (or delegated person). There should be sufficient detail to establish what happened and what the circumstances were that led to the extension or exceedance.

All extension reports will be stored for 5 years and made available to CASA upon request.

Extensions will also be considered in hazard identification and fatigue risk management meetings.

### Home base

The Chief Pilot (or delegated person) will advise all pilots of their designated home base. Any change to home base will be notified to the pilot at least 28 days in advance and will be assigned with a degree of permanence.

Any change to a pilot’s designated home base will trigger the requirement for 3 consecutive off-duty days commencing from the day the change becomes effective.

**Note:** The notification period and requirement for off duty days are examples of an approach that would meet the intent of CAO 48.1 section 14.10 (b).

### Accommodation

The Chief Pilot (or delegated person) is responsible for ensuring that pilots have access to suitable accommodation when away from base, on standby, or on split duty.

A pilot’s home or residence is taken to be suitable accommodation (i.e. it is the pilot’s responsibility to ensure their home meets the suitable resting or sleeping accommodation standard).

**Note:** The definition suitable sleeping accommodation (CAO 48.1 instrument 2019) provides the standards which to assess sleeping accommodation as being suitable.

The Chief Pilot (or delegated person) may assess three star (equivalent or higher) commercial motels or hotels against the standard remotely, unless specific information is obtained that indicates that this is not the case.

If the accommodation is within a commercial motel or hotel that has previously been used without any adverse reports, or if a pilot can attest to the suitability of the facility, then it is deemed suitable.

If a pilot finds any aspect of an accommodation unsuitable, they must advise the Chief Pilot (or delegated person) and submit a fatigue occurrence report (Form OR) ticking the ‘A general concern regarding fatigue’ box at the top of the form.

The Chief Pilot (or delegated person) will retain a list of assessed and suitable accommodation for the purposes of rostering and this will form part of the flight and duty records.

When a pilot is away from base, they should ensure the quality of their restorative sleep by as much as possible ensuring they will not be disturbed. If at a hotel, this can be facilitated by advising reception staff not to disturb (i.e. no phone messages unless very urgent), by putting the ‘do not disturb’ sign on the door and by ensuring mobile phones are on silent.

When rostering a split duty rest period at suitable resting accommodation (other than at the pilot’s home), the standards per the definition **suitable resting accommodation** (CAO 48.1 Instrument 2019) are used.

### Training

#### Training management

* Training includes a general fatigue knowledge component and a component that addresses <XXXX>’s specific fatigue management processes and procedures. A syllabus of topics for each is found below in Table 13 Fatigue training syllabus
* the Chief Pilot, any delegates assigned fatigue management responsibilities such as rostering, and each pilot, will complete <XXXX>’s specific fatigue management processes and procedures training before commencing authorisation, flying or rostering activities with <XXXX>
* the Chief Pilot and any delegates assigned fatigue management responsibilities such as rostering, and each pilot, will complete fatigue knowledge training as soon as possible after they commences with <XXXX> and may be delayed if necessary but in any case, no longer than 6 months from when they commenced with <XXXX>

**Note:** If fatigue training forms a part of an operations risk mitigation, the training must be completed prior to conducting those operations.

* if the pilot can show that they have conducted training in the fatigue knowledge component with another operator that conducts similar operations then while the date of that training remains within three years (the currency period), they do not need to complete the fatigue knowledge component of this training syllabus
* before commencing in the position, the Chief Pilot (or delegated person) will be familiar with the relevant sections of the operations manual, in particular Sections 1.1, 1.2, 1.2.3 & 2.2
* the elements of training that relate to the management of specific fatigue risk, that is, when that training forms a part of the risk management plan in the hazard and risk register, will be completed before the pilot is permitted to conduct the specific operations concerned
* at the completion of each training course each pilot or staff member must successfully complete an assessment and thereby satisfy the Chief Pilot (or delegated person) that he or she has sufficient fatigue knowledge, and understanding of <XXXX>’s specific fatigue management processes and procedures to meet their obligations under <XXXX>’s fatigue risk management policies, limits and procedures. A pass mark is 80%, with any errors discussed with the student and corrected by the facilitator. Any mark below 80% will require re-training and assessment.

