Australian Federation of Air Pilots

Submission in Response to CASA's Fatigue Rules Independent Review 2018

22 April 2018

OVERVIEW

The Australian Federation of Air Pilots (AFAP) represents over 4,500 professional pilots in aviation safety and technical matters and is the largest professional pilot association in Australia. As a founding member of IFALPA, the AFAP also represents these pilots internationally with strong cooperation of over 100 international pilot associations representing well over 100,000 pilots.

We welcome this opportunity to provide feedback to the Independent Review of Australian Fatigue Rules for Operators and Pilots (2018). The AFAP agrees with many of the review report's points and recommendations. In all, we support 15 of the 24 recommendations, however we note there are some caveats and additional commentary in relation to some of these supported recommendations.

While we consider that this report is ultimately a positive step towards finalising fatigue regulation reform in Australian aviation, and we applaud the fact that the review report considers CAO 48.1 to be a necessary reform, we have a number of concerns and objections related to some report perspectives and the associated recommendations.

A common theme throughout the report is the apparent need to introduce substantially more flexibility for Operators. We largely believe that CASA has done a good job with CAO 48.1 and that there is sufficient flexibility provided by the inclusion of Appendix 7 and indeed 7 appendices. We do however agree that this flexibility could be enhanced through a two-tier approach to FRMS, as suggested in Recommendation 4. Notwithstanding this, the AFAP is concerned that the Review Team strongly advocate for the introduction of greater flexibility, but fail to provide similar support in their recommendations for a commensurate increase in operator responsibility toward fatigue risk management to accompany any potential increase in flexibility.

The AFAP recognises the direct association of scalable responsibility with an associated gain in flexibility as an essential and underpinning fatigue management philosophy. It appears that there are many who either don't understand this, or simply refuse to accept the greater responsibility that must flow with the greater flexibility. We consider this to be an unacceptable position and suggest that this review outcome may have been avoided if more appropriate terms of reference had been used.

The AFAP notes that CASA set the terms of reference (TOR) for the Independent Review and we believe that some of these TORs have unduly restricted the review. An example of this is the requirement to compare with *"international peer regulations"*. The AFAP believes this is a restrictive TOR because it has led to the ICAO SARPs being largely ignored by the Review Team in lieu of a preference to benchmark against international 'averages'. The tone of the review appears to dismiss scientific evidence and instead relies on averaging international data - antithetical to the tone of CASA's own paper which is very analytical and science based (A review of the case for change: Scientific support for CAO 48.1 Instrument 2013).

It seems bizarre that the TOR would overlook such a wealth of scientific information as

described in CASAs own research summary and instead rely so heavily on the "desktop" comparison to other jurisdictions, omitting ICAO almost entirely.

The ICAO fatigue guidance material has taken many years to develop with Subject Matter Experts (SMEs) from all stakeholder groups, including the tripartite drafting team from ICAO, IATA and IFALPA. It is disappointing to see this review team give lesser weight to these ICAO SARPs compared to the outcomes of other State regulators, which have their own unique struggles with implementing best practice fatigue rules. Examples are included for Canada, NZ, UK and EASA.

Further to this, the AFAP considers that the TOR have more broadly restricted the review team, with the result that commercial interests have been given precedence over conclusive scientific evidence on the subject of fatigue. The AFAP is concerned that there is a preference for appeasing commercial interests over championing the underpinning safety philosophies of this much-needed reform.

Due to the TOR unduly restricting an open review of the fatigue rules, the AFAP considers there is a need to provide some further recommendations. Our recommendations can be found detailed at the end of the substantive response, however the following list provides a summary:

- That CAO 48.1 includes an internationally recognised definition of the Window of Circadian Low (WOCL). The current implied definition of local night is at odds with the ICAO SARPs and other regulators.

- Extended duties limits: The AFAP recommends improving the prescriptive limits to reflect international fatigue science.

    - Split duties should be limited to 16 hours under certain conditions.

    - FDP should be restricted to 13 hours for daytime starts. There is scientific consensus that 13 hours FDP should be the hard limit (duties starting 0800-1100 with one sector and no extensions),

    - FDP for overnight operations (encompassing the WOCL) should not exceed 10 hours.

- Ensure that sleep opportunity is realistic.

- That the regulator regularly surveys for commercial pilot fatigue.

- Include pilot representation in fatigue working groups within organisations.

- Include Professional Pilot representation on the CASA Aviation Safety Advisory Panel (ASAP).

THE AFAP RESPONSES TO REVIEW RECOMMENDATIONS

THE AFAP RESPONDS TO THE CASAS FATIGUE RULES INDEPENDENT REVIEW 2018 LIST OF 24 RECOMMENDATIONS:

Recommendation 1

That CASA collaborates with the Australian Transport Safety Bureau (ATSB) to develop an agreed definition of a 'fatigue-related safety occurrence', in order to generate and publish more definitive data on fatigue-related safety events in the Australian aviation industry.

The AFAP agrees with and supports this recommendation. It is well known by air safety investigators that fatigue has long been a hidden causal factor in many aviation accidents and incidents. The ATSB now collect data on a pilot's fatigue history for up to a week before an accident or incident, this includes both operational scheduling and lifestyle implications.

More robust data collection and analysis of this type of fatigue data is encouraged by the AFAP.

Recommendation 2

That where an operator chooses to conduct its operations under a specific Appendix, other than Appendix 1 (prescriptive limits) or Appendix 7 (FRMS), CASA amends Appendices 2 to 6 to provide operators some limited scope for flexibility with respect to compliance with the rules using a standardised approval process. This process will enable CASA to show that it considers fatigue mitigation to be appropriate relative to the risk exposure profile.

The AFAP does not support this Recommendation and believes there is already sufficient flexibility contained through the use of appendix 7 (FRMS) and more broadly through the provision of 7 different appendices. The review team's recommendation to provide greater flexibility through amending appendices 2 through 6 is both an unnecessary complication and an increase of risk without an appropriate and commensurate increase in operator responsibility. As the AFAP understands it, a key feature of implementing an FRMS in accordance with appendix 7 is the gaining of extra flexibility for operators with a commensurate increase in operator responsibilities.

