



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
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January 3, 2018

Attachment 18 – Canadian Aviation Regulations Advisory Council on Flight Crew Fatigue Management

OPERATIONAL FACTORS/HUMAN PERFORMANCE

DCA17IA148



Date: September 15, 2014

CANADIAN AVIATION REGULATION ADVISORY COUNCIL (CARAC) NOTICE OF PROPOSED AMENDMENT (NPA): FLIGHT CREW FATIGUE MANAGEMENT

EXECUTIVE SUMMARY

- Transport Canada (TC) is proposing to enhance safety within flight operations by amending the current limitations associated with flight duty for flight crew members (pilots and flight engineers). The current limitations are not supported by today's fatigue science and are not meeting the International Civil Aviation Organization (ICAO)'s Standards and Recommended Practices (SARPs).
- These changes are expected to reduce flight crew member fatigue related error and accident rates and thus enhance safety.

BACKGROUND

- TC's current flight time and flight duty time limitations and rest periods (FDT) requirements were published in 1996. The requirements are based on an agreement made by the Commercial Air Service Operations Working Group in 1994. Since then, the ICAO has amended Annex 6 to the Convention on International Civil Aviation to include a series of Standards for fatigue management requirements. The new ICAO Standards required TC to review the current FDT requirements to determine if they reflected the latest fatigue science.
- To complete this review, the Flight Crew Fatigue Management Working Group was formed. The working group was made up of stakeholder representatives and over the course of 18 months met approximately for 43 days. The result of these meetings was the [Report of The Canadian Aviation Regulation Advisory Council \(CARAC\) Flight Crew Fatigue Management Working Group](#), dated 15 August 2012. The Report found that many of the elements of the current FDT requirements do not reflect today's fatigue science and included recommendations to correct these deficiencies.
- The Report recommends many changes to the current FDT requirements. These changes are supported by today's fatigue science and are harmonized with changes introduced by the Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA).

STATEMENT OF THE PROBLEM AND POLICY CONSIDERATIONS

- A review and analysis of the scientific literature demonstrates that the current FDT requirements:
 - permit daily duty periods that are too long;
 - permit rest periods that are too short;
 - do not consider human physiology (the window of circadian low); and
 - do not consider the effect of cumulative fatigue.
- Some of the Subpart 705 air operators already address many of the short comings in the current FDT requirements through their labour agreements and good risk management. Others operate to the



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limitations of current FDT requirements. The effect on Subpart 705 will be minimal.

- The effect on the Subpart 704 operators will be more pronounced and may be impacted by whether or not they also hold additional operating certificates.
- The effect on Subparts 703 and 702 operators will be significant. The current FDT requirements for these groups are significantly less restrictive than for Subparts 704 and 705. Adjustments to operating schedules may be required.
- An important statistic to be aware of is that in the period of 1 January 2002 to 5 July 2012, accidents involving aircraft operating under CARs subpart 704 (commuter operations), 702 (aerial work) and 703 (air taxi operations) together accounted for 94% of all commercial air accidents and 95% of commercial air fatalities.¹ A majority of these accidents have human performance related cause factors (i.e.: judgement or decision making). It is a fact that human performance is impaired by fatigue. This is not to say that all of these human performance related accidents are caused by fatigue, but it is a reasonable assumption to assume that fatigue is a contributing factor. A 90 hour work week or multiple consecutive 90 hour work weeks are not acceptable given the current fatigue science. A closer look at many of the aviation accidents in the past five years shows that in 70-90% of these events – pilot decision making played a role. When a pilot is fatigued decision making is also affected and is therefore a contributing cause to aviation accidents.
- It should also be noted that this proposed change brings Canada in line with other civil aviation authorities, however, it does not establish global standard for fatigue management. Many other countries have far more restrictive FDT requirements. Please see table 1 below.

ANALYSIS SUMMARY

The references for the fatigue science used below may be found in the [Report of The Canadian Aviation Regulation Advisory Council \(CARAC\) Flight Crew Fatigue Management Working Group](#), dated August 15, 2012.

Following the introduction of the ICAO Standard for fatigue management in 2009, TC realized that a thorough review of the current CAR requirements was required. In order to accomplish this review the Flight Crew Fatigue Management Working Group was established. One of the first tasks of the Working Group was to hire a fatigue scientist to guide their deliberations. The Working Group hired Dr. Gregory Belenky a leading sleep

¹ Transportation Safety Board of Canada, Aviation Investigation Report A11W0048



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scientist from the Sleep and Performance Research Center at Washington State University in Spokane. Dr. Belenky provided the Working Group members with a baseline level of knowledge concerning fatigue science and was able to answer questions as the Working Group deliberated.

The Working Group also sought input from other regulatory authorities (Civil Aviation Safety Authority (CASA) – Australia), the FAA and EASA), as well as air operators and bio-mathematical modelling specialists. A complete list of participants is available in the Working Group Report.

The following are examples of how the current FDT requirements are not supported by the available science:

Flight Duty – Length of Basic Flight Duty Period (FDP): The current regulations allow for a daily 14 hour flight duty period at any time of day. The science suggests a maximum FDP of 12 hours would be effective in managing flight crew fatigue. A maximum FDP of 12 hours provides sufficient time to obtain rest, limits performance degradation over the course of the FDP, and provides adequate time for nutrition, hydration, hygiene, and social requirements. It was felt that the maximum duration FDP of 13 hours would be appropriate when considering a schedule with weekly time free from duty and the layering of the other requirements.

Research has shown that fatigue increases as shifts increase in length, with associated increases in accident likelihood. Studies have found a transient increase in risk after 2-4 hours with much larger increases observed after 9-10 hours and 12 hours on shift. A near two-fold increase in likelihood of incident or accident has been found following 10 hours compared to 8 hours on shift. A three-fold increase in accident likelihood has been found to occur after 16 hours. A study from the United States found that working at least 12 hours per day was associated with a 37% increased hazard rate. The science does not support a 14 hour flight duty period.

FDP Reduction For Window Of Circadian Low (WOCL) Infringement: Human performance is degraded during the WOCL (duty that occurs between 2 am and 6 am). This is due to the body's drive for sleep. Studies that looked at overnight operations, reached the conclusion that the duty period should be restricted to no more than 10 hours through the night. This was due to the fact that flight crews working through the night showed performance degradation expressed in slower response times and increased sleepiness.

FDP Reduction For Sectors Flown: The workload of the flight crew also effects fatigue. There have been several studies conducted that have found that fatigue increased with the number of sectors flown. One study found that the increase from one to a 4-sector duty was equivalent to the effect of an additional 2.77 hours duty or approximately 55 minutes duty per sector. Three other studies found that the most important influences on fatigue were the number of sectors and duty length.

Cumulative Duty Limitations – The current regulations do not have cumulative duty limitations. There are many studies that have found that long hours of work (> 48 hours per week) have negative effects on performance. During a study of medical interns, the weekly scheduled hours were reduced from an average between 77 to 81 hours to an average of between 60 to 63 hours per week. This reduction of weekly work



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hours had a marked effect on diagnostic errors. Interns made 5.6 times as many serious diagnostic errors during the longer work week than during the shorter work week – fatigue negatively affected their decision making abilities. Another study showed that working at least 12 hours per day was associated with a 37% increased hazard rate and working at least 60 hours per week was associated with a 23% increased hazard rate. Other authorities have established weekly limits in the range of 55 to 60 hours. The current flight time limitations (40 or 60 flight hours per 7 days) result in a range of duty hours of 60 to 90 hours. The low end of this range is the maximum for most authorities.

