and error management (TEM)

Part 135 Day VFR Alternative FDT Scheme Example



## Rationale

The CAA acknowledges the contribution made by Aviation New Zealand and the New Zealand Air Line Pilots' Association in developing the following alternative scheme as an example for Part 119 air operators conducting Part 135 day VFR operations.

This FDT scheme has been reviewed by the Sleep Wake Research Centre (SWRC) at Massey University and found to be scientifically acceptable. We anticipate that a number of operators will find this example practical and useable, and helpful in reducing the cost of developing their own FDT scheme.

The purpose of this scientifically endorsed example is to provide operators with clarity on what is expected within an FDT scheme for Part 135 day VFR operations. The aim being to help operators identify the areas that they need to focus on when developing a suitable scheme.

The Part 135 day VFR alternative FDT scheme is designed to form an integral part of an organisation’s Safety Management System (SMS) and consideration must be given to how it will be integrated into the organisation’s unique operational environment.

All FDT schemes are subject to final CAA regulatory approval. This example is only applicable for operations within the NZ domestic FIR. Operations outside this area require separate regulatory approval.

If an operator wishes to make amendments to the scheme, the amended scheme will need to be submitted to SWRC or another fatigue management expert for scientific endorsement prior to regulatory approval. A report from the fatigue management expert along with the amended scheme should be submitted for CAA regulatory approval.

To assist the scientific assessment and to ensure that costs are kept to a minimum it is important that any proposed amendments are shown using track changes. It is also important to provide the justification for the changes.

**This section does not form part of the scheme and is for explanation of the purpose and process to be followed by operators.**

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## Alternative Flight and Duty Time (FDT) scheme for Part 135 day VFR operations within the New Zealand domestic FIR

1. **INTRODUCTION**

**1.1 Purpose and Scope**

The purpose of this scheme is to ensure [insert name of company’s] meets all the requirements of the Civil Aviation Act 1990 and the relevant Rules, as they apply to the regulation of flight times and the avoidance of fatigue in crew members. This scheme is limited to Day VFR operations conducted under CAR Part 135 and covers all flight operations from [insert name of company’s] bases conducted within the New Zealand Domestic Flight Information Region (NZFIR).

**1.2 Aim**

The aim of this scheme is to ensure that fatigue arising during flight duty periods and duty periods is managed appropriately, and that the off-duty periods provided ensure crew members are adequately rested prior to the beginning of each flight duty period or duty period. Accordingly, roster construction will take account of the length of duty periods, time free from duty and cumulative duty periods in attempting to maintain a balanced workload amongst crew members

**1.3 Applicability, Interpretation and Compliance**

The scheme applies to all duties carried out at the behest of the company. It is to be read and interpreted in accordance with the definitions provided in Section 17.

The scheme is applicable to crewmembers who are acclimatised to New Zealand local time and to operations conducted solely under day VFR rules within the New Zealand domestic FIR. This scheme shall be complied with by crewmembers and management personnel responsible for scheme administration.

In this scheme wherever the words “shall”, “must”, or “will” are used the requirements are mandatory. The use of the words “should” or “may” indicates industry best practice that are recommendations that are strongly encouraged, but not mandatory.

**1.4 Responsibilities**

1. This scheme [forms / will form] part of the SMS and as such [falls / will fall] under the responsibility of the CEO.
2. This scheme will be administered by the [insert position of CAA approved responsible Senior Person]. The [insert position of responsible person]is responsible for managing the scheme, including: managing and mitigating identified fatigue hazards, development of the ongoing roster, investigating and administering all fatigue-related reports submitted by crew members, maintenance of required records and reporting deviations from the scheme to CAA as applicable under Section 13A of the Civil Aviation Act 1990 (the Act). Additionally, the [insert position of responsible person] is responsible for the initial and recurrent fatigue education of crewmembers and maintaining records of fatigue education received.
3. The company will assign and maintain a record of each crew member’s designated home base.
4. The company will publish rosters sufficiently in advance so that operating crew know their planned work periods and time free from duty and can plan for adequate pre-duty rest. Crew members will normally be given at least [insert number of days] days’ notice of days off. The roster will be prepared in consultation with and issued to all crew members at least seven days before the start of each roster period.
5. Responsibility for the management of fatigue does not rest wholly with the company. The company acknowledges its responsibilities specified in CAR 135.803 (b) and (c); in particular that a flight crew member must not be permitted or caused to perform an air operation if there is reason to believe that the flight crew member may be suffering from or considering the circumstances of the flight to be undertaken is likely to suffer from fatigue that may endanger the safety of the aircraft or its occupants. Flight crew responsibilities are specified in CAR 135.805. In particular flight crew must be aware of their responsibilities under CAR 135.805 (a) if they are suffering from, or, given the circumstances of the flight to be undertaken, likely to suffer from fatigue that may endanger the safety of the aircraft or its occupants. Flight crew shall not act as operating crew unless they are fit for duty. If they know, or suspect, that their physical or mental condition renders them unfit to operate they must declare this to the [insert position of Responsible Person] so that alternative arrangements can be made. Furthermore, they must not fly if they know that they are or are likely to be in breach of this scheme.