Given that the current approach to implementing an FRMS is for the prescriptive limits from an appendix (2-6) to be the baseline prescriptive limits for the FRMS, and that these can be altered on a needs basis, with reference to a science based risk mechanism, we do not see the need for creating flexibility within appendices 2-6 when appendix 7 already provides this. In other words, the desired flexibility noted in this recommendation (2) can already be achieved through the use of a simple FRMS model, which is less cumbersome in nature, as

outlined in the Review Team's Recommendation 4. (We generally support Recommendation 4 but with some caveats). Given the limited scope for flexibility to amend appendices 2-6, the specifics of one particular operator would require a risk assessment and a needs case to be made anyway, this should be in keeping with the assessments already contained and within an FRMS. To make a recommendation for greater flexibility beyond the controls of Appendix 7 is effectively promoting pseudo FRMS's within appendices 2 to 6. We consider that this hybrid scenario, as recommended, has no basis in science or evidence, and is simply designed to increase commercial flexibility. As such, we believe it has no foundation in the principles of fatigue management and should not be adopted.
We believe that CASA should consider Recommendation 2 unnecessary and potentially dangerous. Alternatively, a focus on making Recommendation 4 workable should be viewed as the far superior option to enacting Recommendation 2 and indeed the solution to gaining the flexibility sought by Recommendation 2.

Recommendation 3

That, notwithstanding any challenges the Australian operating environment may present, CASA adopts prescriptive FDP limits that are more closely aligned with international averages for similar types of operation.

The AFAP does not support this recommendation.

The use of international averages is problematic and does not take into consideration the extent to which the original limits of the comparison jurisdictions were a compromise, or indeed if they are insufficient themselves. There may be many reasons for these jurisdictions not fully applying the ICAO SARPs, such as political acceptance within their own jurisdiction or for some nuanced circumstance relative to the uniqueness of their operational environment. The actual reasons remain unclear. A number of examples are offered below for why using the so called international averages is problematic.

The report provides a relatively detailed and tabulated comparison in sections 2.5 and 2.6, culminating in Recommendation 3. Alarmingly, none of these tables provide a comparison to the ICAO SARPs however. We believe this to be a significant oversight given that the TOR Objectives and Considerations require the review to include benchmarking to both commensurate international jurisdictions and to the ICAO SARPs. Table E-1 In Annex E provides a direct comparison to the ICAO SARPs, however this is only for FRMS (CAO 48.1 Appendix 7), not the prescriptive limits, which are the subject of Recommendation 3.

Furthermore, a relevant section of the DAS Directive (utilised for the Review TOR) asks for regulatory alignment with other standards and practices, adopted by the ICAO. Also, the directive states that regulations should be consistent with international best practice. In our view, international best practice is to adopt and adhere to the ICAO SARPs. Notwithstanding this, the Directive makes it clear that if the regulations from other jurisdictions are to be considered, the Australian regulations should more closely align with the best practice, not simply an average.

Consideration must also be given to other protections these legislatures include in their FTL schemes beside FDP and flight time limits that are absent in CAO 48.1.

Our position in response to this recommendation is:

- CASA should adhere to the ICAO SARPs as closely as possible;
- If there is to be a divergence from these standards, it is from the ICAO SARPs that the Australian case should primarily be considered against for divergence, not from 'international averages' as noted in the recommendation;
- Any divergence must be considered primarily on the grounds of safety risk; and
- International best practice is not the same as utilising international averages.

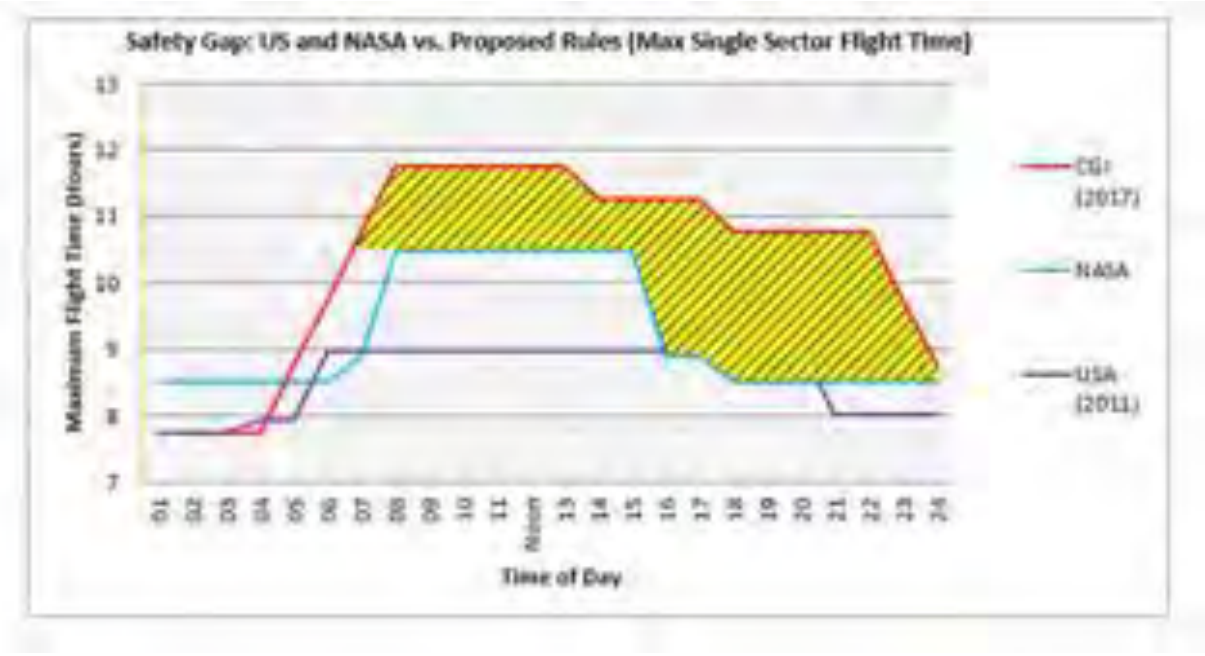
Whilst we acknowledge that there are also other considerations present in the mentioned DAS Directive, regarding benchmarking against international standards, clearly there is no directive to use international averages.