Rest Periods – the current regulation provides for an opportunity to obtain 8 hours sleep. Studies have shown that an 8 hour opportunity for sleep does not sustain performance. Eight hours of sleep does sustain performance; however it requires 9 hours in bed to achieve the 8 hours of sleep. Dr. Belenky indicated that it takes a person 12 hours off duty to get 8 hours of sleep taking into account commuting and the necessities of living. The NPA proposes to require 10 hours at the rest facility when away from home base, and a 12 hour rest period when at home base. This is similar to the FAA but not as restrictive as the EASA.

Time Free From Duty – The current requirements for Subparts 704 and 705 are close to what the science supports. Only minor changes are required to meet the current science. A weekly rest period is essential to allow the dissipation of the cumulative fatigue that has been scientifically established to build up over consecutive periods of duty. It is well established that fatigue and risk show a cumulative build up over consecutive duties. 2 sleep opportunities (at night) with the intervening day in between free from duty are required each week. For deployed operations longer than 1 week in duration (not using weekly time free from duty), Dr. Belenky cited the experience of the United States Army and professions such as oil rig workers who are able to safely sustain 12 hours on, 12 hours off schedules for periods of up to 2 weeks.

Subparts 702 and 703 are not close. I.e.: 3 periods of 24 consecutive hours free from duty every 30 consecutive days; or 42 consecutive days of duty followed by 5 days free from duty. No science supports these patterns.

Consecutive Night Duties – The current requirements do not restrict the number of consecutive night duties that may be flown. The science shows that there is an exponential increase in risk over successive nights. When compared to the first night, the risk is 6% higher on the second night, 17% higher on the third night and 36% higher on the fourth night. There is already a 30% increase in relative risk when a night duty is compared to a day duty (8 am start). This risk compounds over successive nights – a significant decrease in performance.

Other proposed changes are in support of these major changes above or are supported by the science. Such as Additional Rest For Time Zone Differences – jet lag; Additional Rest Due To Disruptive Schedules – transitions from early to late or night duty; the rules around scheduling standby duty and consequent flight duty.

Not all of the recommendations contained in the Working Group Report were agreed to by all of the Working



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Group members.

Domestic and International Facts including ICAO Standards and Recommended Practices

Canada's FDT requirements have not kept pace with the available fatigue science, nor have they kept pace with the requirements of other States. The following table 1 provides some examples from other States:

Country	Weekly Flight Hours Limitation	Weekly Duty Hours Limitation	28 Days Duty Hours Limitation	28 days Flight Hours Limitation	365 days Flight Hours limitation
USA	n/a	60	190	100	1000
EASA	n/a	60	190	100	900
UK	n/a	55	190	100	900
CASA	30	40 - 60	n/a	100	1000
India	35	60	190	117	1000
Canada - Current	40/60	n/a	n/a	112/140	1200
Canada - Proposed	n/a	60	190	112	1000

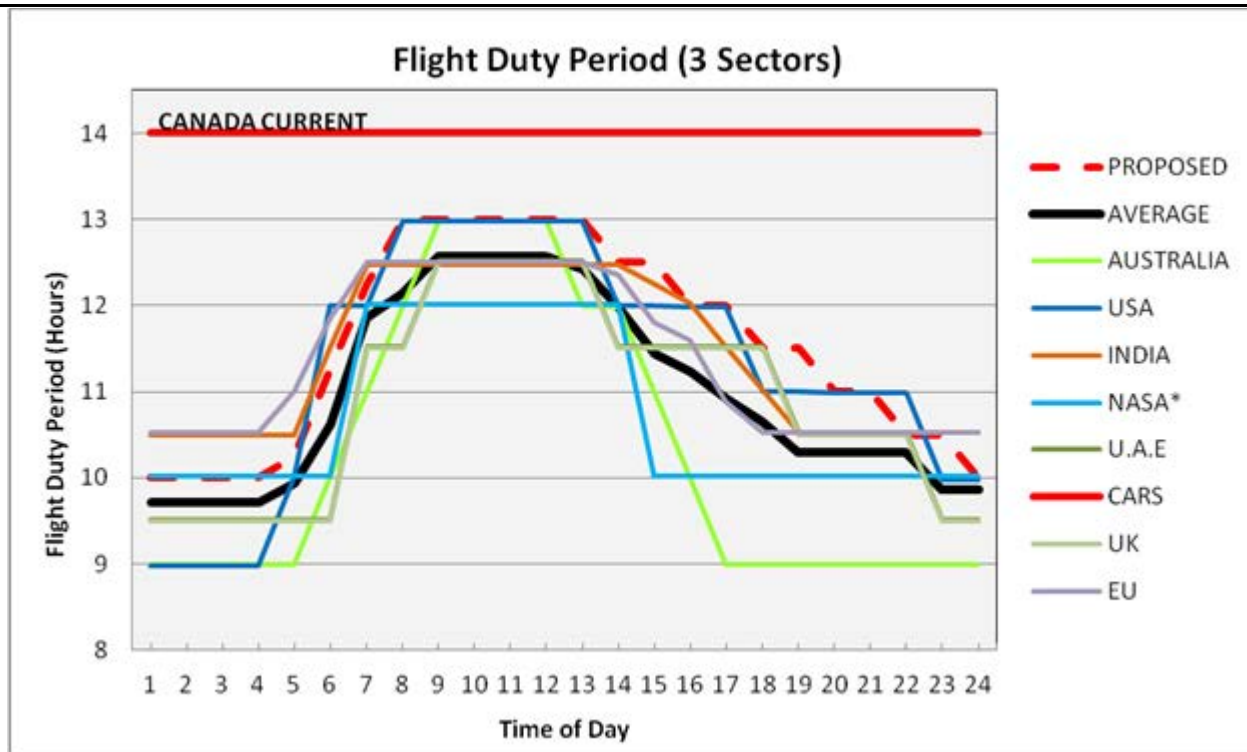
The November 2009 changes to the ICAO SARPs require that fatigue management regulations reflect the available fatigue science. Many other Authorities including the FAA, CASA, EASA, and India have all enacted new regulations that meet the ICAO SARPs.

Based on scientific study regarding hours of work (The National Aeronautics and Space Administration study), the graph below demonstrates how Canada's current and proposed flight and duty time and period regulations compare to the recommended limits.



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This NPA will bring Canada into compliance with the ICAO SARPs and harmonize our regulations with those of other major authorities. However, as stated previously, the proposed requirements improve the management of fatigue but do not set a global benchmark for fatigue management.

TRIAGE STATEMENT

Triage Statement

- There are no existing regulatory requirements for fatigue risk management systems (FRMS). However, it should be noted that FRMS is a voluntary program. An air operator is not required to implement this system: this option is available as an alternate fatigue management scheme. As such there is no additional regulatory burden.
- The impact level of this proposed regulation is anticipated to be medium, according to the Treasury Board Secretariat of Canada's Triage Statement criteria.



