

ISSUE ASSESSMENT PAPER

Date of Assessment Meeting: 22 September 2014

08-ISS-44, 07-ISS-51, 07-ISS-43: Various Fatigue Issues

Issue Description

(8/ISS/44 as submitted by petition on 29/10/2007 by WilsonB)

“Lack of rules surrounding the prevention of fatigue in the aviation industry was identified as an outcome from the Fatigue Workshop held in June 2006. The workshop consisted of experts in the field of fatigue research, whose outcomes align with research conducted by NASA on the prevention of fatigue. As well as cabin crew fatigue management (the subject of an ICAO finding in 2006), the workshop recommended ICAO SARPs and guidance material be incorporated into the rules, the need for fatigue reporting and monitoring systems be addressed in the rules, reference to activities before conducting Part 119 operations be addressed, ULR operations come under FMS as specified in a rule as well as other rule related issues. The workshop outcomes encompassed the management of fatigue beyond the boundaries of Part 119 operations and sought to include maintenance and private operations as well.

This issue has been widened to include the content of issues 8/ISS/32, 33, 34, 35, 36, 37, 41, 45, 46 & 47.”

(7/ISS/51 as submitted by petition on 09/01/2007 by WellsK)

“Part 135 subpart K allows an operator who is only conducting commercial transport operations (CTO) to have almost no limits on flight or duty time apart from requiring him to give two days off in 14, two

consecutive days off in 30 and to fly not more than 160 hours in a month.

Amend CAR 135.803 (a) (2) by deleting air transport operations and adding air operations. Delete CAR 135.803 (a) (3) as all air operations require a scheme to be adheres to that addresses all of the same factors. Re-designate CAR 135.803 (a) (4) as (3). Delete CAR 135.805 (d) as it is ultra vires in that it modifies the requirements of the Act Section 13A.”

(7/ISS/43 as submitted by petition on 19/12/2006 by WilsonB)

“ICAO Finding OPS/03 states that New Zealand, as the State of the Operator, has not established rules specifying the limits applicable to flight time, flight duty periods and rest periods for cabin crewmembers.”

Summary of Issue (problem statement)

A number of issues have been raised in past years relating to the current fatigue management requirements in New Zealand aviation. They have identified a number of gaps and inconsistencies in the New Zealand approach that could affect flight safety. The concerns encompass all types of operations, not just commercial operations.

Recommendations/Action Sought

The Executive is requested to:

1. Agree to amend the rules to align with ICAO Annex 6 requirements for managing fatigue in both the international and domestic aviation context.
2. Agree to amend AC 119-2 accordingly.
3. Develop greater resources within CAA to understand and manage fatigue issues
4. Note that where fatigue is identified as a specific risk to operations that are not covered by civil aviation fatigue requirements, then SMS could be utilised as a tool to deal with individual situations.

Agreed
 Further investigation required
 Yes
 Yes
 Yes

Prepared by: Catherine de Montalk Policy Advisor	Submitted by: John Kay GM Policy and System Interventions
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Intervention: **Regulatory / Non-Regulatory / Monitor / Rejected** (*circle*)

Other decisions:

The Panel agreed that there is not yet enough information to agree that the rules need to be amended. They suggested further policy analysis to explore the implications of any rule amendments to align with ICAO requirements on various size operators. They also queried whether the fatigue issues could be managed through the SMS implementation – while this was not necessarily the ICAO approach, it may be more efficient to address the issue of fatigue management within the scope of the SMS rule. Any further analysis should investigate this possibility further.

Action: Explore in more detail the extent of the rule changes that would be required to align with ICAO and what would the impacts be on various sized operators if extended to domestic operations. Assigned to: Policy

The Panel noted a recently formed working group formed by Chris Ford on fatigue, which includes operations, medical and policy. This group could take responsibility for the development of greater resources and communication within and external to the industry. They also agreed that the amendment to advisory circular AC119-2 and any flow on educational programme could be developed could be managed by this group.