**Note:** The fatigue knowledge training may be integrated into any HF/NTS training that the organisation conducts.

#### Training facilitation

Training will be facilitated by a staff member who has completed a minimum of the following:

* participated as a trainee in the <XXXX> fatigue training course and received an assessment of 80% or higher (with correction to 100% knowledge)
* facilitated an entire fatigue training course under the direct supervision of a <XXXX> staff member who meets the standard required to facilitate the fatigue training course (supervisor will be present during course delivery and provide feedback), or who developed the course.

**Note:** For the first course the facilitator shall have developed the training course.

#### Records

The training and assessment records as well as records of facilitator qualification will form part of the fatigue management records and be kept for the period that the pilot is with <XXXX> plus 1 year. Records of training and assessment should be copied and placed in each pilot’s file.

**Note:** Fatigue Training completion and recurrency training dates may need to be referenced in induction and recurrency checklists in the operations manual. Pilot records may also need a reference to Fatigue Training expiry date.

#### Fatigue knowledge training

There are three main subject areas which form the substance of the fatigue knowledge training program (fatigue, sleep and countermeasures) listed in sections 1 to 3 of the fatigue training syllabus.

#### Company specific procedures training

The training for <XXXX> specific procedures includes all topics as listed in section 4 of the fatigue training syllabus.

#### Recurrent fatigue training

Chief Pilot (or delegated person), each pilot and each rostering staff member will have recurrent training, both knowledge and company specific procedures, at intervals no longer than 3 years.

The recurrent training syllabus will revise previous fatigue topics (fatigue, sleep and countermeasures) as well as revision of company specific fatigue topics, especially any operations manual changes that have been promulgated solely by internal communication channels. This revision will be covered with a simple question and answer format.

The recurrent training syllabus should consider including knowledge and understanding captured in the fatigue hazard section and include de-identified scenarios from the reporting systems to both expand on the pilot’s knowledge and to raise awareness of Company specific hazards and mitigations.

**Note:** A further method could be to review adverse events from either the ATSB or NTSB data bases where fatigue was a known factor and examine current company management techniques that provide adequate defences to mitigate.

At the completion of each training course each pilot or staff member must successfully complete an assessment and thereby satisfy the Chief Pilot (or delegated person) that he or she has sufficient fatigue knowledge, and understanding of <XXXX>’s specific fatigue management processes and procedures to meet their obligations under <XXXX>’s fatigue risk management policies, limits and procedures. A pass mark is 80% will be corrected to 100% with the student. Any mark below 80% will require re-training and assessment.

**Notes:**

1. The recurrency training syllabus will need to follow the same format as that listed for the initial fatigue training syllabus.

2. The re-current training period is an example of a period that may meet the intent of CAO 48.1 subsection 15.6. The period should be based on the fatigue management needs of the operator.

Table 13 Fatigue training syllabus

| Fatigue training syllabus |  |
| --- | --- |
| Delivery Method:* Lecture and Facilitated Discussion

Assessment Methodology:* Facilitator assessment of appropriate level of engagement during sessions
* Multiple choice knowledge test.