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RECOMMENDED CONSULTATION STREAM

Recommended Consultation Stream

- The Flight Crew Fatigue Management Working Group met on 14 separate occasions (43 days in total) over the course of an 18 month period. The Working Group put forward a Report that was presented to a special technical committee meeting of the Canadian Aviation Regulation Advisory Council (CARAC) open to industry and members of the public.
- Further to the analysis of the Flight Crew Fatigue Management Working Group Report, TC is proposing changes to the CARs and associated standards.
- As per the new CARAC process, industry comments will be sought through this Notice of Proposed Amendment. Comments will be considered as TC proceeds with drafting the amendments to the regulations and standards.
- TC will then proceed to publication in the *Canada Gazette*, Part I where industry and Canadians will have the opportunity to provide additional comments.

RECOMMENDED SOLUTION

- Transport Canada proposes to publish regulations that bring Canada into compliance with the ICAO SARPs and provide regulatory requirements in keeping with other regulatory Authorities.
- CAR 705 and 704 Air Operator Certificate holders will be required to demonstrate compliance with the CARs upon publication in *Canada Gazette II*.
- CAR 703 and CAR 702 Air Operator Certificate holders will be required to demonstrate compliance with the CARs 24 months after publication in *Canada Gazette II*.

OBJECTIVES

- The objective of this proposed amendment is to improve aviation safety by applying scientific principles to the management of fatigue.
- In addition, Transport Canada is also demonstrating compliance with the ICAO SARPs and harmonising FDT requirements with those of other States.
- As an alternative to prescriptive limits, the proposed amendment also introduces the option of utilising a



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management system approach to managing flight crew fatigue. Whilst this approach still assures aviation safety, it provides a mechanism for operators to deviate from prescriptive limits where appropriate mitigations and an equivalent level of safety can be demonstrated. This approach utilises the prescriptive requirements as a benchmark for fatigue management and requires the development of safety cases to justify exceedances to these limits.

- The FRMS option can provide a more flexible approach to fatigue management for operators requiring alternate arrangements such as Medevac and ultra long haul flight operations. Transport Canada has a complete set of guidance materials to assist with the FRMS development process.
(<http://www.tc.gc.ca/eng/civilaviation/standards/sms-frms-menu-634.htm>)

PROPOSED CHANGES

1) The following definitions found in CAR 101.01 are proposed to be repealed or modified:

flight crew member on call - means a flight crew member who has been designated by an air operator to be available to report for flight duty on notice of one hour or less;

flight crew member on standby - means a flight crew member who has been designated by an air operator or private operator to remain at a specified location in order to be available to report for flight duty on notice of one hour or less;

flight deck duty time - means the period spent by a flight crew member at a flight crew member position in an aeroplane during flight time;

flight duty time - means the period that starts when a flight crew member reports for a flight, or reports as a flight crew member on standby, and finishes at "engines off" or "rotors stopped" at the end of the final flight, except in the case of a flight conducted under Subpart 4 or 5 of Part VII, in which case the period finishes 15 minutes after "engines off" or "rotors stopped" at the end of the final flight, and includes the time required to complete any duties assigned by the air operator or private operator or delegated by the Minister prior to the reporting time and includes the time required to complete aircraft maintenance engineer duties prior to or following a flight;

flight relief facility - seat - means a comfortable, fully reclining seat, separated and screened from the passengers and flight deck, equipped with a call device, sleep restraint, portable oxygen, and not subject to distraction from noise generated in the cabin.

flight relief facility - bunk - means a bunk that meets the Society of Automotive Engineers (SAE) Aerospace Recommended Practice (ARP) 4101/3, Crew Rest Facilities, used in conjunction with ARP 4101, Flight Deck Layout and Facilities.

minimum rest period - means a period during which a flight crew member is free from all duties, is not interrupted by the air operator or private operator, and is provided with an opportunity to obtain not less than eight consecutive hours of sleep in suitable accommodation, time to travel to and from that accommodation and



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time for personal hygiene and meals;

suitable accommodation - means a single-occupancy bedroom that is subject to a minimal level of noise, is well ventilated and has facilities to control the levels of temperature and light or, where such a bedroom is not available, an accommodation that is suitable for the site and season, is subject to a minimal level of noise and provides adequate comfort and protection from the elements; and

unforeseen operational circumstance - means an event, such as unforecast adverse weather, or an equipment malfunction or air traffic control delay, that is beyond the control of an air operator or private operator.

2) The following definition found in CAR 700.01 is proposed to be repealed:

flight crew member on reserve - means a flight crew member who has been designated by an air operator to be available to report for flight duty on notice of more than one hour;

3) The following CARs is proposed to be repealed:

- Part VII, Subpart 0, Division III (700.14 – 700.23).

4) The following definitions found in Commercial Air Services Standard 720.01 are proposed to be repealed or modified:

"flight relief facility - seat" - means a comfortable, fully reclining seat, separated and screened from the passengers and flight deck, equipped with a call device, sleep restraint, portable oxygen, and not subject to distraction from noise generated in the cabin. (*poste de repos - siège*)

"flight relief facility - bunk" - means a bunk that meets the Society of Automotive Engineers' (SAE) *Aerospace Recommended Practice (ARP) 4101/3, Crew Rest Facilities*, used in conjunction with *ARP 4101, Flight Deck Layout and Facilities*. (*poste de repos - couchette*)

5) The following Commercial Air Services Standard is proposed to be repealed:

- Part VII, Standard 720, Division II (720.15 – 720.23)

6) The following new definitions are proposed to be introduced in CAR 101.01 or 700.01:

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

Acclimatized means the physiological and mental state of a crew member whose bio-rhythms and bodily functions are considered aligned with local time.



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Acclimatized time means the time at the location where the flight crew member is acclimatized.

Augmented flight crew means a flight crew which comprises more than the minimum number required to operate the aircraft allowing each flight crew member to leave their assigned post and be replaced by another appropriately qualified flight crew member for the purpose of in-flight rest.

Break means a period of time on the ground, shorter than a rest period, when the flight crew is free of all duties but still considered to be within a flight duty period.

Consecutive FDPs refers to FDP assignments occurring on consecutive days, when the flight crew member has only the required rest period between the FDP assignments.

Consecutive days free from duty means a single day free from duty followed by a further 24 hours free from duty for each additional consecutive day.

Crew member means a flight, technical or cabin crew member.

Duty means any task that a flight crew member is assigned by an air operator at a specific time, including flight duty, administrative work, training, positioning, and standby.

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

Early Duty means a flight duty period that starts between 02:00 – 06:59, in the flight crew member's acclimatized time.

Fatigue means a physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness and/or physical activity that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety related duties.

Fit for duty means that the crew member is not suffering from fatigue or likely to suffer from fatigue, which would impair their ability to safely operate an aircraft or perform safety related duties for the duration of the planned flight duty period.

Flight duty period (FDP) means a period that begins when a flight crew member is required to report for duty with the intention of conducting a flight, a series of flights, or positioning, and ends when the aircraft is parked with "engines off" or "rotors stopped" after the last flight and there is no intention for further aircraft movement by the same flight crew member.

FDP table start time means the local time at the flight crew member's designated home base or at the location



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where the flight crew member is acclimatized during a FDP and is the time of day used to determine the maximum permitted FDP from the FDP Table.