Action: Newly formed CAA fatigue working group to manage amendments to the Advisory Circular 119-2 and any further education, resource development within the CAA and externally required to ensure effective fatigue management Assigned to: Chris Ford

Background

ICAO requirements

ICAO Annex 6, Part 1, Chapter 4, Section 10 outlines States' obligations to establish mechanisms to manage fatigue of flight and crew members for international commercial air transport aeroplanes. Specifically, two options for fatigue management are provided for States - a flight and duty scheme or a Fatigue Risk Management System (FRMS):

4.10.1 a) regulations for flight time, flight duty period, duty period and rest period limitations; and

b) where authorizing an operator to use a Fatigue Risk Management System (FRMS) to manage fatigue, FRMS regulations.

4.10.2 The State of the Operator shall require that the operator, in compliance with 4.10.1 and for the purposes of managing its fatigue-related safety risks, establish either:

a) flight time, flight duty period, duty period and rest period limitations that are within the prescriptive fatigue management regulations established by the State of the Operator; or

b) a Fatigue Risk Management System (FRMS) in compliance with 4.10.6 for all operations; or

c) an FRMS in compliance with 4.10.6 for part of its operations and the requirements of 4.10.2 a) for the remainder of its operations.

In February 2012, ICAO adopted an International Standards and Recommended Practice for fatigue regulation which described the concept and elements of a Fatigue Risk Management System in more detail. According to ICAO, an FRMS is “*a data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.*” ICAO guidance indicates that it should contain¹:

- An FMRS policy
- Documentation processes
- A fatigue risk management process – which should include identification of hazards, risks and mitigations
- A safety assurance process (monitoring and reporting)
- Promotion and training for staff

New Zealand civil aviation regulations

All New Zealand civil aviation regulatory requirements are focussed on flight and duty schemes. FRMS is not yet specifically incorporated into New Zealand requirements or guidance. The Civil Aviation Rules (CARs) specify regulations for basic fatigue management for Part 115, 121, 125 and 135 operations. Part 145 provides requirements for maintenance personnel duty time limitations.

Smaller Part 115 and Part 135 operators are required to implement a flight and duty scheme that is acceptable to the Director. The relevant rule requirements (115.401 and 135.80)

¹ In 2012, ICAO released “FRMS – A Manual for Regulators” (Doc 9966) providing updated standards and recommended practices for managing fatigue.

contain a list of factors that must be taken into account in the approved scheme (see Appendix One). For commercial transport operations (such as freight operations and operations carrying crew members for specific purposes) specific limits on flight and duty hours are also specified in Part 135.

Fatigue rules in Parts 121 and 125 are similar except that the rules prescribe specific limits on aggregate times that air transport pilots can fly. As an example, Rule 121.805 and 125.805 state:

(d) A person must not act as a flight crew member of an aircraft performing an air operation if, at the beginning of the flight, the aggregate of the person's previous and planned flight times on air operations—

(1) during the period of 28 consecutive days expiring at the end of the day on which the flight begins — exceeds 100 hours; or

(2) during the period of 365 consecutive days expiring at the end of the day on which the flight begins — exceeds 1000 hours.

In practice, flight and duty schemes are approved through operator expositions guided by Advisory Circular 119-2 which sets out fatigue management guidelines for internal (within New Zealand) and external (operating outside New Zealand) operations. This includes details on rostering flight times, duty periods, meal periods and rest periods².

With the exception of Part 145 maintenance organisations, there are no other duty time limitation requirements for ground based operations. Part 145.52 could be argued to provide some management of fatigue.

145.52 Maintenance personnel duty time limitations:

An applicant for the grant of a maintenance organisation certificate must establish procedures to ensure that a person who is authorised under rule 145.60 to perform or supervise maintenance, or to certify release-to-service, or to certify conformity to acceptable data is relieved from duty for—

(1) a period of at least 8 consecutive hours in the 24-hour period immediately before exercising the authorisation; and

(2) at least 4 periods of at least 24 consecutive hours each in the 30-day period immediately before exercising the authorisation.