Below is a discussion on some of the legislative schemes analysed in the review.

Sections of the Canadian FDP rules are still in contention and should not be used for comparison.

The FDP table in Canada had more to do with industry needs than the reliance of available science. The most compelling case is the accepted science on single sector flights and corresponding duty days (Samel, et at 1997) basically 12 hours duty during the day and 10 hours at night. The graphic below highlights the difference in single sector flight between the CG1 proposal and the science (labelled NASA for the NASA technical memorandum). Especially for single sector flights, there is no contradictory science that justifies the greater values. Also absent under the Canadian legislation is any reduction returning from overseas after a difficult all night operation. A 13 hour FDP with 11:45 flight time with two pilots is an extreme example of fatigue legal in CG1.

Canadian FDP safety gap graphic



The language of the Canadian fatigue regulations is likely to change. With additional protections to ensure greater time off following time zone shifts, especially if either duty infringes on the WOCL. Further, without a reasonable weekly limit on flight and or duty, the possibility of back to back overseas rotations that indicate significant fatigue modelling scores could be possible.

This is what was contemplated for the Canadian regulations for greater than 13 hours, but it was later decided to make it part of an FRMS safety case:
Selected FDPs commencing between 07:30 and 11:00 can be extended by up to 45 minutes when the following conditions are met:

a) Extensions must be planned in advance. Flights and turnaround times must be planned to be completed within 13:45 flight duty hours with all known factors on the day of operation. UOC can be used. Limited to 1.5 hours instead of 2 hours.
(b) Flights should be planned quarterly if possible for more realistic wind historical data.
(c) The day prior, the wind projections will be used to plan the duty day and if over schedule by greater than 10 minutes on the second flight the crew check-in will be adjusted 15-30 minutes later. This advice to the pilots to adjust check-in will occur prior to 20:00.
(d) Consisting of 2 flights with similar distance (within 300 nm)
(e) Total cumulative extension time per flight crew member must not exceed 120 minutes within any 7 consecutive days.
(f) The minimum rest following the extended FDP must be 13 hours at home base or 11 hours in a suitable accommodation.
(g) Flight crew member must be afforded at least 2 local night rests immediately prior to starting an extended FDP.
(h) Flight crew member cannot exceed 24 duty hours in any 2 consecutive calendar days.
(i) The FDP after extended day cannot be night duty unless two local night's rest.
(j) FDP cannot include a sector with a flight time greater than 7 hours.

(k) Difference between local time at start of FDP and home base time must not exceed 1 hour.
(l) Extended FDP cannot be combined with extensions due to in-flight rest.
(m) Data will be collected to confirm alertness levels objective and subjective measures.
(n) Modelling indicates fatigue scores ranges of 4.2 starting at 07:30 and 4.5 starting at 11:00 for 13:45 flight duty periods. Actual data needs to confirm safe projections.
(o) CRFD occurrences cannot exceed 10% of the time.
(p) UOC must be closely monitored for realism of planning. (Rare events that cannot be forecast, such as earthquakes, rare volcanic eruptions (less than once every decade) and 911 type terrorist attacks will not be used for realism of planning data if FSAG agrees the event was a rare event)
(q) For breaks in excess of 2 hours on the ground the crew will be given suitable accommodation.
r) At pilot option, hotel rooms will be provided subsequent extended operations to ensure a pilot is not faced with a long drive home following extended operations.

Additional mitigation provisions are included in other jurisdictions and provide substantial additional protections against fatigue risk, particularly in the following areas:

1. extended wakefulness caused by a combination of standby followed by FDP;
2. early start operations that encroach the window of circadian low;
3. consecutive night operations;
4. disruptive schedules, and;
5. rest periods at home base between rotations that cross multiple time zones.

The protections provided in other jurisdictions that are absent in CAO 48.1 include:

1. A more conservative definition of WOCL duties (FAA, CAP, EASA and Transport Canada). All peer legislatures and ICAO define the WOCL as the interval from 0200-0559 acclimatised time.
2. Disruptive schedules provisions (CAP, EASA and Transport Canada);
3. Home base extended minimum rest periods following rotations that cross multiple time zones (EASA, CAP, FAA, TC);
4. More conservative limit of 3 on the number of consecutive FDP's that encroach the WOCL (FAA);
5. 900-hour limit on flight time per calendar year (EASA), and;
6. Much more conservative limits on the combination of Standby + FDP to limit exposure to extended wakefulness (CAP, EASA, FAA, TC).

In support of our proposal for a consensus definition of the WOCL, ICAO, the FAA, Transport Canada and EASA define the WOCL as encompassing the hours 0200-0600 acclimatised time (See the AFAP recommendation 1). In contrast, CASA, through CAO 48.1, does not define the WOCL. Despite this, it can be inferred from the definitions of local night and late night operation that CAO 48.1 considers the WOCL to cease at 0500 acclimatised time. In other words, duties between 0500-0559 would be considered night duties under the FAA definition (limited to a maximum of 3 consecutive FDP's), however this would not be the case under CAO 48.1, meaning that up to 6 such consecutive duties could be assigned.

EASA, CAP and TC consider such duties 'early start duties' and place additional restrictions on them which CAO 48.1 does not contemplate. This includes preventing an early start duty from being rostered after a night duty unless there has been an intervening local night's rest. CAO 48.1 lacks an explicit definition of the WOCL and this affects the definition of a 'late night operation' and 'local night' and their application. Therefore, these concepts do not provide the same level of protection compared to the peer jurisdictions. There is a lack of scientific literature to support CAO 48.1's unique and non-ICAO compliant inferred definition of the WOCL.