Additionally, crew members are responsible for:

* complying with the requirements of this scheme.
* taking advantage of sleep and rest opportunities provided to achieve required restorative sleep or rest, so they are sufficiently alert for subsequent flight duties.
* reporting fatigue-related occurrences that have led or could have led to a reduction in safety margins if some additional mitigating action had not been taken.
* notifying the [insert position of Responsible Person] of any personal situation that because of its nature, duration, effects or for any other reason, might impact on the crewmember’s ability to meet the company’s fatigue risk management obligations. This could include notification of factors such as secondary employment, living a long distance from base, travelling a long distance to report for duty etc.

1. CAR 135.805 (b) requires that “a flight crew member shall not perform other hire or reward flight duties while employed, engaged, or contracted by an air operator when such duties in addition to such duties and flying in addition to that in air operations will exceed the flight and duty time limitations prescribed in the scheme” approved for [insert name of company]. Pilots performing hire and reward operations for other operators must provide all relevant details of such other hire and reward duties and flying, duty periods, rostered days off and cumulative flight and duty time to the [insert name of responsible person] to ensure rosters are built in compliance with the requirements of this scheme.
2. **OFF-DUTY PERIODS AND DAYS OFF**
   1. A crewmember will not be assigned or commence a flight duty period (FDP) or standby duty unless the crewmember has had at least 8 consecutive hours’ sleep opportunity uninterrupted by any requirement of the company. Contact with crewmembers between the hours of 2200 and 0600 hours should be avoided except for emergency situations.
   2. A crewmember cannot be assigned or report for a FDP, duty period or standby until the crewmember receives an off-duty period as specified below. Except as provided in 2.3, 2.4, 2.5 and 2.6 below, a crewmember’s off-duty period will be at least 10 hours (the minimum off-duty period). When a crewmember is rostered to report for a duty at home base prior to 0600 local time the off-duty period immediately preceding such duty shall be increased to 12 hours.
   3. At home base when the FDP or duty period is 12 hours or longer the minimum off-duty period shall be at least 12 hours
   4. If Pilot-in-command’s discretion is exercised, then the off-duty period following that FDP must be increased in accordance with the provisions of Section 8.3
   5. At least once in any 7 consecutive day period a crewmember shall be provided a single day off free from all duties.
   6. At least once in any 14 consecutive day period a crewmember shall be provided 2 consecutive days free of all duties to include 2 local nights.
3. **FLIGHT DUTY PERIOD (FDP) AND FLIGHT TIME LIMITATIONS**
4. The standard reporting time prior to flight is [insert number of minutes] minutes. Pre-flight duties are part of the FDP; 30 minutes duty must be allowed for post-flight activities, which are also included as part of the FDP
5. A Crewmember must not be assigned an FDP longer than the number of hours specified in Table 1 below (the FDP limit), as determined by the start time of the FDP.