In the agricultural sector, the CAA's recent Agricultural Sector Risk Profile identified a suite of risk-taking behaviour as presenting safety risks, including operating while fatigued. On deeper analysis, it was found that the cause of fatigue was driven largely by the practical and economic pressures faced within the industry. Work is underway by the Helicopter & Agricultural Operations unit to address these underlying causes (see). Because the underlying causes cannot be resolved by rule making, there is currently no intention to amend the rule requirements in this area.

The CAA's draft "Occupational Health and Safety for Cabin Crew and Flight Crew" guideline provides information on fatigue management for these personnel.³ While this

² For example: "During any duty period exceeding 4 hours the pilot shall have a rostered meal period on the ground of not less than 30 minutes free of any 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 preceding meal period."

³ Includes information on the cause, signs, ways to minimise fatigue in the workplace and FRMS.

document is still in draft form, it is considered to outline current best practice and expectations.

Operators and private pilots also receive additional educational material through Vector magazine and the AvKiwi Safety Seminars⁴.

Advisory Circular 00-4 (Safety Management Systems) provides information on developing a formal risk management framework to improve safety. Included is a note on integrating SMS with other management systems, including FRMS:

There are a number of case studies within industry to demonstrate that the integration of the FRMS within the SMS framework is extremely beneficial, particularly when considered alongside the human factors-related risks that must be systematically managed.

FRMS (including managing stress and fatigue) are mentioned in AC 121-4 (The Training and Assessment of Human Factors and Crew Resource Management). This AC recommends elements that should be included in the development of human factors training programmes for Part 121 operators.

Other New Zealand regulations

All aviation businesses have to comply with minimum requirements set out in the Health and Safety in Employment Act 1992, regardless of rules set by the CAA (except in limited, specified circumstances). The HSE Act⁵ includes a requirement in Part 1, section 5(b) that employers:

“promote the prevention of harm to all persons at work and other persons in, or in the vicinity of, a place of work by...

(b) defining hazards and harm in a comprehensive way so that all hazards and harm are covered, including harm caused by work-related stress and hazardous behaviour caused by certain temporary conditions”.

Section 2 of the HSE Act defines a hazard as:

“a) means an activity, arrangement, circumstance, event, occurrence, phenomenon, process, situation, or substance (whether arising or caused within or outside a place of work) that is an actual or potential cause or source of harm; and (b) includes - (i) a situation where a person’s behaviour may be an actual or potential cause or source of harm to the person or another person; and

(ii) without limitation, a situation described in subparagraph (i) resulting from physical or mental fatigue, drugs, alcohol, traumatic shock, or another temporary condition that affects a person’s behavior.”

The Employment Relations Act 2000 also places obligations on employers to provide rest breaks for employees.

Appendix Two provides a summary of the current regulatory approaches to fatigue management of organisations and participants involved in aviation.

Previous efforts to address fatigue issues

⁴ A Vector Article on fatigue appeared in the January/February 2014 issue. The 2014 “Personal Pre-Flight” seminars focus on educating pilots on pre-flight human factors that could impact their ability to fly.

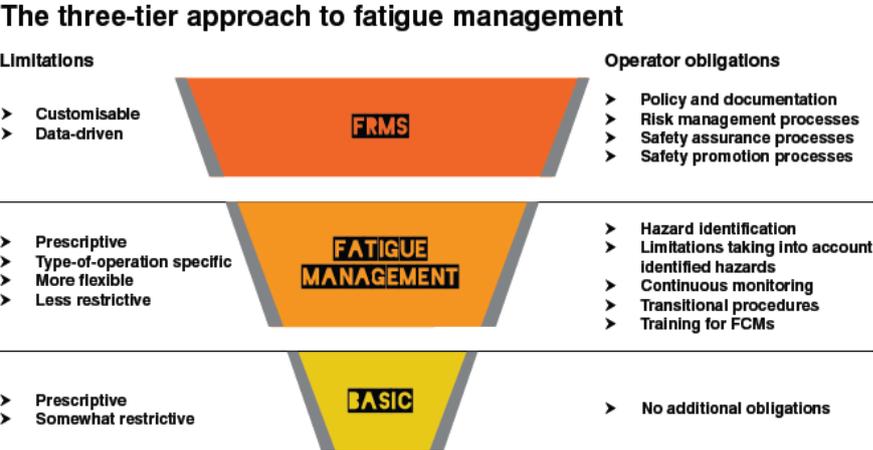
⁵ The HSE Act is currently being reviewed by Ministry for Business, Innovation and Employment, with the new Health and Safety at Work Reform Act due to come into effect in April 2015. No significant changes are expected as a result of this change as it pertains to the issue discussed in this paper.