(Any incorrect answers to be reviewed via facilitated discussion during post-test debrief)**Note:** Test should have sufficient questions to ensure participants have adequate understanding of all topics covered. Suggested pass rate is 80% | Training Materials:* Electronic Presentation Media
* Fatigue / Ops Manual
* White Board
* CAO 48.1
* CAAP 48-1
 |
| Fatigue knowledge | Notes |
| **1. Sleep****Duration: 1hr (1x 50 min session with 10 min break)** | **Note:** Suggested session timings only |
| 1.1 sleep physiology* Achieve an understanding of the physiological need for sleep:
* Describe the process of the build-up of ‘sleep pressure’ while awake
* Develop an awareness of average and individual minimum sleep needs
* Describe the normal sleep process:
* Achieve a basic understanding of sleep cycles and structure
* Develop an understanding of the need for quality sleep:
* Describe the impact of fragmented sleep on sleep quality.
 | Session 1 |
| 1.2 circadian body clock* Describe circadian rhythms:
* Develop an understanding of the biological rhythms that affect alertness and sleepiness
* Achieve an understanding of terms such as ‘Sleep gate’ and ‘Window of Circadian Low’
* Achieve an understanding of the impact of daylight on setting or resetting of circadian rhythms.
 | Session 1 |
| 1.3 sleep disorders * Develop an awareness of common disorders that may impact sleep quality or quantity including:
* Sleep apnoea
* Insomnia.
 | Session 1 |
| 1.4 sleep debt and recovery* Develop an understanding of how a sleep debt can occur:
* Describe link between repeated minor sleep loss and substantial sleep debt
* Describe how sleep debt must be repaid:
* Develop an awareness of the potential need for multiple nights of recovery sleep to regain optimum performance.
 | Session 2 |
| 1.5 shift work* Achieve an understanding of the impact of shift-work on sleep and performance:
* Describe how shift work can impact sleep quantity and quality
* Develop an understand of how shift work can result in working at times of circadian lows.
 | Session 2 |
| 1.6 jet lag* Achieve an understanding of how trans-meridian flight can disrupt circadian rhythms:
* Describe how international travel can leave an individual’s biological rhythms out of alignment with the local day (circadian dysrhythmia)
* Develop an awareness of the rate at which individuals adapt to time zone changes:
* Achieve an understanding of the potential effect of jet lag on performance before/while adapting.
 | Session 2**Note:** Optional, not generally required for flying operations however if pilots travel for simulator training or personal reasons it might be of value |
| **2. Fatigue****Duration: 1hr (1x 50 min sessions with 10 min break)** | **Note:** Suggested session timings only. |
| 2.1 Understanding fatigue* Define fatigue
* Achieve an understanding of the types of fatigue:
* Describe transient and cumulative fatigue.
 | Session 3 |
| 2.2 The causes and contributors to fatigue* Identify major factors affecting fatigue including:
* Time of day (circadian rhythm effects)
* Recent sleep quantity and quality
* Time awake
* Time on Task
* Nature of tasks
* Environmental conditions
* Hydration
* Fitness
* Food
 | Session 3 |
| 2.3 Signs and symptoms of fatigue* Identify the range of signs and symptoms associated with fatigue including:
* Physical
* Mental
* Emotional.
 | Session 3 |
| 2.4 The consequences of fatigue on safety* Understanding the impact of fatigue on the effective performance of tasks.
 | Session 4 |
| 2.5 High fatigue risk situations* Be aware of the areas of human performance most affected by fatigue:
* Develop knowledge of the type of tasks more sensitive to onset of fatigue related performance decrease.
* Develop an understanding of environments and times of the day where fatigue is more likely to occur or to develop more quickly.
 | Session 4 |
| 2.6 The contribution of fatigue in accidents* Appreciate the contribution of fatigue to incidents and accidents in the aviation environment:
* Review international and Australian case studies of fatigue related aviation incidents and accidents
 | Session 4 |
| 2.7 Recovery from FatigueUnderstand sleep is the only way to recover from fatigue:* Develop an understanding of the average time needed to recover from:
* Transient
* Cumulative fatigue.
 | Session 4 |
| **3. Countermeasures****Duration: 1hr (1x 50 min sessions with 10 min break)** | **Note:** Suggested session timings only |
| 3.1 tailoring the sleep environment* Describe setting up a bedroom or sleeping facility to aid in achieving quality sleep.
 | Session 5 |
| 3.2 managing sleep habits* Understand how to develop habits beneficial to quality sleep.
 | Session 5 |
| 3.3 napping* Describe the benefits of napping
* Develop an understanding of how napping can reduce the impact of fatigue during duties
* Describe effective napping techniques:
* Achieve an understanding of controlling napping duration to reduce sleep inertia
 | Session 5 |
| 3.4 exercise* Describe how exercise can assist in mitigating the impact of fatigue.
* Describe how increased fitness can improve individual resistance to the onset of fatigue.
 | Session 5 |
| 3.5 nutrition and hydration* Describe how appropriate nutrition and hydration can aid in mitigating fatigue.
* Develop an understanding of food types and nutrition strategies that maintain energy without causing undue drowsiness.
 | Session 5 |
| 3.6 caffeine* Describe the effect of caffeine on alertness.
* Develop an understanding of the benefits and limitations of the strategic use of caffeine to mitigate fatigue.
 | Session 6 |
| 3.7 avoidance of alcohol before bed * Be aware of the impact of alcohol on the quality of sleep:
* Develop an understanding of appropriate consumption of alcohol to limit the impact on sleep quality.
 | Session 6 |
| 3.8 use of sleep aids* Describe common prescription and over the counter sleeping pills and sedatives.
* Understand the use, limitations and risks associated with the use of sleep aids:
* Develop an understanding of the health and performance effects of sleeping pills and sedatives
* Describe the concept of clearance times associated with the use of sleep aids.
 | Session 6 |
| 3.9 avoidance of nicotine* Develop awareness that nicotine is a stimulant that may impact ability to sleep.
 | Session 6 |
| 3.10 keeping a sleep log* Discuss the limitations of informally tracking sleep quantity and quality:
* Develop an awareness of the potential for overestimating sleep.
* Discuss the use of a structured sleep log to accurately record sleep quantity and quality:
* Identify the structure and content of an appropriate log to aide recording of sleep information.
* Develop an appreciation of the benefits of a sleep log in identifying negative habits or repeated minor sleep deficits and in forming beneficial sleep habits.
 | Session 6 |
| **4. Company fatigue management procedures****Duration: 1hr (1x 50 min sessions with 10 min break)** | **Note:** Suggested session timings only |
| 4.1 Fatigue Risk Management Policies* Develop an understanding of organisational fatigue risk management policies appropriate for the individuals’ position and duties.
 | Session 7 |
| 4.2 Application of Flight and Duty Limits* Ensure an understanding of the application of organisational flight and duty time limits.
 | Session 7 |
| 4.3 Fatigue Management processes and Procedures* Develop a working understanding of organisational fatigue management procedures and processes (including proper use of forms).
 | Session 7 |
| 4.4 Extension policy and procedures* Understand the application of organisational policy and procedure for extensions (and exceedances).
 | Session 8 |
| 4.5 Flight Crew Members’ obligations* Develop an awareness of the pilot’s obligations regarding individual fatigue management.
 | Session 8 |
| 4.6 Rostering and recording system* Understand the use of the organisation’s rostering and recording system.
 | Session 8 |