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| **Table 1:** Maximum Flight Duty Period – All flights conducted under Day VFR   |  |  |  | | --- | --- | --- | | **Local time of report for duty** | **Maximum length of Flight Duty Period (hours).**  Refer Section 8 for specific requirements applicable to use of discretion in unforeseen circumstances | **Single Pilot**  **Maximum Flight Time (hours) within a single FDP** | | **04:30-04-59** | **10** | 8 | | **05:00-05:59** | **11** | 8 | | **06:00-06:59** | **12** | 8 | | **07:00-09:59** | **13 (refer note 1)** | 8 | | **10:00-or later** | **12** | 8 |   **Notes:**  1. Where report for duty is between 0700 and 0959 a crew member may be assigned a flight duty period up to a maximum of 13 hours provided the crew member has an off-duty period of at least 12 hours immediately prior to reporting for such an assigned duty.  2. A duty period, as opposed to a FDP, may be up to 14 hours, however, once a crewmember’s duty period is 12 hours or longer a 12 hour off duty period after that duty period is required as specified in paragraph 2.3 |

1. A flight crew member shall not be assigned, nor shall a flight crew member accept such assignment, if the members total flight time will, as a result, in the case of a single-pilot operation exceed 8 hours within any flight duty period.
2. When a flight crew member flies in a simulator, either on a check or training flight, or as an Instructor, and then within the same duty period flies as a flight crew member, all the time spent in the simulator is counted in full towards the subsequent FDP and daily flying hour maxima. The FDP allowable is calculated from the report time of the simulator detail.
3. **EXTENSION OF FLIGHT DUTY PERIOD BY USE OF SPLIT DUTY**
4. A flight crew member’s flight duty period may exceed the maximum flight duty period set out in Section 3.2 by 50 % of the duration of the break provided to the crewmember. The break must be taken in suitable accommodation; and
5. The assigned split duty period is notified in advance (at a minimum prior to the off-duty period immediately preceding the split duty assignment) and is not an early start duty; and
6. The break in suitable accommodation is at least 3 hours in duration and includes the period 1400-1500 local time; and
7. The FDP as extended by split duty including any discretionary extension of FDP exercised under Section 8 is limited to a maximum of 14 hours.
8. **MEAL BREAK**
   1. During any duty period exceeding 4 hours crewmembers shall have a rostered meal period on the ground of not less than 30 minutes free of duty. Provision shall be made for such a meal period within the first 5 hours of a duty period and thereafter at intervals of not more than 4 hours from the completion of the previous meal period. A meal break required under this provision may be included during the period of the break in suitable accommodation when split duty periods are assigned in accordance with the provisions of Section 4.
9. **DELAYED REPORTING TIME** 
   1. A crewmember’s reporting time may be delayed in the event of unforeseen circumstances, but it is important to minimise disturbance to the crewmember’s sleep.
   2. When a crewmember is notified of a delayed reporting time in accordance with company specified procedures, the FDP is calculated as follows:
      1. The maximum FDP is calculated based on the more limiting of the original or the delayed reporting time and the FDP starts counting at the delayed reporting time.
      2. If more than one delay is notified, then the FDP starts counting 1 hour after the second notification or at the original delayed reporting time if this is earlier.
      3. When the company informs the crewmember of a delay of 10 hours or more in reporting time and the crewmember is not further disturbed by the company, the delay counts as an off-duty period.
10. **CANCELLATIONS** 
    1. If a crewmember is notified by the company that a flight will not occur (cancellation), then the company may reschedule the crewmember to work within the rostered duty period.
    2. Whether or not the crewmember is rescheduled to work within the rostered FDP or duty period, the subsequent off-duty period must remain as originally scheduled.
11. **DISCRETION IN UNFORESEEN CIRCUMSTANCES (PILOT IN COMMAND)**
12. Extension of Flight Duty Period (FDPs)

Discretionary extension of a flight duty period beyond the applicable maximum values specified in 3.2 table 1 is only permitted in unforeseen operational circumstances. Before exercising this discretion, the pilot in command shall be satisfied that all crewmembers required to operate the aircraft consider themselves to be fit to undertake the extended FDP. The following limits apply:

8.1.1. The FDP specified in Table 1 to section 3.2 may only be extended by a maximum of one hour, and shall be calculated according to what happens, not what was planned to happen.

8.1.2. An extension of FDP is not permissible if it causes a crewmember to exceed the cumulative flight time limits in Section 13 or the cumulative duty time limits in Section 14.

8.1.3. In all cases where the pilot in command intends to extend a FDP he/she shall whenever possible confirm this use of his/her discretion with the [insert title/ position of appropriate responsible person].