This issue was raised in 2007/2008 in response to an ICAO audit finding ANS/02 citing inconsistencies between CAA and ICAO fatigue management. In 2006, a CAA workshop identified the issues described in issue submission 8.ISS.44 (above).

Following on from the 2006 workshop, a subsequent meeting in 2010⁶ identified amendments needed to Parts 121, 125 and 135 to better address fatigue across the air transport sector. The meeting recommended a fatigue management rule project be added to the 2010/11 rule development programme. At that time, it was considered that further work by CAA was needed to determine whether amendments were required to other Parts (e.g. 91, 141 and 145) which do not have any fatigue management requirements.

Fatigue management by other States

In 2012, The Australian Civil Aviation Safety Authority (CASA) introduced Civil Aviation Rule 48 (flight time limitations) to address fatigue of flight crew members and operators, and align Australian regulations with ICAO’s Annex 6. CASA adopted a graduated, three-tiered approach to managing fatigue (see below diagram) ranging from basic fatigue requirements to more prescriptive, that will be adopted by operators based on their operational requirements.



CASA also re-established a project to review current standards and amend legislation to make current rules less prescriptive and reflect the more advanced methods of fatigue management that have become available.

In addition to rules, States such as Australia, Canada and the United States provide comprehensive educational material for operators. This material covers identifying and managing fatigue, the causes of fatigue, and information on developing fatigue management processes for operators.⁷

⁶ The 2006 workshop included a panel of fatigue management experts. The 2010 workshop included a mix of CAA staff and industry representatives.

⁷ See <http://www.casa.gov.au/fatigue>, <http://www.tc.gc.ca/eng/civilaviation/standards/sms-frms-menu-634.htm> and http://www.faa.gov/about/initiatives/maintenance_hf/fatigue/

Is there a problem?

International alignment

The analysis above indicates that New Zealand requirements do not align with the current ICAO standards relating to management of fatigue for international operations. States are expected to provide regulations supporting both flight and duty schemes and fatigue risk management systems – to enable operators to select the mechanism for fatigue management that best suits their needs. CASA has implemented this in a tiered approach, with lesser risk operations only requiring flight and duty schemes, and higher risk organisations encouraged to implement FRMS.

Currently operators can incorporate a Fatigue Risk Management System that aligns with the guidelines in AC 121-4. However, this must still meet the flight and duty scheme requirements outlined in the rules. This provides a barrier to operators wishing to implement fatigue management systems as the two are not necessarily compatible.

Domestic safety risks associated with fatigue

ICAO standards and recommended practices relating to fatigue do not apply at a domestic level, however there is substantial evidence to suggest that pilot fatigue in particular can create a safety risk. From 2003 to 2007 there were four fatal accidents involving fatigue recorded in New Zealand.⁸ Reduced attention due to the effects of fatigue was reported as contributing to each accident, where each pilot had been flying for more than 7 hours in their shift. Of the four accidents, three occurred in top-dressing operations. This is mirrored by domestic incidents in other States. In Australia three fatal fatigue-related accidents were reported from 2010 to 2013. In all cases the pilot was reported to have fallen asleep while in flight. The United States have six reported fatigue-related incidents or accidents from 2004 to 2012. In four of these cases the pilots and co-pilots were asleep during flight.

There is little evidence that fatigue in private operations plays a significant role in public flight safety. Pilot and engineer fatigue is managed through largely voluntary mechanisms. The CAA has put significant effort into articles in Vector, posters and booklets, and AvKiwi seminars. Pilot training includes elements to ensure that pilots are aware of the need for fatigue management. These mechanisms appear to be effectively managing any issues around private pilot fatigue.