Flight time means the time from the moment an aircraft first moves for the purpose of taking off until the moment it finally comes to rest at the end of the flight;

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

In flight rest facility means a bunk, seat, room, or other accommodation that provides a flight crew member with a sleep opportunity:

1. Class 1 rest facility means a bunk that meets the Society of Automotive Engineers' (SAE) *Aerospace Recommended Practice (ARP) 4101/3, Crew Rest Facilities*, used in conjunction with *ARP 4101, Flight Deck Layout and Facilities*.
2. Class 2 rest facility means a seat in an aircraft cabin that allows for a flat or near flat and horizontal sleeping position, which is separated from passengers at least by a curtain to provide darkness and some sound mitigation, equipped with portable oxygen and is reasonably free from disturbance by passengers or crew members;
3. Class 3 rest facility means a seat in an aircraft cabin or flight deck that reclines at least 40 degrees from vertical, provides leg and foot support and is not attached or joined to any seat occupied by passengers.

Late duty means a FDP finishing in the period between 00:00 and 01:59 hours, in the flight crew member's acclimatized time.

Local night's rest means when the flight crew member's rest period fully encompasses the hours between 22:30 to 07:30 in the local time zone.

Night duty means a FDP that starts between 13:01 – 01:59 and finishes after 02:00, in the flight crew member's acclimatized time.

Positioning means the transferring of a flight crew member from one place to another, at the request of the operator, excluding both the time from home to the designated reporting place at home base and vice versa, and the time for local transfer from a place of rest to the commencement of duty and vice versa.

Prescriptive fatigue management documentation means a set of flight and duty time limitations including



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flight time, flight duty period, duty period limitations and rest period requirements and the policies and procedures for their application.

Rest period means a continuous and defined period of time, subsequent to and/or prior to duty, during which a flight crew member is free of all duties.

Sector means a single flight that includes one takeoff and landing - synonymous with leg or flight segment.

Single day free from duty means a time free of all duties consisting of a single day and two local night's rest and which may include a rest period as part of the single day free from duty.

Split duty means a duty period where the FDP is extended by one or more breaks on the ground within the FDP.

Standby means when a crew member is required by the operator to be available to receive an assignment for a specific duty without an intervening rest period.

Standby availability period (SAP) means a defined period of time during which a crew member is on standby.

Standby accommodation means a place that protects from the elements, a place to sit, where available not open to the public, and with access to food and drink.

Standby duty period (SDP) means the elapsed time from the beginning of the SAP to the end of an assigned FDP without an intervening rest period.

Suitable accommodation means, for the purpose of standby, split duty and minimum rest, a single-occupancy bedroom that is subject to a minimal level of noise, with sufficient ventilation and the ability to regulate temperature to a comfortable sleeping temperature and light intensity or, where such a bedroom is not available, accommodation that is suitable for the site and season, is subject to a minimal level of noise and provides adequate comfort, to obtain horizontal rest, and protection from the elements.

Ultra long range (ULR) means long range flights having a planned flight time greater than 16 hours or a flight duty period that exceeds 18 hours.

Unforeseen operational circumstances means an unplanned event such as un-forecast adverse weather, equipment malfunction or air traffic delay, which is beyond the control of the operator and that the flight crew member becomes aware of after leaving home or the suitable accommodation.

Window of circadian low (WOCL) means the period between 02:00 and 05:59 hours in the time zone to which the flight crew member is acclimatised.



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7) The following CARs are proposed to be introduced in Part VII, Subpart 0, Division III:

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700.14 Where a person becomes aware that an assignment by an air operator to act as a flight crew member on a flight would result in any of the provisions of this Division not being complied with (limitations exceeded or other requirements not met), the person shall so notify the air operator.

Air Operator Responsibilities

700.15(1) an air operator shall provide flight crew with a schedule that permits sufficient opportunity to rest and recover;

(2) publish duty schedules sufficiently in advance to provide the opportunity for flight crew members to plan adequate rest;

(3) collect actual flight time / flight duty time data necessary to support the planning of flight operations;

- (a) change a schedule or crewing arrangements when: the planning for a given FDP or flight time is found to be unrealistic the operator must make the adjustment within 28 days following the discovery.
- (b) report adjustments made to comply with schedule reliability to TC every two months.
- (c) use all available data to plan realistic flight times and flight duty periods.
- (d) planning of flight operations is considered unrealistic when the maximum FDP or flight time is exceeded on more than 10% of the time using a sampling of 10 events or 56 days; the operator may choose which sampling method (events or days).

(4) require that flight crew members declare to the air operator whether or not they are fit for duty, prior to beginning a flight duty period;

(5) Take appropriate action when a flight crew member has declared them self not fit for duty; and

(6) include flight times and duty times accumulated in other flight operations, flight training units, and military aircraft when calculating individual flight crew member flight time and flight duty period limitations.

Flight Crew Member Responsibilities

700.16 A flight crew member shall:

(1) use the allocated time to rest and recover;



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- (2) prior to beginning a flight duty period, declare to the air operator whether or not they are fit for duty;
- (3) not begin a flight duty period if they are unfit for duty;
- (4) as soon as possible and as applicable, advise the air operator, the pilot-in-command, and other flight crew members, if during a flight duty period, they become unfit for duty; and
- (5) report to the air operator all flight time and duty times accumulated in operations for other air operators, flight training units, and military aircraft for calculation of flight time and flight duty period limitations.

Prescriptive Fatigue Management Documentation

700.17 (1) An air operator shall document the policies, procedures and processes required for compliance with the applicable prescriptive limitations.

(2) An air operator shall nominate a home base for each flight crew member.

(3) With respect to Flight Duty Period (FDP) the air operator shall have processes:

- (a) specifying how the pilot-in-command shall — in case of special circumstances which could lead to fatigue, and after consultation with the crew members affected — reduce the actual FDP and/or increase the rest period in order to eliminate any detrimental effect on flight safety.
- (b) specifying how the pilot-in-command shall — in case of unforeseen operational circumstances which could lead to fatigue, and after consultation with the crew members affected, increase the actual FDP in order to manage any detrimental effect on flight safety.
- (c) requiring the pilot-in-command to submit a report whenever an FDP is increased beyond the maximum or decreased at his/her discretion, in actual operations.
- (d) for reviewing all increases beyond the maximum FDP to determine the percentage of FDPs that increase beyond the maximum FDP.
- (e) for adjusting the schedule where any FDP that is shown to actually increase beyond the maximum FDP more than 10 percent of occasions.
- (g) for providing food and drink opportunities for flight crew members.

Nutrition - Providing the Flight Crew Member with Food and Drink Opportunities

700.18 When a FDP exceeds 6 hours, the air operator shall provide the flight crew member with food and drink opportunity every 6 hours.

Records of Flight and Duty Times and Rest Periods



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700.19 Air operators shall maintain:

- (1) Individual records of flight, duty and rest period for all crew members, for a period of 24 months, including:
 - (a) Flight times;
 - (b) Start, duration and end of each duty and FDP; and
 - (c) Rest periods and days free of all duties.
- (2) Reports by the pilot-in-command on extended flight duty periods and extended flight hours, for a period of 24 months.
- (3) Upon request the air operator shall provide a flight crew member a copy of their individual records of flight and duty times and rest periods.

Flight Duty Period (FDP)

700.20 Air operators and flight crew members shall use Table 1 to determine the duration of the FDP.

Instructions for using Table 1:

Determine the start time of the FDP and determine the acclimatized time of the flight crew member; if these are the same, enter the Table in the row containing the local start time of the FDP. Otherwise see Subsection 700.39 - Determining FDP Table Start Time.