For example in the peer jurisdictions, a rest period or time free of duty encompassing a local night ends no earlier than 06:00 to 07:30 acclimatised time. This is to enable a FCM to obtain the majority of their normal WOCL sleep. The fact that CAO 48.1 allows a local night to finish at 05:00 acclimatised time means that WOCL sleep opportunity may be truncated by up to 3 hours even when a 'local night's' rest has been assigned. This is because a FCM typically needs 1 hour after wake up for physiological needs and 1 hour between leaving home and report time when at home base. Thus a 05:00 report time typically corresponds to a 03:00 local time wake up. The 2015 CASA literature for supporting the need for a updated fatigue rules supports that at least an hour and a half should be considered the usual additional disturbed period prior to an assigned FDP commencement time.

The AFAP understand that the unamended version of CAO 48.1 has attempted to mitigate the risk caused by operations that encroach the WOCL by reducing some FDP limits rather than providing the protections contained in peer legislatures. It would be dangerous to assume that these CAO 48.1 FDP limits could be, in some cases, increased to those allowed by peer legislatures without also including the other fatigue risk mitigation protections that those legislatures impose. Such an approach would lead to a higher level of fatigue risk being permitted in the Australian regulations compared to those of peer legislatures with which the review panel has benchmarked CAO 48.1. We therefore understand that the use of so called international averages has been very selectively applied and that this is almost exclusively to the detriment of risk protections.

International Peer Disruptive Schedules Considerations and examples:

EASA CS FTL.1.235 Rest Periods (a) Disruptive schedules

1. If a transition from a late finish/night duty to an early start is planned at home base, the rest period between the 2 FDPs includes 1 local night.
2. If a crew member performs 4 or more night duties, early starts or late finishes between 2 extended recovery rest periods as defined in ORO.FTL.235(d), the second extended recovery rest period is extended to 60 hours.

Additionally, for night duties in excess of 10 hours FDP, EASA requires FRM principals to apply such as:

GM1 CS FTL.1.205(a)(2) Flight Duty Period (FDP)
NIGHT DUTIES – APPROPRIATE FATIGUE RISK MANAGEMENT

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

1. avoiding long night duties after extended recovery rest periods
2. progressively delaying the rostered ending time of the FDPs preceding long night duties;
3. starting a block of night duties with a shorter FDP; and
4. avoiding the sequence of early starts and long night duties.
    i) Fatigue risk management principles may be applied to the rostering of long night duties by means of:
    ii) considering operator or industry operational experience and data collected on similar operations;
    iii) evidence-based scheduling practices; and
    iv) bio-mathematical models.

Transport Canada requires a local night's rest (2230-0730LT) between any late finish or night duty (ending after 0000) and an early start (0200- 0659 report time) and vice versa.

- CAP 371 contains similar provisions to mitigate against the effects of fatigue caused by disruptive schedules and also consecutive early starts.
- CAO 48.1 does not include any limitations on an early start (prior to 0700) being assigned following a previous night duty.
- CAO 48.1 only provides minimal protections for consecutive late night operations and limits the number of late night operations within a 168 hour period to 4.

Examples of International peer requirements for Home base extended minimum rest following rotations encompassing multiple time zones:

The EASA example;

1. For the purpose of ORO.FTL.235(e)(1), 'rotation' is a series of duties, including at least one flight duty, and rest period out of home base, starting at home base and ending when returning to home base for a rest period where the operator is no longer responsible for the accommodation of the crew member.

2. The operator monitors rotations and combinations of rotations in terms of their effect on crew member fatigue, and adapts the rosters as necessary.
3. Time zone differences are compensated by additional rest, as follows:
    i. At home base, if a rotation involves a 4-hour time difference or more, the minimum rest is as specified in the following table. (2-5 local night's rest).

EASA requires at least 2 local nights rest (until at least 0600LT) at home base between any rotation involving 4 hours or more time difference. If there is a transition from an eastward to westward rotation or vice versa, 3 local nights rest at home base are required between alternating rotations.

The FAA requires 56 hours rest (including 3 local nights) following 168 hours away from home base where the FCM travels more than 60 degrees longitude.

Transport Canada imposes various requirements for local nights' rest (22:30-0730) after rotations involving considerable time zone displacement.

In contrast, CAO 48.1 does not contain substantive provisions for local night(s)' home base rest following rotations that involve multiple time zone displacement.

Examples of more conservative limits on consecutive number of FDPs that encroach the WOCL

(The following information applies both in the context of how the pseudo WOCL definition adopted by CAO 48.1 differs from peer legislatures, as well as substantive differences in the number of consecutive WOCL duties that can be assigned).

- The maximum number of consecutive early start duties (0500 acclimated time) or night duties that can be assigned under FAA regulations is 3. Whilst under CAO 48.1 a FCM can be assigned 6 consecutive early start duties.
- The less restrictive CAO 48.1 limit on consecutive night duties allows 2 consecutive 'out and back' rotations involving 2 FDPs each consisting of night duties to be assigned 'back to back' without sufficient recovery rest at home base. This is not allowed under FAA or Transport Canada regulations.

900-hour Flight Time Limit per Calendar Year (EASA)

This hard limit on flying hours provides a useful mitigation against long term cumulative fatigue especially in operational environments that are highly seasonal in nature.

Much more conservative limit on the combination of (Standby) STBY + FDP
All peer legislatures have significant protections to limit the combination of STBY followed by subsequent callout and FDP for the purposes of limiting the time that a FCM is required to be awake to approximately 16 hours. This is in line with the consensus of scientific fatigue research that confirms that the risk of fatigue related errors increases to an unacceptable level after approximately 16 hours awake.