The link with flight safety is more difficult to illustrate when it comes to ground-based aviation personnel. There is limited data available that suggests that fatigue is a specific concern for flight safety when it involves personnel working in supporting operations. However despite the lack of data, there is potential for fatigue of supporting personnel to ultimately affect flight safety.

Complexities

Fatigue is highly personalised, that is, it depends greatly on the tolerance of the specific individual to fatigue, the range of factors that he or she is exposed to that may exacerbate fatigue (both at work and in their private lives), and the likelihood that their actions could directly influence the safety of the flight.

Through the above discussion, two primary themes have emerged around whether New Zealand's current regulatory approach to aviation fatigue management is effectively dealing with the complexities involved in this issue.

⁸ Three non-fatal occurrences involving fatigue were also reported from 2002 to 2006.

1. *Lack of flexibility in existing Civil Aviation regulatory approach*
 In air transport and commercial engineering operations the focus is heavily on ‘duty schemes’ – designed exclusively around the daily workload of the affected person – with very specific guidance within advisory circular 119-2 on what may be considered ‘acceptable to the Director’. In practice, CAA auditors tend to rely heavily on the contents of the advisory circular when approving expositions. The CAA has few ‘experts’ in this field who would be able to determine whether fatigue was being effectively managed through alternative means. This can result in a more ‘prescriptive’ approach to fatigue being taken by CAA auditors when approving expositions, with a corresponding reduction in flexibility of approach to enable management of individual situations.

2. *Gaps in other aviation operations where fatigue may cause a high risk to flight safety*
 For aviation operations not currently covered by existing regulation, such as security, Air Traffic Control, ground crew and aviation training, the Health and Safety in Employment requirements to manage fatigue are targeted at employee safety. While some of the larger operations (eg Avsec and Airways New Zealand) have specific procedures in place to manage fatigue, compliance with health and safety requirements is variable and not necessarily targeted at flight safety. In these cases, the specific employee function becomes relevant to whether or not their fatigue could impact on flight safety. In these cases, there may be gaps in the civil aviation regulatory approach.

Level of Risk

International alignment

At an international level, the lack of alignment with ICAO fatigue management standards without appropriate justification places a risk on the CAA as a competent regulator in the international context. This could be resulting in an increased safety risk as flight and duty schemes do not completely address the full risk associated with fatigue. There are also potential reputational risks for New Zealand internationally where other states are not comfortable with New Zealand’s approach to managing aviation fatigue and decline or restrict New Zealand aviation operations from their airspace.

Risk = **HIGH** (likelihood:high/impact:moderate)

Domestic flight safety

Lack of flexibility in existing Civil Aviation regulatory approach: Existing regulation largely provides for basic fatigue management for air transport and commercial engineering operations, and all operators must have approved flight and duty schemes in place. However the current requirements are not holistic in their approach in that they do not take into account the full range of risk factors that could result in fatigue. The practical application by CAA personnel also results in a more prescriptive approach to fatigue management than is considered appropriate in some cases.

Risk = **MODERATE** (likelihood moderate/impact low)

Gaps in other aviation operations where fatigue may cause a high risk to flight safety: On the whole, there does not appear to be any significant risk associated with the lack of specific civil aviation regulation in other aviation sectors. In the potentially higher risk areas, such as security or air traffic control, procedures and agreements are in place to manage employee

fatigue. There may be some variability in response to the Health and Safety requirements and some specific functions where there is a higher risk to aviation safety, but these appear minimal.

Risk = **LOW** (likelihood low/impact low)

Options

Resolving problems relating to international alignment

1. *Status Quo* – no change to the current approach. Flight and duty schemes would continue to be approved via expositions, and operators encouraged to implement fatigue risk management systems.

This option would not be fully compliant with the ICAO approach and so a difference would need to be filed. This approach may limit operator ability to effectively manage fatigue as the two systems (flight and duty schemes and fatigue risk management systems) are not necessarily completely compatible and could potentially create a barrier to operators wishing to implement fatigue risk management systems.