*Under Section 13 of the Civil Aviation Act 1990, the pilot in command of an aircraft is responsible for the safe operation of the aircraft in flight, the safety and well-being of all passengers and crew, and therefore has discretion not to permit an extension to occur even though allowed under Section 8.1.1*

* 1. Reduction of FDP and/or Increase in Off-Duty Period

In case of unforeseen circumstances that could lead to severe fatigue, the pilot in command shall reduce the actual flight duty period and/or increase the off-duty period in order to eliminate any detrimental effect on flight safety.

* 1. Whenever a pilot-in-command extends an FDP under the provisions of section 8.1 the subsequent off-duty period must be increased by the amount of the extension. All discretionary extensions shall be reported to the [insert title/position of responsible person]and a record maintained of all extended FDPs.

1. **STANDBY**
2. All standby shall be rostered and the start and end time of standby shall be defined. Changes to rostered periods of standby during the active roster should be notified at a minimum prior to the commencement of the off-duty period immediately preceding the rostered change, to provide the opportunity to obtain adequate sleep.
3. Standby must be preceded by an off-duty period in accordance with the requirements in Section 2. The limits in Section 2.1 and 2.2 apply.
4. Airport standby:
5. The maximum duration of standby and FDP is determined by the reporting time at the airport according to the applicable limits in Section 3 Table 1.

The company shall provide accommodation to the crewmember on airport standby, i.e., a quiet and comfortable place not open to the public with the ability to control light and temperature, equipped with adequate furniture that provides a crewmember with the opportunity to sleep, with enough capacity to accommodate all crewmembers present at the same time, and with access to food and drink.

1. The time spent on airport standby counts in full for cumulative duty limits in Section 14.
2. Standby other than airport standby (i.e. at home or company provided suitable accommodation):
3. The maximum standby period shall not exceed 14 hours.
4. At the end of a standby period a minimum off-duty period of 10 hours at the place of rest shall be provided.
5. The total time a crewmember may spend on standby and flight duty period in event of callout, is limited to the flight duty period specified in Section 3 Table 1 plus four hours, or 16 hours whichever is less.
6. **POSITIONING**
   1. If a crewmember is required to be positioned by surface or air transport, the following shall apply:
      1. Positioning after reporting but prior to operating shall be counted as FDP.
      2. Positioning after operating counts as duty but does not count as FDP.
      3. All time spent positioning counts in full towards the cumulative duty time limits in Section 14.

Note: When crew members are required to travel from their home to an operating location other than from where they normally operate, any travelling time from their home exceeding 30 minutes shall be classed as positioning.

1. **LIMITS ON CONSECUTIVE FDPS WITH HIGHER FATIGUE RISK**

Sleep deprivation, leading to the onset of fatigue, can arise when a crewmember is required to report early for duty on a number of consecutive days. Therefore, not more than 3 consecutive duties with report time for duty prior to 0700 may be undertaken, nor may there be more than 4 such duties in any 7 consecutive days. The off-duty period immediately subsequent to the third consecutive early start must include a local night.

**11.2** Where a crew member’s travel time from place of off-duty rest to place of reporting for duty is assured of being less than 30 minutes, then an early start duty may be defined as a duty with a report time for duty prior to 0630 with the provisions of 11.1 being applicable for early starts with report for duty prior to 0630.

1. **ADDITIONAL LIMITS ON HELICOPTER FLYING**
2. **Repetitive Short Sectors**
   * 1. Crew flying repetitive short sectors, e.g. for tourist flights, heliskiing short sector shuttles, at an average rate of 10 or more landings per hour, shall have a break of at least 30 minutes away from the helicopter within any continuous period of four (4) hours.
     2. When carrying out the more demanding roles of helicopter flying, for example, winching, crew shall have a break of 30 minutes away from the helicopter within any continuous period of four (4) hours.
   1. **Survival Suits**