Determine the planned number of sectors and locate the appropriate column for the number of sectors;

The maximum FDP will be at the intersection of the Start FDP row and Number of Sectors column.

When the air operator wishes to introduce schedule changes (additional sectors or reductions in sectors) during a FDP, the air operator has two options:

if the changes do not result in an increase to the originally planned FDP duration the original FDP limit remains unchanged; or

if the changes result in an increase to the originally planned FDP duration, adjust the FDP limit using Table 1 taking into account the new number of sectors flown.

Non-scheduled VFR helicopter operations always use Column A of the Table.

Table 1 - Maximum Daily FDP



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		Columns				
		A	B	C	D	E
		Number of Sectors				
		1-3	4	5	6	7+
Rows	Start of FDP	Maximum FDP (hours)				
1	2300-0429	10.0	9.5	9.0	9.0	9.0
2	0430-0459	10.5	10.0	9.5	9.0	9.0
3	0500-0529	11.0	10.5	10.0	9.5	9.0
4	0530-0559	11.5	11.0	10.5	10.0	9.5
5	0600-0629	12.0	11.5	11.0	10.5	10.0
6	0630-0659	12.5	12.0	11.5	11.0	10.5
7	0700-1259	13.0	12.5	12.0	11.5	11.0
8	1300-1459	12.5	12.0	11.5	11.0	10.5
9	1500-1659	12.0	11.5	11.0	10.5	10.0
10	1700-1859	11.5	11.0	10.5	10.0	9.5
11	1900-2059	11.0	10.5	10.0	9.5	9.0
12	2100-2259	10.5	10.0	9.5	9.0	9.0

Flight Duty Period - Aerial Application Operations

700.21 Where the flight is conducted under Subpart 2 of the *Canadian Aviation Regulations* in aerial application operations, a flight duty period of 13 hours may be assigned provided that:

- a) the total flight duty time shall not exceed 13 hours in 24 consecutive hours;
- b) rest periods that allow a total of at least 9 hours opportunity to sleep in 24 consecutive hours shall be taken in suitable accommodation;
- c) one of these rest periods shall allow at least 5 consecutive hours opportunity to sleep between 20:00 and



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06:00 local time; and

- d) the flight crew member shall receive at least 5 periods of 24 consecutive hours free from duty within each 28 consecutive days.

Extension of FDP Due To In-Flight Rest

700.22 An air operator may, on aircraft equipped with in flight rest facilities, increase the maximum FDP value found in Table 1 (700.20) as follows:

(1) with one additional flight crew member and a:

- (a) Class 3 rest facility: an additional 1.5 hours to a maximum FDP of 14.0 hours;
- (b) Class 2 rest facility: an additional 2.5 hours to a maximum FDP 15.0 hours; or
- (c) Class 1 rest facility: an additional 3.5 hours to a maximum FDP 15.0 hours.

(2) with two additional flight crew members and a:

- (a) Class 3 rest facility: an additional 3.0 hours to a maximum FDP 15.25 hours;
- (b) Class 2 rest facility: an additional 4.25 hours to a maximum FDP 16.5 hours; or
- (c) Class 1 rest facility: an additional 7.0 hours to a maximum FDP 18.0 hours.

(3) Where the FDP is increased in accordance with Subsections (1) or (2), the air operator shall ensure that the following conditions are met:

- (a) The augmented FDP shall be limited to 3 sectors.
- (b) The minimum opportunity for in-flight rest period shall be:
 - (i) for flights planned as 1 sector, a balanced or optimized division of duty and rest between all of the flight crew members; or,
 - (ii) for flights planned as 2 or 3 sectors:
 - A. a period of 2 consecutive hours for the flight crew members seated at the aircraft controls for the final landing; and
 - B. a period of consecutive 90 minutes for all other flight crew members.
- (c) All flight crew members shall commence their FDP at the same reporting place if they are part of an augmented crew. However, if the first sector of the FDP is planned at a flight time of less than 105 minutes, the augmenting flight crew member may join the flight following the first sector (join for the second sector).
- (d) At least one augmenting flight crew member shall be on the flight deck during all takeoffs and landings.
- (e) In order to determine the maximum time available for in flight rest, the air operator shall use the phase of flight between climbing above 10,000 above aerodrome elevation and 15 minutes prior to



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the planned beginning of the descent.

- (f) All the time spent in the rest facility shall be counted as FDP.
- (g) The minimum rest following an augmented flight shall be at least as long as the preceding duty period or at least 14 hours in the suitable accommodation or 16 hours at home base, whichever is the greater (other provisions may also apply to the length of the rest period – time zone differences).
- (h) Where a flight crew is augmented by the addition of at least one flight crew member, the total flight time accumulated during the flight shall be logged by all flight crew members for the purposes of calculating the maximum flight times.
- (i) An in flight rest facility shall be provided for each augmenting flight crew member.

Unaugmented Long Range Flights

700.23

- (1) For flights operated by un-augmented flight crews, the air operator shall:
 - (a) Reduce the applicable maximum FDP found in Table 1 by 1 hour when a FDP includes a sector with a planned flight time greater than 10 hours.
 - (b) Not operate an additional sector following a sector with a planned flight time greater than 7 hours when the FDP infringes on the crewmember's WOCL.
- (2) An additional sector may be operated after a sector with a planned flight time greater than 7 hours, provided the operation is conducted as part of the air operator's approved fatigue risk management system.

Ultra Long Range Operations

700.24 An air operator shall not conduct ULR operations unless they are conducted as part of the air operator's approved fatigue risk management system.

Unforeseen Operational Circumstances — Pilot-In-Command's Discretion

700.25

- (1) In the case of unforeseen operational circumstances the pilot-in-command may modify the limits for FDP, duty and rest periods.
- (2) The pilot-in-command, in case of unforeseen operational circumstances, which could lead to fatigue, may reduce the actual flight duty time and/or increase the rest period in order to reduce any detrimental effect on flight safety.



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(3) The pilot-in-command shall consult all flight crew and other crew members where applicable on their alertness levels before deciding these modifications.

(4) Due to unforeseen operational circumstances, the pilot-in-command shall not increase the maximum daily FDP by more than as follows:

- (a) For single pilot operations, by not more than 1 hour;
- (b) For un-augmented flight crews, by not more than 2 hours;
- (c) For augmented flight crews with a FDP planned with 1 sector, by not more than 3 hours; or
- (d) For augmented flight crews with a FDP planned with 2 or 3 sectors, by not more than 2 hours.

(5) If on the final sector within an FDP that has been increased in accordance with Subsection (4) and further unforeseen operational circumstances occur after take-off, that will result in the permitted increase being exceeded, the pilot-in-command may continue the flight to the planned destination or alternate; and

(6) The air operator shall increase the duration of the minimum rest period following an FDP that exceeded the maximum limits of the FDP Table due to unforeseen operational circumstances by an amount at least equal to the extension of the FDP.

Unforeseen Operational Circumstances — Short-Term Re-Planning — Pilot-In-Command's Discretion

700.26

(1) The air operator may request a split duty period to a scheduled FDP due to unforeseen operational circumstances.

(2) The pilot-in-command may accept the split duty or modifications to the schedule at the pilot-in-command's discretion.