2. *Align rules to comply with ICAO Annex 6 approach for international operations* – this approach would introduce the option for operators to implement approved Fatigue Risk Management Systems and would be complemented by communications, guidance and training to assist operators to develop the appropriate approach.

This option would align with ICAO requirements and enable operators to implement more flexible and targeted risk management systems. Where operators implement a FRMS, the CAA would need to ensure it has access to the suitably qualified personnel to assess that FRMS and determine its appropriateness for the operation in question.

Domestic flight safety

Lack of flexibility in the existing civil aviation approach

3. *Status Quo*: Parts 115, 121, 125 and 135 operators would continue to manage fatigue through approved flight and duty schemes and Part 145 operators would comply with duty limitations.

Maintaining the current situation would not address the issues or risks identified with the lack of flexibility in the existing civil aviation approach. Of course, maintaining the status quo for domestic operators, many of whom are small operations, means little to no financial or regulatory impact for these operators.

4. *Provide for greater flexibility within the Advisory Circular AC 119-2*. The current advisory circular is highly prescriptive and does not effectively take into account the potential for variability or other factors associated with fatigue. As the rules themselves are reasonably performance based, providing more flexibility within the advisory circular, with a greater focus on the risks that need to be addressed in the development of flight and duty schemes may go some way toward managing the need for flexibility.

This approach would align with the CAA's approach to SMS and a risk-based regulatory model. It would allow organisations to better tailor their management of fatigue to the needs and scope of their operations. Where fatigue is identified as a significant, specific risk, appropriate actions could be taken by the operator and/or the CAA through the exposition acceptance process.

However, this option could pose a cultural shift for an industry used to specific guidance and prescribed flight and duty shifts. Enabling a more flexible approach that considers a wider range of factors influencing fatigue would necessitate some industry education.

5. *Develop more expertise within CAA to understand risks associated with fatigue*: There is limited expertise within the CAA to determine whether operators' proposed flight and duty schemes will adequately address fatigue. As the requirements around flight and duty schemes become more complex and sophisticated, providing for more training or expertise in this area may enable CAA staff to assess proposals for approval of flight and duty schemes that are different to the 'acceptable means' outlined in the advisory circular.

It is worth noting here that prior agreement was reached on 11 September to establish a cross-team working group within the CAA of aviation fatigue specialists. This could be a mechanism to implement this option.

6. *Amend the rules to enable operators to put in place Fatigue Risk Management Systems*: This approach would align domestic air transport and commercial engineering operations with international requirements.

Enabling Fatigue Risk Management Systems would introduce the flexibility that is currently lacking in the existing regulation and achieve consistency across the industry. As noted in option 4 above, this approach may involve a significant cultural shift for many operators, particularly domestic ones.

Gaps in other aviation operations where fatigue may cause a high risk to flight safety

7. *Status Quo* – No change to the current approach. The risk in this area is not considered to be high, and existing approaches appear to be largely addressing fatigue.

8. *Work with Worksafe NZ to ensure that health and safety regulation effectively manages fatigue in aviation businesses* - while the health and safety focus is on employee safety, this has flow on effect to flight safety. This may be informed by further research and a risk assessment to identify the specific roles where fatigue of aviation employees may impact on the health and safety of colleagues and/or the general public. The CAA working group on aviation fatigue, recently agreed upon for establishment, could undertake this work.
9. *Rely on SMS for operators who have identified fatigue as a high risk* - with the introduction of SMS, certificated operators will be required to manage the risks identified for their operation. Where fatigue is identified as a high risk to flight safety, and there is no specific regulatory requirement to manage fatigue, SMS may be the mechanism by which to manage these risks.

This option would be consistent with the CAA's general approach to risk-based regulation, and could support the CAA's message that SMS can act as a single, comprehensive management system for an entire operation. Implementation of this option is dependent on a final SMS rule being ultimately approved.
10. *Extend civil aviation fatigue management regulation to cover all aviation operations* – given the risk of gaps in the existing regulatory system is considered low, the cost of compliance with such a requirement may be higher than the safety benefit gained.