### Fatigue hazard identification

<XXXX> will undertake fatigue hazard identification and management, to ensure that pilots can safely operate an aircraft or perform safety related duties and minimise any fatigue risk.

The fatigue hazard identification follows through three phases and will be an ongoing process. It will also be used to determine adjustments to prescriptive limits to suit <XXXX>’s operations and circumstances (which will not in any case exceed Appendix 2 limits). Any proposed operations will be subject to the fatigue hazard identification process before pilots will be permitted to conduct the operation. The process may also determine other controls that can be used to minimise fatigue risks.

<XXXX> will undertake the following hazard identification and risk management phases:

#### Initial hazard identification

<XXXX> will identify fatigue hazards that could potentially cause harm to the health and safety of people or damage to plant and equipment. <XXXX> will work with pilots and other staff to identify fatigue hazards that may occur within the following situations:

* work tasks & how performed (e.g. rostering practices, flying without an autopilot)
* physical work environment (e.g. hot weather conditions)
* use of equipment, material (e.g. NVG operations)
* work design and management (e.g. low level flying or limits for newly qualified pilots).

<XXXX> may use a number of methods to assist in the process of identifying fatigue hazards and these may include one or more of the following:

* pilot’s input from their experience of particular types of operations
* any fatigue problems brought to the attention of the Chief Pilot (or delegated person)
* information from Flight and Duty records, including fatigue reports, extension reports and any reported exceedances
* consulting with colleagues/discussion
* review of standards, procedures and systems (including observations)
* staff surveys or questionnaires (if conducted)
* external sources (such as industry specific knowledge sources and industry groups)
* details from external audits/safety assessments.

<XXXX> will take action to minimise or eliminate fatigue risk ‘as low as reasonably practicable’. Information gathered through this phase and the following two phases will be used to populate Table 14 (or an equivalent).

Column 1 in Table 14 details the hazards identified by the above steps. Any existing controls (such as legislation) will be entered into the table (column 2). This column will also include any other controls that could reasonably be considered as acting to manage the fatigue risk such as workload on the ground, the temperature, noise and vibration, hunger and hydration. Column 3 designates whether the hazard is still present and/or reduced.

Further risk management controls (especially limit adjustment) to manage the risk ‘as low as reasonably practicable’ will be found in column 4. It is important to consider any informal controls that are being used and consider whether they need to be made more formal (documented) as an additional control to ensure they are reliably applied. The information in column 4 should then be considered for adequacy and a decision made as to whether any limits such as those in in Section 1.2.3 Duty time, FDP, flight time and cumulative limits need to be adjusted. Column 5 designates whether the hazard remains and/or is further reduced with the mitigation(s).

To ensure monitoring and evaluation of the risk management procedures, a responsible person will be assigned for each entry and any further policy or practice considerations will be entered into column 6.

The major outcome of this initial phase is to identify hazards and recommend any mitigations required.