12.2.1 The wearing of survival suits can prove an irritant and be uncomfortable. Therefore:

1. a flight crew member should not participate in moving freight or baggage, or any other activity requiring excessive physical effort. Their role should be supervisory;
2. schedules which involve continuous flying in excess of four and a half (4½) hours shall include provisions for a break free of all duty of at least 30 minutes, not including a total of 30 minutes for immediate post and pre-flight duties. The break shall be scheduled prior to exceeding a total of six (6) hours flying.
3. **LIMITS ON CUMULATIVE FLIGHT TIME**
4. A flight crew member shall not be assigned, and a flight crew member shall not accept such assignment, if the members total flight time, will as a result, exceed:
5. 100 hours in any consecutive 28 days;
6. 300 hours in any consecutive 90 days;
7. 1,000 hours in any consecutive 365 days or 12 consecutive month period (state which applies); and
8. In the case of single-pilot operation, 8 hours within any flight duty period.
9. **CUMULATIVE DUTY TIME: CALCULATION AND LIMITS**
10. Duty hours shall be added to cumulative totals in accordance with the following:

To count in full:

1. Duty periods and flight duty periods, plus subsequent post-flight duties
2. The time spent on positioning
3. The cumulative duty accrued by a Crewmember during any consecutive 7-day period must not exceed 60 hours.
4. The cumulative duty accrued by a Crewmember during any consecutive 14-day period must not exceed 110 hours.
5. The cumulative duty accrued by a Crewmember during any consecutive 28-day period must not exceed 190 hours
6. **RECORDS TO BE MAINTAINED**
7. Records for the duty and off-duty periods of all crewmembers shall include:
8. The beginning, end and duration of each duty period (including standby duty when applicable) and FDP;
9. Dates of days off; and
10. Cumulative duty time totals for each period
11. For each flight crew member records shall be maintained for daily and periodic flight time totals. A crewmember’s total flight time includes ALL flight time conducted for hire and reward (and private flying) accumulated in New Zealand or elsewhere.
12. A record of crewmember fatigue management training will be maintained.
13. Records required under Sections 15.1 and 15.2 are to be retained for a minimum period of twenty-four months from the date on which the duty or flight took place.
14. [Operators are to specify in their scheme how and where these records are kept].
15. **EDUCATION AND TRAINING**
16. Education and training on the effects of fatigue and how it can be managed (to include sleep, the circadian biological clock, the consequences of sleep loss and recovery, the influence of workload and the way these factors interact with operational demands) are essential to understanding and managing fatigue risk inherent in shift work.
17. To ensure crewmembers are knowledgeable regarding the effects of fatigue and how it can be mitigated and managed, all crewmembers will complete initial and biennial fatigue management training. Topics will include as appropriate: crewmember responsibilities; causes and consequences of fatigue in the operation(s) in which they work; reporting fatigue hazards; how to identify fatigue in themselves and others; personal strategies that they can use to improve their sleep at home and to minimize their own fatigue risk, and that of others, while they are on duty; basic information on sleep disorders and their treatment, where to seek help if needed, and any requirements relating to fitness to fly.

[Operators to specify who is responsible for the oversight of such training, how the training will be delivered (e.g. classroom / computer-based training / outsourced) and the qualifications or specific training provided to those delivering the training]

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1. **DEFINITIONS**

***Note:*** *These definitions have been designed to assist the development of FDT schemes but must be read alongside the Civil Aviation Rule Part 1 definitions which take primacy.*

**Aircraft** means any machine that can derive support in the atmosphere from the reactions of the air otherwise than by the reactions of the air against the surface of the earth.

**Airport standby** means standby when a flight crew member is required by the operator to be at a designated location, usually at an aerodrome.

**Break** means a period of time on the ground, shorter than a rest period, when the flight crew is free of all duties.

**Crewmember** means a person assigned by an operator to duty on an aircraft during a flight duty period.

**Cumulative duty**means the progressive sum of duty periods.

**Cumulative flight time**means the progressive sum of flight time, excluding flight time accrued during recreational private operations.

**Days Off** means periods available for leisure and relaxation free from all duties. A single day off shall include 2 local nights. An off-duty period may be included as part of a day off.

**Duty** means any task that a crewmember performs as required by the operator, including but not limited to flight duty period, flight duty, pre- and post-flight duties, administrative work, training, positioning, aircraft positioning on the ground, aircraft loading, and aircraft servicing.

**Duty period** means any continuous period throughout which a flight crew member is required by an operator to be on duty or available for duty, whether on the ground or in the air.