Recommendations

1. Align rules to comply with ICAO Annex 6 approach for both domestic and international air transport operations and the supporting engineering functions.
2. Amend AC 119-2 accordingly. Consideration should be given to alignment of this AC with the CASA approach, i.e. low risk operations could continue to utilise flight and duty schemes, while higher risk operations could implement fatigue risk management systems.
3. Develop greater expertise within CAA on fatigue risk management. This recommendation has already been informally acted upon through the establishment of a cross-team working group on aviation fatigue.
4. Where fatigue is identified as a specific risk to operations that are not covered by civil aviation fatigue requirements, then SMS could be utilised as a tool to deal with individual situations.

Appendix One

Rule 115.401

115.401 Operator responsibilities – flight and duty scheme

(a) A holder of an adventure aviation operator certificate must ensure that an adventure aviation operation is not performed unless a scheme has been established for the recording and regulation of all flight and duty times for each person performing the duties of a flight crew member or tandem master.

(b) The flight and duty time scheme required by paragraph (a) must be acceptable to the Director and address the following factors where appropriate to the operator's type of operation:

(1) rest periods prior to flight:

(2) mixed duties:

(3) standby periods:

(4) flight duty period:

(5) type of operation:

(6) cumulative duty time:

(7) cumulative flight time:

(8) discretionary increases in flight time limitations or flight duty limitations or both:

(9) circadian rhythm:

(10) days off:

(11) record keeping.

(c) A holder of an adventure aviation operator certificate conducting an adventure aviation operation must—

(1) ensure that a person does not act as a flight crew member or tandem master if the certificate holder knows or has reason to believe that the person is suffering from, or, having regard to the circumstances of the flight to be undertaken, is likely to suffer from, such fatigue while the person is acting as a flight crew member or tandem master that the safety of the aircraft or its occupants may be endangered; and

(2) keep an accurate record of the flight time and duty time of each flight crew member and tandem master, including any other hire or reward flight and ground duties; and

(3) retain the flight time and duty time record required by paragraph

(c)(2) for a period of 12 months from the date on which it was made.

135.803 Operator responsibilities

(a) A holder of an air operator certificate must not cause or permit an air operation to be performed with an aircraft unless—

(1) a scheme has been established for the regulation of flight and duty times for every person flying as a flight crew member in the aircraft; and

(2) the scheme addresses the following factors for air transport operations where appropriate to the operator's type of operation:

- (i) rest periods before flight:*
- (ii) acclimatisation:*
- (iii) time zones:*
- (iv) night operations:*
- (v) maximum number of sectors:*
- (vi) single pilot operations:*
- (vii) two pilot operations:*
- (viii) two pilots plus additional flight crew members:*
- (ix) flight crew members' qualifications:*
- (x) mixed duties:*
- (xi) dead-head transportation:*
- (xii) reserve or standby period:*
- (xiii) flight duty period:*
- (xiv) in-flight relief:*
- (xv) type of operation:*
- (xvi) cumulative duty time:*
- (xvii) cumulative flight time:*
- (xviii) discretionary increases in flight time limitations or flight duty limitations or both:*
- (xix) circadian rhythm:*
- (xx) days off:*
- (xxi) record-keeping; and*

(3) the scheme for commercial transport operations, complies with the following:

- (i) flight crew must not fly in excess of 160 hours in any 30 consecutive days:*
- (ii) flight crew must have not less than 2 days free of duty in any 14 day period:*
- (iii) flight crew must have not less than 2 consecutive days free of duty in any 30 day period; and*

(4) the scheme is acceptable to the Director.

(b) The operator of an aircraft performing an air operation must not cause or permit any person to fly in the aircraft as a flight crew member if the operator knows or has reason to believe that the person is suffering from, or, having regard to the circumstances of the flight to be undertaken, is likely to suffer from, such fatigue while the person is flying as may endanger the safety of the aircraft or its occupants.