Incidents: <XXXX> will analyse reports received through the incident and/or fatigue occurrence or extension reporting systems for root causes (the ‘why’ of a situation).

The results of this analysis may identify new fatigue hazards or lead to amending existing fatigue risk mitigation.

These results must be entered into Table 14 (and may have a reference linking them back to the specific report).

(Refer Sections 1.2.14 Reporting and 2.1 Extensions).

Annual Review and Significant Change: At this time the fatigue management approach (including hazard identification and risk mitigation) is reviewed and amended where necessary. Refer to Section 1.1 Fatigue management policy.

<XXXX> will meet with all pilots and staff (or provide a way for their input into the process) every 12 months (at a minimum) and will discuss:

* a summary of fatigue reports including specific mention of more significant reports and all hazards identified and mitigation actions since the last review
* fatigue Risk Management controls – general review of adequacy
* review all limits (as defined in Section 1.2.3) as set by <XXXX> - review adequacy
* accommodation – any issues or required improvements
* extension Reports – review procedures and improvement recommendations that could be made
* communication Protocols – improvement recommendations
* hazard Identification process – review adequacy.

This review will also occur when there are significant operational changes including those affecting rostering, the introduction of new aircraft types, new operational areas or routes, new training methods or the introduction of new technology.

Records from the Fatigue Hazard Identification Phases and associated reviews will be kept with the flight and duty records (refer Section 1.2.13 Recording flight and duty times).

The table and analysis form part of the Flight and Duty Records

Table 14 Component of flight duty records

| Identified fatigued hazard (date recorded) | Existing controls | Hazard still present Yes/No/Diminished | Additional mitigations | Hazard still present Yes/No/Diminished | Responsible person and policies and practice considerations  |
| --- | --- | --- | --- | --- | --- |
| Insufficient or disrupted sleep prior to duty period | Report fatiguedFatigue training | Yes | Controlled restCaffeine | Diminished | Operations Manager to monitor fatigue reports. FCM survey to be conducted 6 months after the additional mitigations are introduced. |
| Extreme temperatures / humidity | Cockpit climate controlFatigue Training | Diminished | Rest intervals between sectors conducted in air-conditioned rest facilitiesEncourage regular hydration with electrolyte drinks | Diminished to acceptable levelsHazard for operations in high temperatures does not exist for operations between April and November (base specific) | Head of Maintenance to monitor levels of aircraft climate control unserviceability’s. |
| High Noise levels | Mandatory use headsets (Ops manual ref XXXX) | Diminished | Upgrade headsets to be noise cancelling | No – noise reduced to normal range | Chief Pilot – amend Ops manual policy |
| Flight within Instrument meteorological conditions (IMC) or at night. | CAR 217 training and checkingPart 61 IF recency requirements. | Diminished | Autopilot must be serviceable or two crewIncrease IF recency requirements to XX hours every XX days | Diminished to acceptable levels | Head of Maintenance to monitor levels of autopilot unserviceability’s.Chief Pilot to make system changes to monitor new recency recording |
| Automation not available. For example:No Autopilot | Appropriate training  | Diminished | Increased rest intervals between sectors.Reduce night flying to less than XXX per FDP | Diminished to acceptable levels | Head of Maintenance to monitor levels of autopilot unserviceability’s. |
| Consecutive WOCL duties causing fatigue | Limit of 3 Consecutive WOCL duties per 7 daysFatigue Training | Yes | Max Limit of 2 consecutive WOCL duties per 7 daysIncreased ODPControlled restCaffeineSleep monitoring | Diminished to acceptable levels | Operations Manager |

**Notes:**

1. The entries in the above are just examples to provide some explanation of what might be required to manage fatigue risk in the Operator’s operations. Any adjustment to a limit would need to be reflected in the appropriate place in the fatigue management limits and CASA notified of the change. Operators do not need to wait for a response from CASA before operating to the new limit. Operators can make such changes whenever they feel it is required as long as they do not exceed a limit in CAO 48.1 Instrument 2019 (in this case Appendix 2).

2. The Fatigue Risk Register should be referenced to in the Operations Manual however it should be kept separately so that it can be continuously updated. Organising the list so that the greatest risk is at the top of the register adds value to the register by making the register easier to interpret and read.

3. The hazard identification and mitigation process would be contained in the SMS for those operators operating within an SMS and this section should refer to the applicable section of the SMS.