CAO 48.1 has almost no protections to mitigate against this risk. For example, a FCM assigned a 0300-1500LT standby would have planned their sleep to be sufficiently rested for a 03:00 call in for a 05:00 report time. Under CAO 48.1, they can be woken at 03:00 for a 14:59LT sign on and assigned a 12 hour, 2 sector FDP. This would have the FCM signing off at 02:59LT, potentially resulting in 24 hours awake. Even if the FCM was not called early, they would likely be awake at 05:00-06:00 and still be liable to be assigned a FDP that would result in over 20 hours awake. This constitutes an unacceptable fatigue risk that is protected against in all peer legislatures but not through CAO 48.1

In summary, the AFAP holds the view that the Independent Review Team has erred in its approach to international benchmarking, with the so called use of international averages, because they have selectively included opportunities for increasing FCM usage from the peer legislatures whilst at the same time neglecting to provide recommendations for the inclusion of the associated protections and restrictions present in those fatigue rules that allow those differences to occur.

Furthermore, the benchmarking with international standards fails to use ICAO SARs as its primary focus, despite clear directive to do so through the TOR, and despite this being a preferable approach in any event. We consider the practice of using some aspects of international peer fatigue rules in a piecemeal manner, as the Review Team appears to have done, to be a substandard approach to regulatory amendment and development. We consider that regulations should be consistent with international best practice rather than a race to the bottom. In our view, international best practice is to adopt and adhere to the ICAO SARPs as a primary option, and as a secondary option, to draw upon whole legislature best practice from other jurisdictions. It is definitely not to use 'international averages' which are clearly drawn from selective aspects of peer legislature.

Recommendation 4

That CASA creates at least two risk--based tiers of FRMS requirements (to be reflected in FRMS application/assessment materials such as Form 817), with the highest level of FRMS requirements to be applied to Part 121 passenger and cargo transport operations.

The AFAP is in support of a two-tier system to FRMS but only with certain conditions and considerations.

It is important to note that an essential foundation of CAO 48.1 is that fatigue management is a joint responsibility between operators, FCMs and the regulator. An FRMS (Appendix 7) requires more operator involvement and responsibility toward fatigue management than is otherwise the case through the use of the prescriptive appendices (2-6). Obviously, the main benefit for operators utilising an FRMS is the opportunity of gaining greater flexibility. However, this is as a trade off for having greater requirements and responsibilities. AFAP considers that CASA has got this balance correct and that this is a measured and responsible approach. Thus, if there is to be a two-tier approach to FRMS, then we believe it to be essential for operators with less FRMS requirements (i.e. such as other than Part 121 operators), to have less flexibility in their FRMS's too. This should be on scale and commensurate with the reduced sharing of the overall fatigue management risk by

operators. We foresee that this approach would be consistent with the current philosophy of FRMS as differing to the other appendices and also allow for some flexibility and scalability for some operators willing to contribute more to the joint sharing of fatigue risk responsibilities than otherwise would be the case by operating using appendices 2 to 6..

Some essential factors to consider for ensuring changes relating to Recommendation 4 are a success are:

- That CASA provides emphasis on the flexibility/increased responsibilities trade off and provide education and information to Operators so that they understand that increased flexibility is not a license to alter the prescriptive limits without a risk/science based case for doing so.
- Use the lower-level of FRMS as a means to provide operators with a simple, cost efficient means to gain some small measures of flexibility from the baseline measures in appendices 2-6.
- Consider Recommendation 2 redundant in lieu of a successful application of Recommendation 4
- Provide clear guidance on the scalable means of a 'low-level' FRMS that balances an increase of operational flexibility with a commensurate increase in obligations and risk mitigator requirements by the operator towards fatigue management and the associated resources.
- Fully implement Recommendation 16 and 22 in order to support Recommendation 4
- Ensure that FRMS are built with baseline limits/conditions from CAO 48.1 appendices 2-6 and not from the currently used Standard Industry Exemptions (SIEs).

We believe that Recommendation 4 is essentially talking about the provision of scalability of FRMS options. This cannot mean that the flexibility is scalable and the responsibilities are not commensurately scaled too. If this essential philosophy is included in the scalability of FRMS, then we are able to support Recommendation 4.

Recommendation 5

That CASA reduces the level of prescription in CAO 48.1 Appendix 7 to align more closely with an outcomes--based regulatory philosophy.

The AFAP does not support this recommendation.

The AFAP considers that this recommendation is closely linked to Recommendation 4 (a two tiered approach to FRMS) and with Appendix 2, (i.e. creating greater flexibility). Notwithstanding the same comments about joint responsibility applying here, additionally it is important to note that currently, FRMS is based on the hard limits of the prescriptive appendices and alteration from these prescriptive limits is to be on the basis of a scientific case. We strongly support this underpinning philosophy and note that this risk management philosophy can be found in the current CASA fatigue guidance material and FRMS handbook.

Notwithstanding that an underlying foundation of Appendix 7 allows for flexibility through an outcomes-based regulatory approach, we understand that this also essentially involves the need for a science based approach to justify the measures of flexibility introduced into an FRMS, over the limits and conditions detailed in appendices 2 to 6. It must be noted that an outcomes-based regulatory philosophy is not to the exclusion of a safety and risk based management philosophy. We note the Review Team cites the DAS Directive 01/2015 to support the making of this recommendation but that same directive also provides balancing statements related to safety and risk. Thus, the directive and the approach of Appendix 7 is to provide the opportunity to gain flexibility with an outcome-based approach but not at the expense of mitigators and measures to provide sufficient fatigue protections. The wording of this Recommendation seems to encourage relaxation of the prescriptions of Appendix 7 to promote flexibility for operators without recognising support for the essential safety philosophy.

The report cites concerns from 'mature' operators that Appendix 7 fails in its goal of increased flexibility and this is used as a justification for the need for Recommendation 5. Again, this is an unbalanced view. The gains of flexibility are meant to be measured and scaled against the increases in operator responsibility and in our opinion Appendix 7 does a good job of spelling this out. Whilst Appendix 7 provides clear language to this, it may be more that some stakeholders don't like what the clear language is informing them of.