(3) The pilot-in-command shall consult all crew members on their alertness levels before accepting the split duty or other modifications to the schedule.

(4) When requesting the introduction of a split duty, the air operator shall make the request to the pilot-in-command before the start of the break on the ground.

(5) The criteria for increasing the FDP duration based on the rest period obtained during the break are contained in the Subsection 700.xx (Split Duty).

Delayed Reporting Time



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700.27 This Subsection is intended to accommodate changes to the schedule that are made after the flight crew member's rest period has begun.

(1) Where a flight crew member is notified by the air operator of a delay in reporting time before leaving his rest facility, the FDP is calculated as follows:

- (a) when the delay is less than 4 hours, the maximum FDP from Table 1 shall be based on the more limiting of the original or the delayed reporting time and the FDP shall start at the actual reporting time;
- (b) when the delay is 4 hours or more, the maximum FDP from Table 1 shall be based on the more limiting of the original or the delayed reporting time and the FDP starts 4 hours after the original reporting time;
- (c) when the delay is 10 hours or more and the flight crew member is not further disturbed by the air operator until a mutually agreed hour, the elapsed time between the original and the delayed reporting time is considered a rest period. If, upon the resumption of duty, further delays occur, then the appropriate criteria in this paragraph and the two preceding paragraphs above shall be applied to the re-arranged reporting time.

(2) The air operator shall not interrupt the flight crew member's rest period in order to inform them of the delayed reporting time.

Cumulative Duty Hour Limitations

700.28

No air operator shall assign a flight crew member to duty and no flight crew member shall accept such an assignment, where the total duration of duty periods to which a flight crew member is assigned will exceed:

- (1) 1,928 duty hours in any 365 consecutive days;
- (2) 190 duty hours in any 28 consecutive days; and,
- (3) 60 duty hours in any 7 consecutive days when using Time Free from Duty Option 1 found in Subsection 700.xx; or,
- (4) 70 duty hours in any 7 consecutive days when using Time Free from Duty Option 2 found in Subsection 700.xx and the air operator shall not:
 - (a) assign early, late or night duties to the flight crew member;



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- (b) schedule the flight crew member to duty periods greater than 12 hours duration; and
- (c) permit a flight crew member to exceed a maximum of 24 duty hours in any 2 consecutive days.

Flight Time Limitations

700.29 No air operator shall assign a flight crew member for flight time, and no flight crew member shall accept such an assignment, if the flight crew member's total flight time in all flights conducted by the flight crew member will, as a result, exceed:

- (1) where the flight crew member conducts single-pilot operations, 8 flight hours in any 24 consecutive hours;
- (2) 112 flight hours in any 28 consecutive days;
- (3) 300 flight hours in any 90 consecutive days; and
- (4) 1,000 flight hours in any 365 consecutive days.

Positioning

700.30 When an air operator assigns a flight crew member to positioning, the air operator shall:

- (1) Count all of the time spent positioning as duty time;
- (2) Include time spent positioning after reporting but prior to operating as part of the FDP. This positioning does not count as a sector;
- (3) Where positioning follows a FDP and the duration of duty period exceeds the permitted FDP, the air operator shall increase the subsequent rest period as follows:
 - (a) where the exceedance is 3 hours or less, the subsequent rest period shall be at least as long as the preceding duty period; or
 - (b) where the exceedance is greater than 3 hours, the subsequent rest period shall be at least twice as long as the preceding duty period. An exceedance of greater than 3 hours may only take place with the joint agreement of the flight crew member and the air operator.

Split Duty

700.31

- (1) The maximum FDP may be increased where the air operator provides the flight crew member with a break



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during the FDP (split duty). The air operator shall provide a break in accordance with the following conditions:

- (a) A break on the ground within the FDP shall have a minimum duration of 60 consecutive minutes in the suitable accommodation.
 - (b) The break will begin after the flight crew member is in the suitable accommodation.
 - (c) The break excludes travel time to and from the suitable accommodation.
 - (d) The maximum FDP may be increased by an amount of time equal to:
 - (i) 100% of the duration of the break during the hours of 00:00 to 05:59 at the flight crew member's acclimatized time;
 - (ii) 50% of the duration of the break during the hours of 06:00 to 23:59 at the flight crew member's acclimatized time; or,
 - (iii) In the case of short-term re-planning due to unforeseen operational circumstances, 50% of the duration of the break; and,
 - (e) 45 minutes of the break in the suitable accommodation does not count towards the increase in the flight duty period.
- (2) In the case of a FDP assignment, that includes a split duty, following a Standby assignment;
- (a) The flight crew member's SDP may be increased by a maximum of 2 hours if a break is provided in accordance with the criteria above.
 - (b) This FDP is limited to 2 sectors following the break.

Standby

700.32

- (1) Where an air operator assigns a flight crew member to Standby, the air operator shall:
- (a) notify the flight crew member in advance of the start time, end time, and nature [location - at home or hotel] of the SAP;
 - (b) notify the flight crew member:
 - (i) at least 12 hours prior to the beginning of the SAP, if the assigned SAP does not infringe upon the WOCL; or



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(ii) at least 32 hours prior to the beginning of the SAP, if the assigned SAP does infringe upon the WOCL.

(2) The air operator shall not shift the designated SAP by more than:

- (i) 2 hours earlier or 4 hours later than the preceding SAP; and
- (ii) a total of 8 hours from the original SAP start time in any 7 consecutive days unless the flight crew member is provided with 2 consecutive days free from all duties within the 7 consecutive days.

(3) If the shift of the start time of the SAP crosses 02:00, the air operator shall not introduce an additional SAP shift unless the flight crew member is provided with 2 consecutive days free from all duties prior to beginning a subsequently shifted SAP.

(4) The air operator shall not shift the start time of the SAP into the flight crew member's WOCL without notifying the flight crew member of the SAP at least 24 hours prior to the beginning of the SAP.

(5) The air operator shall not assign a flight crew member to a FDP outside of the aggregate maximum SDP unless:

- (a) the air operator provides the flight crew member with minimum 24 hours notice of the assignment, prior to the beginning of the FDP;
- (b) The air operator shall not provide this notification to the flight crew member between the hours of 22:30 to 07:30; and
- (c) the air operator shall not assign the flight crew member to any duties from the time of the notification until the beginning of the FDP.

(6) When assigning a flight crew member to Standby, the air operator shall:

- (a) not assign a flight crew member to a SAP that exceeds 14 hours;
- (b) after a flight crew member is assigned to a FDP, the SAP ends;
- (c) provide the flight crew member with a minimum rest period of 10 hours between SAPs;
- (d) limit the maximum duration of a SDP for un-augmented flight crew members as follows:
 - (i) for SAPs starting between 0200 and 1759 the maximum SDP is 18 hours;
 - (ii) for SAPs starting between 1800 and 1859 the maximum SDP is 17 hours;
 - (iii) for SAPs starting between 1900 and 2059 the maximum SDP is 16 hours;



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- (iv) for SAPs starting between 2100 and 2259 the maximum SDP is 15 hours; and
- (v) for SAPs starting between 2300 and 0159 the maximum SDP is 14 hours.

(e) Calculate the SDP limits for augmented flight crew members as follows:

- (i) the maximum SDP for a flight crew augmented with one additional flight crew member is 20 hours and with a class 1 or 2 rest facility; or
- (ii) the maximum SDP for a flight crew augmented with two additional flight crew members is 22 hours and with class 1 or 2 rest facilities.