4. For those without an SMS, CAAP 48-1 Appendix F provides examples and guidance in this area.

5. The table 14 may be captured and stored elsewhere and referred to in this manual so as to avoid the need to notify of minor updates.

### Flight and duty records

Flight and Duty Records include all details relevant to the rostering and fatigue management system and specifically include:

* rosters planned and achieved, and staff home base designation
* fatigue Occurrence Reports
* incident Reports that involve fatigue
* analysis or reports, actions and conclusion stemming from fatigue related investigations
* extension/exceedance reports
* notifications from pilots of unavailability due to fatigue (if not resulting in a Fatigue Occurrence Report)
* the results of annual review of the fatigue management system
* the results of Fatigue Hazard Identification and Mitigation reviews
* training and Assessment Records relating to the Fatigue Management System
* the list of suitable sleeping accommodation
* completed alertness consideration tables
* any other unique arrangements (e.g. prior sleep opportunity arrangement).

All Flight and Duty Records (including the rostering and recording system) will be backed up at least weekly and records (including electronic records) shall be kept for 5 years. Backups and archived records will be stored off site <at XXXX> to mitigate loss risk.

**Notes:**

1. This should be expanded to include company specific details on who, what, where, when and how records are kept. Items/processes such as backing up to the cloud, stored at facility x by admin etc. would be in here.

2. This section should be specifically referenced in the general section on record keeping/retention periods if appropriate.

# Conditions and processes for extensions to limitations

## Extensions

An FDP or flight time extension will only be authorised in unforeseen operational circumstances where other possible solutions to operational issues are unavailable.

Only the Chief Pilot (or delegated person/s), can authorise an extension to an FDP or flight time limit. To do so the Chief Pilot (or delegated person/s) will consider:

* increased operational risks including:
	+ impacts from increased sectors and/or workloads
	+ environmental factors including weather and temperature
	+ aircraft serviceability including MEL items (such as autopilot unserviceability)
* potential for ‘get-home-itis’ or some other, non-essential factor to be motivating the pilot to request the extension
* availability of assigning alternate pilots
* possibility of sortie cancellation or modification
* any patterns of extension
* future rostering or planning implications of the extension
* opportunities for duty rest.

An FDP can only be extended if:

* the pilot considers themselves fit for the extended FDP. They should undertake an alertness consideration review. Note: Where possible the pilot should discuss their fatigue level with a third party, who knows about the signs and symptoms of fatigue, before reaching a decision on their fitness for the extension
* the pilot has had sufficient time to consider their fatigue levels and agree to the extension
* the decision to extend is made and agreed prior to the last flight of the FDP
* the FDP is extended by no more than 1 hour (different limits apply to augmented crew operations)
* the flight time is extended by no more than 30 minutes
* cumulative flight or duty limits are not exceeded including infringements of the WOCL.

All decisions to extend must have been made prior to becoming airborne on the last flight of the FDP. No pilot will become airborne without an extension, knowing they cannot complete the flight, as planned, within the maximum FDP limit.

If unforeseen operational circumstances arise after take-off on the final flight of an FDP; and those circumstances would cause a pilot to exceed any flight and duty time limit then, the pilot can continue to the planned destination or alternate at their discretion as dictated by the safety of passengers and crew. In these circumstances, if limits are exceeded, it is called an exceedance and must be reported and recorded in the same manner as an extension.

An extension to an FDP that results in the pilot infringing the WOCL will result in that FDP counting as a WOCL infringing duty.

Extensions and exceedances require an Extension Report (Form ER) to be completed in accordance with the reporting provisions in Section 1.2.14 - Reporting, and must also be recorded in the hazard identification and mitigation system (refer also Section1.2.18 Fatigue hazard identification).

The report will also form part of the flight and duty records.

Extensions will be reviewed by the Chief Pilot (or delegated person) as part of <XXXX>'s continuous improvement system (refer also Section 1.2.18 Fatigue hazard identification) and the analysis will be stored as part of the flight and duty records.

**Notes:**

1. Reference should be made here to the operator's SMS if they have one.

2. The pilot in command may be the authorised delegate as long as the Chief Pilot is satisfied the pilot in command has sufficient training to make an informed decision and there is a formal process to support the pilot in command in making that decision—such as undertaking an alertness consideration review and/or consultation with a third party—if that is appropriate given the nature of the operation.