Furthermore the review team fails to provide a nuanced recommendation as to how the varying degrees of 'maturity' are meant to be fairly and transparently assessed from one operator to another by the regulator. An emphasis of which companies may or may not be 'mature' creates a further problematic scenario where it becomes difficult to properly understand when a recommendation relating to 'mature' operators may or may not be applicable given that there is an absence of an explanation by the Review Team as to how to define the difference. What we do know is that an operator that can demonstrate and commit to more measures of responsibility with resources and processes, when it comes to the management of fatigue, are the operators that can be afforded scalable increases in operational flexibility. Prescription can already be reduced through the mechanisms of an Appendix 7 FRMS.

In summary, we oppose this recommendation on the grounds that:

- The prescription in Appendix 7 helps to clearly guide operators as to how they can and can't gain the flexibility that an FRMS can provide, the guidance material should be reviewed to reflect CAO 48.1 wording and intent, not the other way around;
- The use of prescriptive wording within Appendix 7 should not be mistaken for aspects of prescriptive limits and conditions of an actual FRMS
- Safety and risk mitigation is the most important outcome of an outcomes-based regulatory philosophy;
- This Recommendation inappropriately plays down the requirement of an operator's associated responsibility in gaining access to the greater flexibility; and
- This Recommendation fails to acknowledge Recommendation 4 can solve much of the practical flexibility that concerns the so-called 'mature' operators.

Recommendation 6

That CASA modifies the tone and language used in CAO 48.1 and all supporting documentation to clearly distinguish between legal requirements and guidelines on acceptable means of compliance.

The position of the AFAP regarding Recommendation 6 is to proceed with caution and that there may not be any changes required here.

CAO 48.1 is a legal document and a disallowable instrument, changing the language in the regulation itself may lead to unforeseen consequences. We do support and agree with the use of practical language in the supporting documentation and guidance material. However, the supporting documentation for CAO 48.1 must make reference to the legal document and thus, we caution against unilaterally altering the current supporting documents without due consideration. Currently though, we consider that the guidance material and FRMS Handbook already utilises language clearly differentiable to 'legal' language. It is the concern of the AFAP that this recommendation actually has its foundations in feedback from stakeholders who are largely unfamiliar with the supporting documents and guidelines or are somewhat uninitiated with guidance material for regulations and that this recommendation may more properly reflect that some stakeholders are merely unhappy with the regulatory changes and hence they have asked for the 'tone' of the documents to be altered. It can be considered that the use of the word 'tone' is quite telling and an indicator that much of the feedback leading up to this Recommendation, and indeed the establishment of the Fatigue Review itself, has been emotive and ill informed. Thus, if any modification of the language used is made, we suggest it is only done so with due regard and effective consultation.

Recommendation 7

That CASA considers limiting an operator's ability to switch between Appendices during a single FDP. Where multiple types of operations that would fall under different Appendices are required to be undertaken during a single FDP, the more restrictive limits should apply.

The AFAP supports this recommendation and believes that the number of operators interested in such switching will be small.

Recommendation 8

That CASA considers removing Part 137 aerial application operations from CAO 48.1 due to the sector's lower relative risk exposures. If it is deemed necessary to include restrictions for aerial application operators in CAO 48.1 then CASA should consider increasing the flexibility of the relevant CAO 48.1 limits to align them with the current provisions of Subpart 137.Q.

The AFAP disagrees with Recommendation 8 and believes that it is necessary to include Part 137 operations in CAO 48.1. Furthermore, we believe that the statement that there is relatively low risk for these operations is inaccurate and arguably false.

Aerial agricultural operations are predominantly conducted at very low altitudes where a continuously high level of attentiveness is required and thus, the fatigue and safety

implications of this should be treated seriously. Therefore, the removal of Part 137 operations from fatigue regulation is an unacceptable proposal in our view. Moreover, given the high-risk nature of these types of operation, fatigue rules commensurate with other airwork operations should be seen as an absolute minimum option for Part 137 operations. Therefore, not only do we disagree with the removal of Part 137 operations from fatigue regulation, we don't support relaxing the fatigue rules for Part 137 operations either.

Recommendation 8 refers to "the sector's lower relative risk exposures" and, as outlined above, this is not borne out in reality. The only exception to this is if the safety risk referred to completely excludes the operating pilot and focuses solely on the safety risk relative to the general public. Furthermore, Recommendation 8 ignores the TOR objective that the regulations should have particular regard to the safety of passengers and other persons likely to be affected by an activity. The operating pilot is an essential person in aerial agricultural operators and it cannot at all be reasonably asserted that he or she is not likely to be affected.

Recommendation 9

That CASA removes the requirement for operators to make allowance for individual circumstances when assigning work, given the existing requirement for flight crew members to commence flight duty periods fit for duty, and notify the company if they consider themselves unfit for duty at any time.

AFAP does not support this Recommendation on a number of grounds.

An essential tenet of the upgrade to the fatigue rules is that operators take a greater share of the responsibility in the management of fatigue than under the existing rules (including SIEs) and do so as a jointly shared responsibility with FCMs. We support this tenet but this Recommendation seeks to undermine it. Additionally, we consider that Recommendation 9 is essentially seeking to remove provisions which are there to cater for exceptional circumstances rather than the normal working arrangements. Moreover, the Recommendation ignores reporting truths in the real operational environment in lieu of considering a theoretical ideal as the established day to day working reality.

One of the supporting reasons provided by the Review Team for making this Recommendation is that in most cases, a fatigue management program will allow an FCM to remove themselves from duty should they be fatigued for any reason. The report provides no reference or data for believing that this assertion is possible and in our view, whilst this is a theoretical ideal, the reality is it is not the case on most occasions. The UNSW fatigue survey is able to provide much data to support a contrary perspective to that position assumed by the Fatigue Review Team in making Recommendation 9. In our view, the practical realities are quite different to the underlying assumptions of Recommendation 9 and that often, crew don't feel they can call-in fatigued, the UNSW fatigue survey found that 45% of pilots will use a sick leave day instead. More than 70% believe that reporting fatigued is pointless and onerous, or that it will be treated with a negative response from their employer and that this response will induce negative consequences.