(7) When the SAP begins between 02:00 and 05:59 (flight crew member's acclimatized time), the air operator may increase the maximum SDP by 50% of the time period between 02:00 and 05:59 that the flight crew member was not disturbed by the air operator, to a maximum of 2 hours.

(8) The air operator shall not assign the flight crew member to a flight duty that exceeds the lesser of either the SDP maximum or the FDP maximum from Table 1 (Subsection 700.20).

(9) The air operator shall count all time spent on standby by a flight crew member as duty at a rate of 33% for the calculation of cumulative duty limitations.

(10) Transition from SDP to SAP

- (a) Following a SDP and subsequent rest period, the air operator may have the flight crew member resume the previously scheduled SAP in progress.
- (b) When a flight crew member resumes a previously scheduled SAP in progress, as long as the end time of the SAP remains the same as the previously scheduled SAP end time, the SAP is not considered to have shifted. The SDP limit is calculated from the start of the previously scheduled SAP.
- (c) When the air operator wishes to change the start time of the SAP, all provisions related to the shifting of the start time of the SAP apply.

Airport Standby

700.33 When assigning a flight crew member to Airport Standby, the air operator shall:

- (1) consider the flight crew member to be on duty from the time of reporting at the aerodrome for the SAP until the end of the scheduled SAP;
- (2) count all time spent by a flight crew member on airport standby as duty for the calculation of cumulative



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duty limitations;

- (3) when the air operator assigns a flight crew member to flight duty during a SAP, use the start time of the SAP as the FDP start time in order to establish the maximum FDP available (FDP began when SAP began);
- (4) provide the flight crew member with standby accommodation while assigned to airport standby; and
- (5) when the flight crew member has not been assigned to flight duty, provide the flight crew member with a minimum rest period prior to the next scheduled SAP or FDP.

Rest Periods

700.34 The air operator shall provide a flight crew member with basic minimum rest as follows:

- (1) minimum rest period at home base: the minimum rest period provided before undertaking an FDP starting at home base shall be 12 hours;
- (2) minimum rest period away from home base: the minimum rest period provided before undertaking a flight duty period starting away from home base shall be 10 hours in the suitable accommodation;
- (3) where the air operator provides a suitable accommodation to the flight crew at home base, the away from home base provision (Subsection (2)) may be applied (10 hours in the suitable accommodation); and
- (4) where the duration of a duty period exceeds the maximum permitted FDP plus 1 hour (with the exception of positioning), the subsequent rest period shall be at least as long as the preceding duty period.

Time Free From Duty

700.35 (1) The air operator shall provide a flight crew member with additional time free from duty in accordance with one of the following Options:

- (a) Option 1 - A flight crew member shall be provided a minimum of one single day free from duty in
 - (i) any 7 consecutive days;
 - (ii) the beginning of the single day free from duty may be delayed by a maximum of 2 hours due to unforeseen operational circumstances. When this occurs the duration of the single day free from duty shall be extended by a minimum of 2 hours; and
 - (iii) a minimum of 4 single days free from duty within in any 28 consecutive days; or,
- (b) Option 2 - A flight crew member shall be provided a minimum of 5 consecutive days free from duty



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within every 20 consecutive days.

(2) To transition between Option 1 and Option 2, the flight crew member shall be provided with 5 consecutive days free from duty are required.

Additional Rest Due To Disruptive Schedules

700.36

(1) Disruptive schedule provisions do not apply when the crew member is in a location where local time differs with the flight crew member's acclimatized time by more than 4 hours.

(2) The air operator shall provide the flight crew member with a minimum of one local night's rest in between the two FDPs when the flight crew member is scheduled to transition from:

- (a) a late or night duty to an early duty; or
- (b) an early duty to a late or night duty.

Additional Rest Due To Time Zone Differences

700.37 The air operator shall provide the flight crew member with additional rest due to time zone differences as follows:

(1) when a duty period ends away from home base at a location where the local time zone differs by:

- (a) 4 hours from the time at the location of the start of the FDP, the minimum rest shall be 11 hours in the suitable accommodation; or
- (b) more than 4 hours from the time at the location of the start of the FDP, the minimum rest shall be 14 hours in the suitable accommodation.

(2) when a duty period ends at home base and the local time zone differs by:

- (a) 4 hours from the time at the location of the start of the flight duty period and the flight crew member has been away from home base for more than 36 consecutive hours, the minimum rest shall be 13 hours;
- (b) more than 4 hours but not more than 10 hours from the time at the location of the start of the flight duty period and the flight crew member has been away from home base for:
 - (i) more than 60 consecutive hours or the returning FDP encroaches upon the flight crew member's WOCL, the flight crew member shall be provided with a minimum of 2 local night's rest prior to the start of the next flight duty period; or



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(ii) less than or equal to 60 consecutive hours and the returning FDP does not encroach on the flight crew member's WOCL, the flight crew member shall be provided with a minimum of 1 local night's rest prior to the start of the next flight duty period.

(c) more than 10 hours from the time at the location of the start of the flight duty period and the flight crew member has been away from home base for:

(i) more than 60 consecutive hours, the flight crew member shall be provided with a minimum of 3 local night's rest prior to the start of the next flight duty period; or

(ii) less than or equal to 60 consecutive hours, the flight crew member shall be provided with a minimum of 2 local night's rest prior to the start of the next flight duty period.

Consecutive Duties Infringing on the WOCL

700.38

(1) FDPs are considered consecutive when scheduled without an intervening local night's rest.

(2) The air operator shall, following 3 consecutive FDPs that infringe upon the hours between 02:00 and 05:59, provide the flight crew member with a local night's rest;

(3) The break resulting from a split duty may be used to increase the FDP length as per the Split Duty provisions (Subsection 700.31); or

(4) The air operator may schedule a flight crew member to 5 consecutive FDPs that infringe upon the hours between 02:00 and 05:59 if:

(a) each FDP includes a split duty with a scheduled break that provides the flight crew member with a minimum of 3 hours opportunity for rest in the suitable accommodation and the flight crew member is provided with this break;

(b) following the 4th or 5th consecutive FDPs that infringe upon the hours between 02:00 and 05:59, provide the flight crew member with a minimum period of 56 consecutive hours free from duty; and

(c) the break on each of the duties infringing the WOCL shall not be used to increase the FDP as per Split Duty provisions (Subsection 700.31).

Determining FDP Table Start Time (Table 1 – 700.20)

700.39 Air operators and flight crew members shall determine the FDP start time in Table 1 as follows:



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- (1) For an acclimatized flight crew member the maximum daily FDP is based on start time of the FDP using local time.
- (2) For a not acclimatized flight crew member the maximum daily FDP is based on start time of FDP using the last acclimatized local time.
- (3) Time Zone Differences and Time Required to Acclimatize (this applies to flight crew member leaving home base and returning to home base).
 - (a) For the purpose of determining the FDP Table start time, Canada will be considered to encompass 5 time zones: Pacific, Mountain, Central, Eastern, and Atlantic. The Newfoundland Time zone is considered to be included in the Atlantic Time zone.
 - (b) when the time zone difference between local time and last acclimatized time does not exceed 4 hours, a flight crew member is considered acclimatized to the new time zone when all rest periods within a 72 consecutive hour period have occurred in the same time zone; or,
 - (c) when the time zone difference between local time and last acclimatized time exceeds 4 hours, a flight crew member is considered acclimatized to the new time zone when all rest periods within a 96 consecutive hour period have occurred in the same time zone.