(c) The operator of an aircraft performing an air operation must—

(1) keep an accurate record of the flight time and duty time of each flight crew member; and

(2) retain the flight time and duty time record required by paragraph

(c)(1) for a period of 12 months from the date on which it was made.

125.803 Operator responsibilities

(a) The operator of an aeroplane must not cause or permit an air operation to be performed with the aeroplane unless—

(1) a scheme has been established for the regulation of flight and duty times for every person flying as a flight crew member in the aeroplane; and

(2) the scheme addresses the following factors if appropriate to the operator's type of operation:

(i) rest periods before flight:

(ii) acclimatisation:

(iii) time zones:

(iv) night operations:

(v) maximum number of sectors:

(vi) single pilot operations:

(vii) two pilot operations:

(viii) two pilots plus additional flight crew members:

(ix) flight crew members' qualifications:

(x) mixed duties:

(xi) dead-head transportation:

(xii) reserve or standby period:

(xiii) flight duty period:

(xiv) in-flight relief:

(xv) type of operation:

(xvi) cumulative duty time:

(xvii) cumulative flight time:

(xviii) discretionary increases in flight time limitations or flight duty limitations or both:

(xix) circadian rhythm:

(xx) days off:

(xxi) record-keeping; and

(3) the scheme is acceptable to the Director.

(b) The operator of an aeroplane performing an air operation must not cause or permit any person to fly in the aeroplane as a flight crew member if the operator knows or has reason to

believe that the person is suffering from, or, having regard to the circumstances of the flight to be undertaken, is likely to suffer from, such fatigue while the person is flying as may endanger the safety of the aeroplane or its occupants.

(c) The operator of an aeroplane performing air operations must—

(1) keep an accurate record of the flight time and duty time of each flight crew member flying in the aeroplane; and

(2) retain the flight time and duty time record required by paragraph

(c)(1) for a period of 12 months from the date on which it was made.

(d) Notwithstanding rule 125.805(c), the flight and duty time scheme limitations do not apply if the flight is one which ought to be made in the interests of safety or health of any person, in such cases it is the responsibility of the pilot-in-command to be satisfied that the safety of the flight is not endangered by reason of any flight crew member exceeding the applicable flight time limitations.

Appendix Two

<Create a title>

Role	CAR	Other regulations and practice	Potential for fatigue to affect flight safety
Part 115 - Adventure Aviation operations	115.401		Moderate
Part 121 - Air Operations – Large Aeroplanes	121.801 – 121.805		Moderate
Part 125 - Air Operations – Medium Aeroplanes	125.801 – 121.805		Moderate
Part 135 - Air Operations – Helicopters and Small Aeroplanes	135.801 – 135.805		Moderate
Part 137 - Agricultural Aircraft Operations	None	Health and Safety Act, Sector risk profile implementation ⁹	Medium
172 - Air Traffic Service Organisations (<i>including Air Traffic Control</i>)	None	Health and Safety Act, collective employment agreements. ¹⁰	Low
Part 140 - Aviation Security Service Organisations	None	Health and Safety Act.	Low
Part 145 - Aircraft Maintenance Organisations	None	Health and Safety Act	Moderate
Part 141 - Aviation Training Organisations	None	Health and Safety Act	Low
Part 146 - Aircraft Design Organisations	None	Health and Safety Act	Low

⁹ See 7.ISS.90

¹⁰ See 6.ISS.10

Part 148 - Aircraft Manufacturing Organisations	None	Health and Safety Act	Low
Part 149 - Aviation Recreation Organisations	None	None	Moderate
Part 109 - Regulated Air Cargo Agents	None	Health and Safety Act	Very low
Other non-certificated organisations and individuals	None	Health and Safety Act (if a commercial operation), or none if a private/recreational operation	Low

Where fatigue results in an accident, the costs can be significant, including potential loss of life. However, the economic risk of insufficient fatigue management requirements is largely dependent on the operation being considered. Some operators are already practicing fatigue management to some extent. The costs to some operators of implementing a formal fatigue management system would vary depending on their current practice; though some costs may be offset by the avoidance of others that result from accidents where fatigue was a contributing factor.