## Rostering in accordance with flight and duty time policy

The Chief Pilot (or delegated person) is responsible for preparing and publishing the roster. The roster will be planned on a 28-day basis and published 7 days before the beginning of the roster period. The roster will be amended and republished as quickly as possible if any changes are made. Any pilot affected by the changes will be notified in accordance with the communication protocol.

### Operations under multiple appendices

**Note: I**f not operating under multiple appendices this section should be removed.

Before a pilot is assigned an FDP where they must combine two different CAO 48.1 appendices within the one FDP the following applies:

* check that the pilot is within the cumulative duty and flight time limits for the new appendix
* the maximum FDP and flight time limits are those contained in the appendix under which the operation is being conducted at that particular time, the limits being determined based on the commencement of the FDP not on the time of commencement of operations under each appendix
* at any particular time in an FDP the pilot must remain within the cumulative duty and cumulative flight time limits for the appendix under which the operation is being conducted at that particular time
* to establish the minimum off-duty period that the pilot must be assigned following the FDP the minimum ODP is worked out as if the pilot worked the whole FDP under each appendix. The highest of these off-duty periods is then the minimum ODP and must be completed prior to commencing an FDP under any appendix.

Before a pilot is assigned an FDP under a different appendix the pilot will complete any off-duty period requirements resulting from conducting a previous FDP.

Before transferring from an aerial work appendix to any other appendix, the following requirement applies:

* the pilot must have had at least 6 days off-duty in the 28 consecutive days before commencing the FDP or standby.

Fatigue occurrence report (Form OR)





Figure 2 Fatigue occurrence report (form OR)

Alertness consideration table



Figure 3 Alertness consideration table (form ACTab)

* 1. Instructions for using the ACTab prior to duty

Q1. How alert are you feeling?

Question 1 involves the pilot rating their current alertness (ideally close to their report time) using one of the seven options on the alertness scale. The result falls into one of three bands of risk – Low, Moderate, or High.

If High Risk, the pilot must consider discussing this with other employees or the Chief Pilot (or delegated person) and may need to address the risk through applying previously defined risk control measures, such as extended rest periods or task rotation. If a decision is made to continue with the duty, proceed to Question 2.

Q2. Have you had adequate sleep?

Question 2 involves the pilot accruing points based on their sleep in the prior 24 hours, 48 hours, and hours wake at the end of the duty. The points sum to produce a final score, which is categorised in terms of risk as Low, Moderate, or High.

Note: 48 hours is used in this table, because the table focuses almost entirely on acute or transient fatigue and the assumption is that the pilot was well rested prior to this point. If the pilot has a longer period of disrupted or restricted sleep then they should consider that the cumulative fatigue associated with this, will increase the fatigue risk. An increased cumulative fatigue will increase the risk associated with subsequent, shorter than required, sleep periods identified in the table and pilots should put more weight on any symptoms (response to question 1) and take a more conservative approach to any heightened risk identified by using this table.

If the result is High Risk, the pilot must consider discussing this with other employees or the Chief Pilot (or delegated person) and may need to address the risk through applying previously defined risk control measures, such as extended rest periods or task rotation. If a decision is made to continue with the duty, proceed to Question 3.

Q3. What time does the duty occur?

Question 3 involves the pilot classifying their duty based on the time of day that the duty occurs. The result falls into one of three bands of risk – Low, Moderate, or High.

They then continue to Question 4.

Q4. What level of operational risk is associated with the duty?

Question 4 involves the pilot classifying the level of operational risk associated with the duty.

It is understood that the accumulation of fatigue will eventually diminish performance and increase error rate, to the point where the pilot becomes ‘fatigue impaired’, or simply too tired for the job intended. Aviation systems should be able to tolerate some human error and diminished performance capability, but very often task demands can increase, due to unforeseen circumstances. Consequently, what was previously acceptable in terms of an acceptable performance/error level, now becomes unacceptable.

Fatigue risk interacts with other areas of human performance, such as workload and task complexity and all of these risks need to be considered and if necessary, addressed.

For fatigue risk, pilots should consider what factors are associated with the tasks allocated to them prior to presenting as fit for duty. This is because it has been well researched that reduced alertness (or the accumulation of fatigue) impacts on ‘real world skills’. Pilots, other employees and the Chief Pilot (or delegated person) should consider fatigue risks that may be present in conjunction with other risks, such as the type of task being undertaken, the nature of the airspace, weather considerations, airport demands and aircraft serviceability.