The survey data more specifically states that when asked why FCMs do not report their work-related fatigue experiences, the most common reason was that there were no benefits in reporting fatigue (Figure 15). Over one in four respondents felt that there was likely to be an adverse response from their company if they reported fatigue whereas a similar proportion said that they did not report fatigue as they were too tired and couldn't be bothered. Thus, there is a significant and existing problem with fatigue, fatigue reporting and operator support for fatigue reporting that Recommendation 9 is not cognisant of and which has been overlooked, suggesting that SMS aren't as 'mature' as is assumed in the report.

This is despite most pilots reporting that their company encouraged reporting fatigue under all or at least some conditions. Pilots recognise and understand companies' wish for them to report, but still feel either threatened by reporting or feel that there is no point to reporting.

Extracts from the UNSW Survey of Fatigue of Professional Pilots, 2017

Transport and Road Safety Research Centre

Final Report

Survey of Pilot Fatigue for Australian Commercial Pilots

Prof Ann Williamson and Dr Rena Friswell

24 October 2017

Refer to pages 19, 20 & 21 of the report.

Pilot reporting of fatigue experiences before or during work

Just over half of pilots responded that they have ever reported their experience of fatigue before or during work (see Figure 14) but of these, most reported that they have done so rarely. Not surprisingly, there was a significant relationship between experiencing fatigue as a personal problem and reporting of fatigue (Spearmans $r_{(1129)}$=0.37, p0.0001). When asked why they do not report their work-related fatigue experiences, the most common reason was that there were no benefits in reporting fatigue (Figure 15). Over one in four felt that there was likely to be an adverse response from their company if they reported fatigue whereas a similar proportion said that they did not report fatigue as they were too tired and couldn't be bothered.

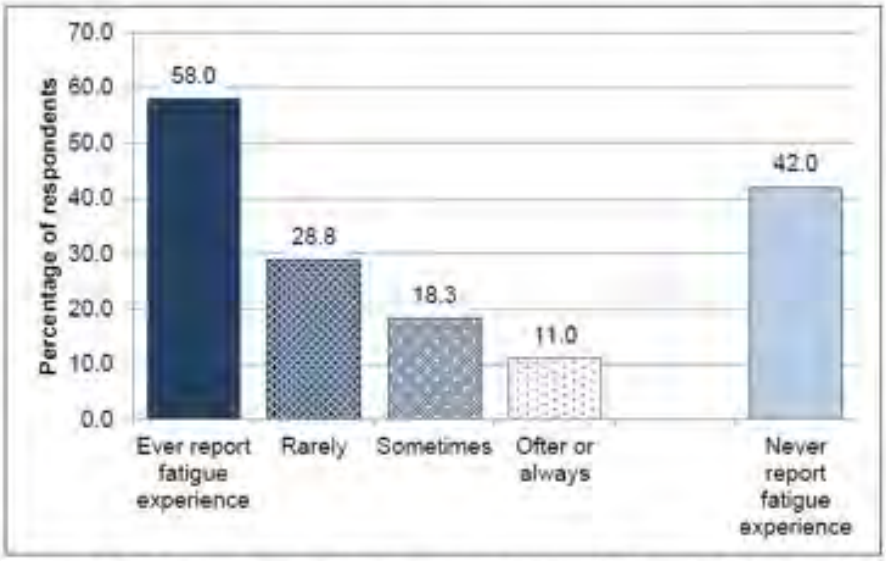


Figure 14: Pilot reporting of fatigue experiences before or during work

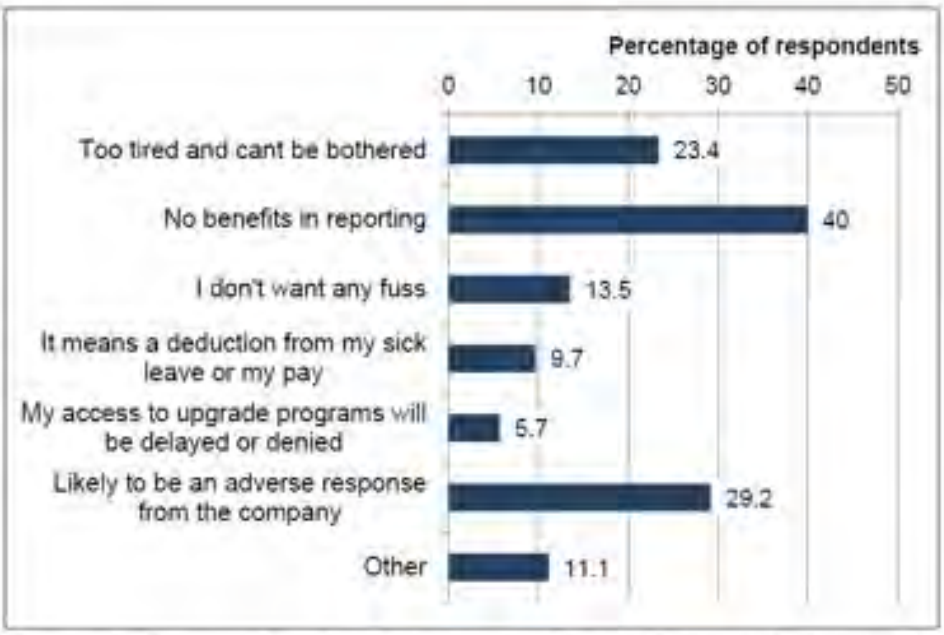


Figure 15: Reasons for pilots not reporting fatigue before or during work

Questions were asked about alternatives to reporting fatigue to the company. As shown in Figure 16, approaching half of the respondents had reported sick instead of reporting fatigued and a slightly lower percentage had removed themselves from duty due to fatigue. Again, this was done rarely by most pilots who reported taking this action in response to experiencing fatigue at work. Despite these findings of relatively rare reporting of fatigue and of pilots taking alternative action to reporting fatigue, most pilots felt that their company encourages reporting (see Figure 17). Fewer than one in five pilots felt that their company discouraged reporting of fatigue.