*Where a flight crew member is required by an operator to be on duty or available for duty for two or more periods separated by an interval of less than 10 hours, the periods shall be deemed continuous, starting when the first of the periods begins and finishing when the last period ends. See Also Split Duty.*

**Early Start Duty** means a duty that commences in the period 0500 to 0659 hours local time.

*The definition of any early start may be amended to mean a duty that commences in the period 0500 to 0629 but only if the travel time from the place of a crew member’s off duty rest to the place of reporting for duty is assured of being less than 30 minutes.*

**Fatigue** means a physiological state of reduced mental or physical performance capability resulting from sleep loss, extended wakefulness, circadian phase, and/or workload (mental and/or physical activity) that can impair a person’s alertness and ability to perform safety-related operational duties

**Fit for Duty** means in respect of a person means that their ability to act as a crewmember of an aircraft is not impaired by fatigue the consumption of alcohol or drugs or any mental or physical condition

**Flight crewmember** means a crewmember assigned by an operator for duty in an aircraft during flight time as a pilot

**Flight duty period (‘FDP’)** means a period that commences when a crewmember is required to report for duty, which includes a sector or a series of sectors, and finishes when the aircraft finally comes to rest and the engines are shut down plus 30 minutes post flight duty, at the end of the last sector on which the crewmember acts as an operating crew member

*A flight duty period includes the duties performed by the flight crewmember on behalf of the operator that occur before a flight segment or between flight segments without a required intervening off-duty period. Examples of tasks that are part of the flight duty period include administrative duties, positioning, training conducted in an aircraft or flight simulator, and airport standby, if the above tasks occur before a flight segment or between flight segments without an intervening required off-duty period*.

**Flight time** means the total time from the moment an aircraft first moves for the purpose of flight until the moment it comes to rest at the end of the flight including all associated push back, taxiing and subsequent holding time

**Flight time – helicopters (1)** The total time from the moment a helicopter’s rotor blades start turning until the moment the helicopter finally comes to rest at the end of the flight, and the rotor blades are stopped OR

**Flight time – helicopters (2)** The total time from the moment a helicopter’s landing gear breaks contact with the ground until the final landing for that flight segment.

***Note: Helicopter operators may choose one of the definitions above as is applicable to their operations.***

**Home base** means the location, assigned by the operator to the crew member, from where the crew member normally starts and ends a duty period or series of duty periods and where, under normal circumstances, the operator is not responsible for the accommodation of the crew member concerned.

**Local Night** means a period of 8 hours falling between 2200 hours and 0800 hours local time.

**Off-duty period** means a period of time during which a crewmember is free of all duties and standby associated with his or her employment.

**Pilot-in-command** In relation to any aircraft, means the pilot responsible for the operation and safety of the aircraft.

**Positioning** means the practice of transferring crew from place to place as passengers in surface or air transport at the behest of the company.

**Reporting Time** meansthe time at which a crew member is required by the company to report for any duty.

**Roster** means a list of planned shifts or work periods within a defined period of time.

**Safety Management System (SMS)**means a systematic approach to managing safety, including the necessary organisational structures, accountabilities, policies, and procedures.

**Sector** means the segment of an FDP between an aircraft first moving for the purpose of taking off until it comes to rest after landing on the designated parking position.

**Sleep opportunity**means a period of time during an off-duty period when a Crewmember:

* is not meeting the reasonable requirements of bodily functioning such as eating, drinking, toileting, washing and dressing; and
* has access to suitable accommodation without, under normal circumstances, being interrupted by any requirement of the operator.

**Split-Duty** means a flight duty period, which consists of two duties separated by a break on the ground during which the crew member is relieved of all duty but is of a lesser period than the minimum required off-duty period.

**Standby Duty** means a period during which a company places restraint on a crew member who would otherwise be off duty. However, it shall not include any time during which the crew member is contactable for the purpose of giving notification of a duty which is due to start 10 hours or more ahead.

**Suitable Accommodation** means a well-equipped sleeping facility which is subject to minimum noise, is well ventilated, in which it is possible to easily control the levels of light and temperature.

*A person’s home or residence is considered to meet the requirements of suitable accommodation.*

**Unforeseen Operational Circumstance** meansan unplanned event that becomes evident after the commencement of the FDP such as unforecast weather, equipment malfunction, or air traffic delay which may result in necessary on-the-day operational adjustments.