Furthermore, all should recognise that tasks that involve cognitive performance (e.g. decision making, memory capacity) and threat and error management can potentially be poorly measured or mismanaged by a pilot who is fatigued.

Using ACT, the pilot continues to the final step, in order to assist their determination of whether they may have adequate alertness to undertake the duty.

Determine the fatigue risk level and what may need to be considered when determining whether to undertake this duty

Based on the results for Questions 1-4, the pilot can use the table provided to determine whether a fatigue risk may be present during this duty. Together with measured levels of alertness, pilots can begin discussing how to manage possible risks with the Chief Pilot (or delegated person) and subsequently develop an effective risk management plan.

Sleep requirements [user customisable]

Whilst it is easy to understand that adequate sleep is a prerequisite for an alert flight crew member, the notion of what adequate sleep consists of is subject to individual variability and this is further complicated by how easy it is to overestimate the amount and quality of sleep we actually get. As a general guide an individual who was previously well rested prior to the 48-hour window requires at least 6 hours sleep in 24 hours, and 13 hours in 48 hours.

An individual can develop section 2 of the ACTab Form to suit themselves. The blue highlighted numbers in section 2 can be individualised, and consequentially, the numbers to the left should be reduced by 1 hour from the number to its right. A good place to start is for an individual understanding how much sleep is needed to feel well rested. This may be ascertained after a day or two of waking normally (to dissipate any accumulated sleep debt). Once this figure is recognised, then a basis is formed for suggesting what reduction from this figure over a 24- and 48-hour period may lead to the risk rising until the accumulated sleep debt becomes too much. As a general guide, if starting from a well-rested state, less than 13 hours sleep in the last 48 hours and 6 in the last 24 hours should be considered significant.

It must be emphasised that the figures in this section of the tool can be tailored to account for individual needs.

Extension report (Form ER)



Figure 4 Extension report (form ER)

Acclimatisation

In order to determine maximum FDP limits, Flights crew members state of acclimatisation would need to be determined.

An extreme range of variables are involved in dealing with the Acclimatisation crew concept. CASA can’t deal with the complexity of these procedures within the confines of a generic Ops manual template. Instead, to deal with acclimatisation, the operator will need to develop or acquire a software solution that will achieve the obligations outlined below:

The operations manual must have procedures capable of determining whether the FCM is in an acclimatised state and, if so, where they are acclimatised to and, conversely, when they are in an unknown state of acclimatisation. These procedures must achieve the same outcome as that when using the table below.



Figure 5 Acclimatisation

* There must be procedures for determining the required adaption period for an FCM who is in an unknown state of acclimatisation. The adaptation periods are specified in Table 7.1 of CAO 48.1.
* The limits in the operations manual must not exceed the FDP limits for acclimatised FCMs (CAO 48.1, Appendix 2, Table 2.1) and FCMs in an unknown state of acclimatisation (CAO 48.1, Appendix 2, Table 3.1). These limits are highlighted in the tables below

Table 15 Maximum FDP for an FCM in an unknown state of acclimatisation according to number of sectors and duration of the off-duty period immediately before the FDP

| **Duration of the off-duty period immediately before the FDP** | **Maximum FDP hours according to sectors flown** |
| --- | --- |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 1-3 | 4 | 5 | 6 | 7 | 8+ |
| **Less than 30 hours** | 10  | 9.5  | 9  | 8.5  | 8  | 7.5  |
| **30 hours or more**  | 12 | 11.5 | 11  | 10.5  | 10  | 9.5 |

Table 16 Adaption period to become acclimatised

| Time zone change (measured in time zones) | Adaption period to become acclimatised to new location (hours) |
| --- | --- |

| Note: See definition of time zone | West | East |
| --- | --- | --- |
| 2 | 24 | 30 |
| 3 | 36 | 45 |
| 4 | 48 | 60 |
| 5 | 48 | 60 |
| 6 | 48 | 60 |
| 7 | 72 | 90 |
| 8 | 72 | 90 |
| 9 | 72 | 90 |
| 10 or more | 96 | 120 |

**Notes:**

1. Adaptation period means a continuous off-duty period for an FCM to become acclimatised to a particular location

2. An adaptation period under paragraph 7.4 may commence before the time when an FCM comes to be in an unknown state of acclimatisation.

For guidance in determining acclimatisation, including examples of how an FCM becomes reacclimatised in accordance with paragraph 7.4, AOC holders and FCMs should refer to CAAP 48-01.