Fatigue Management Training

700.40

- (1) Air operators shall provide fatigue management training to flight crew members, crew scheduling personnel and concerned management personnel.
- (2) The training syllabus shall address the possible causes and effects of fatigue, and fatigue countermeasures.

Controlled Rest on the Flight Deck

700.41

- (1) Every flight crew member who participates in the controlled rest on the flight deck program shall have received training in the program.

(2) Pre-flight Activities

- (a) The pilot-in-command shall determine if operational considerations allow or preclude the use of



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controlled rest on the flight deck based on guidelines developed by the air operator;

(b) the flight crew members' rest periods will be planned and briefed at a pre-flight briefing to enable them to anticipate and maximize the sleep opportunity and to manage their alertness. If required, this briefing can occur in flight; and

(c) the briefing shall include:

- (i) the choice of rest sequence;
- (ii) planned and unplanned wake-up criteria;
- (iii) transfer of control procedures; and
- (iv) co-ordination with the flight attendants.

(3) Pre-rest Period

Pre-rest period activities should take approximately 5 minutes and shall include:

- (a) the transfer of duties;
- (b) an operational briefing;
- (c) completion of physiological needs;
- (d) co-ordination with the flight attendants; and
- (e) time for the flight crew member preparing to rest to become comfortable in the flight deck seat.

(4) Rest Period

- (a) Only one flight crew member at a time shall rest and the other flight crew member(s) shall remain alert. An alertness monitor may be considered as a back-up system;
- (b) The resting flight crew member's duties shall be completed by the non-resting flight crew member(s);
- (c) All flight crew members shall remain on the flight deck throughout the rest period;
- (d) Each rest period shall be limited to a maximum of 45 minutes to avoid sleep inertia when the flight crew



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member is awakened;

(e) Rest periods shall occur only during the cruise phase of the flight and shall be completed at least 30 minutes before planned top of descent, workload permitting; and

(f) If required, more than one sleep opportunity may be taken by the flight crew members.

(5) Post-rest Period

(a) Unless required due to an abnormal or emergency situation, at least 15 minutes without any flight duties should be provided to the awakened flight crew member to allow sufficient time to become fully awake before resuming normal duties; and

(b) an operational briefing shall be given to the awakened flight crew member.

It is proposed to introduce a new Subpart 8, to Part I of the CARs, Fatigue Risk Management Systems (FRMS)

General

1. An air operator may apply to the Minister for authorization to manage flight crew fatigue through a Fatigue Risk Management System (FRMS). This authorization may be for some or all of the air operator's operations and would be in lieu of the prescriptive fatigue management requirements.
2. The FRMS shall correspond to the roster system or flight time specification scheme used by the operator in accordance with CAR XXX. Any deviations from CAR XXX or any other CAR related to flight time, duty time and rest periods shall only be permitted in accordance with the operator's approved fatigue risk management provisions.
3. Each air operator shall establish, follow and continuously upkeep a Fatigue Risk Management System for the management of fatigue related risks in the workplace or,
4. Where the Certificate Holder is required to have a safety management system in accordance with CAR 107, the components and elements of the SMS may be used, as applicable, to meet the requirements of this subpart.
5. As per CAR XXX (the above regulatory reference), where the Certificate holder utilizes the SMS to meet these requirements compliance with this subpart must be clearly documented.
7. The fatigue risk management system shall include:



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Policy

- I. a fatigue risk management policy that:
 - a. reflects the shared responsibility of management, flight, technical and cabin crew and other involved personnel;
 - b. clearly state the safety objectives of FRM;
 - c. be signed by the accountable executive;
 - d. be communicated, with visible endorsement, to all the relevant areas and levels of the organisation;
 - e. declare management commitment to effective safety reporting;
 - f. declare management commitment to the provision of adequate resources for FRM;
 - g. declare management commitment to continuous improvement of FRM;
 - h. require that clear lines of accountability for management, flight, technical and cabin crews, and all other involved personnel are identified; and
 - i. require periodic reviews to ensure it remains relevant and appropriate.

Documentation

- II. Documentation that reflects all of the requirements of this subpart;
- III. Defined responsibilities for the management of fatigue related risks for:
 - a. Management;
 - b. the person managing the fatigue risk management system; and
 - c. employees.

Safety Risk Management

- IV. a policy for employee self reporting of fatigue related situations.
- V. processes for identifying fatigue related hazards that include:
 - a. predictive identification of fatigue hazards by examining work schedules and taking into account factors known to affect sleep and fatigue and their effects on performance.
 - b. proactive identification of fatigue hazards within current operations. Including but not limited to:
 - i. self-reporting of fatigue risks;
 - ii. employee fatigue surveys;
 - iii. relevant employee performance data;
 - iv. available safety databases and scientific studies; and
 - v. analysis of planned versus actual time worked.



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c. reactive analysis and identification of fatigue hazards to detect potential negative safety consequences and develop preventative and corrective measures. The analysis may include hazards identified in:

- i. fatigue reports;
- ii. confidential reports;
- iii. audit reports;
- iv. incidents; and
- v. other data analysis of events.

VI. a process for providing feedback to employees on fatigue reports and communicating information related to fatigue.

VII. a process for storing fatigue related information.

Assessment

VIII. An air operator shall develop and implement risk assessment procedures that determine the probability and potential severity of fatigue-related events and identify when the associated risks require mitigation.

IX. The risk assessment procedures shall review identified hazards and link them to:

- i. operational processes; and
- ii. the effectiveness of existing safety barriers and controls.

X. A process for establishing safety performance indicators for the FRMS.

XI. A process for:

- i. monitoring preventative and corrective measures;
- ii. for continuous improvement of the fatigue risk management system; and
- iii. for measuring the attainment of the safety objectives.

Promotion

XII. Practical guidelines for management and employees when dealing with fatigue related situations that involve operating beyond the defined fatigue risk management system guidelines;

XIII. A competency-based fatigue training and education program for management and employees that includes:

- i. an overview of the FRMS structure and how it works in the operator's organization;
- ii. employee responsibilities and those of the operator, in the FRMS, including effective



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- safety reporting;
- iii. causes and consequences of fatigue in the operation(s) in which they work;
- iv. FRM processes in which they play a vital role, particularly in the use of fatigue reporting systems and implementing mitigations;
- v. the importance of accurate fatigue data (both subjective and objective);
- vi. how to identify fatigue in themselves and others;
- vii. 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; and
- viii. basic information on sleep disorders and their treatment, where to seek help if needed, and any requirements relating to fitness to work.

Coming into Force:

Subpart 705 and 704 Air Operator Certificate holders will be required to demonstrate compliance with these provisions upon publication in *Canada Gazette II*.

Subpart 703 and CAR 702 Air Operator Certificate holders will be required to demonstrate compliance with these provisions 24 months after publication in *Canada Gazette II*.

UNTIL OCTOBER 3, 2014, COMMENTS ON THIS NOTICE MAY BE ADDRESSED, IN WRITING, TO:

Canadian Aviation Regulation Advisory Council: carrac@tc.gc.ca

Note: after this date, comments will no longer be considered in further revisions to the regulations and standards.