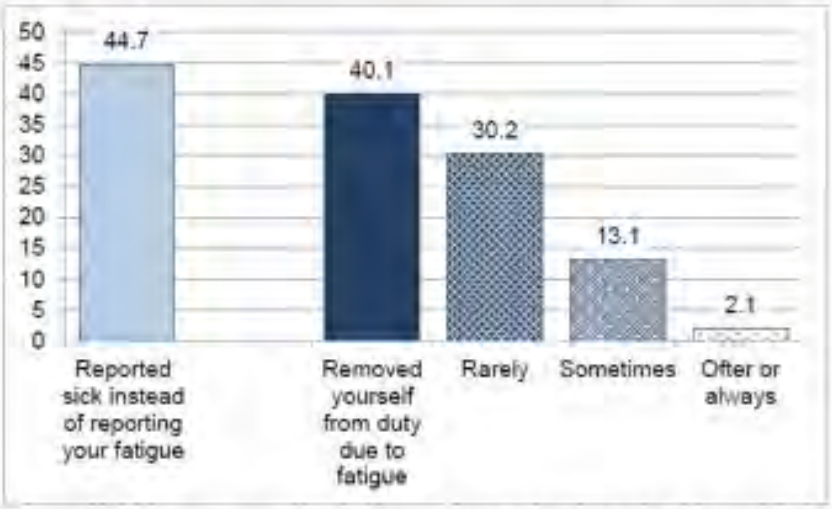


Figure 16: Percentage of pilots reporting sick instead of reporting fatigued and percentage who have ever removed themselves from duty due to fatigue and how often they have done so

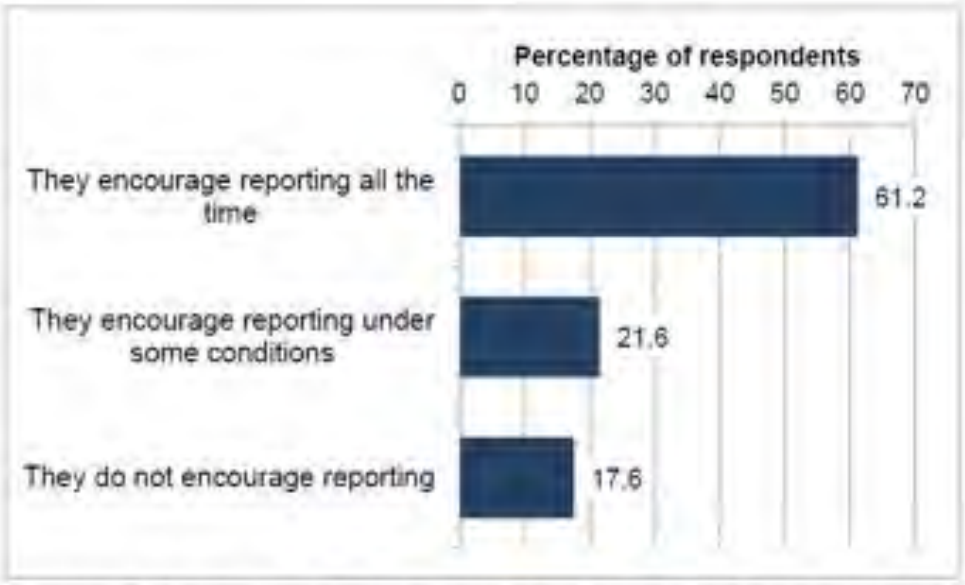


Figure 17: Pilots perceptions of how their company views reporting of fatigue

The Colgan air accident is an example of the importance of an operator considering individual circumstances.

The NTSB's findings in the Aircraft Accident Report of Colgan Air's Bombardier DHC-8-400 Loss of Control on Approach, February 12, 2009 included a contributory cause that the pilots' performance was likely impaired because of fatigue.

The findings of this investigation included that Colgan Air did not proactively address the pilot fatigue hazards associated with operations at a predominantly commuter base and that Operators have a responsibility to identify risks associated with commuting, implement strategies to mitigate these risks, and ensure that their commuting pilots are fit for duty.

The NTSB recommendations included requiring all Part 121, 135, and 91K operators to address fatigue risks associated with commuting, including identifying pilots who commute, establishing policy and guidance to mitigate fatigue risks for commuting pilots, using scheduling practices to minimize opportunities for fatigue in commuting pilots, and developing or identifying rest facilities for commuting pilots.

In Australia's now deregulated and dynamic aviation market there are many instances where pilots find themselves using their private time to commute long distances to work. This is especially prevalent in the lower paid entry level regional airline jobs and when pilots bid to change type or rank that may mean base changes. These are just some examples where individual circumstances must be acknowledged by the regulations and operators.

Recommendation 10

That CASA amends CAAP SMS--3(1) to link the content of NTS fatigue management training to the content required for operators under CAO 48.1. This would streamline and align fatigue management and NTS training program outcomes.

The AFAP supports Recommendation 10. The capturing of fatigue training in appropriate systems and the inclusion of fatigue matters in the broader context of training and other activities of operators is important.

Recommendation 11

That CASA amends CAAP 48--1 to reflect a more realistic publishing requirement for flight crew rosters. This could be achieved by reducing the guidance to a more realistic period, such as 7--10 days, noting that any other requirements included in current industrial agreements would still apply.

The AFAP does not support this Recommendation.

The current practice of publishing rosters 14-30 days in advance allows pilots to have adequate time to be sufficiently rested and adequate time to plan a suitable work-life balance, which allows a pilot to be "fit' for work. The fatigue management related benefits of this is that it allows for, and provides for, a better opportunity for a FCM to successfully manage and reduce stress and fatigue. It is our view that Recommendation 11, in part, ignores the longer-term issues of fatigue management by focusing too heavily on short-term cycles of fatigue management in lieu of providing FCMs with the ability to better forward plan. A reasonably advanced published roster is necessary to mitigate the longer-term fatigue risk.

The UNSW Survey of Pilot Fatigue for Australian Commercial Pilots 2017 found that Pilots nominated inconsistent roster patterns in their top three problems as contributors to fatigue. Reducing roster periods to 7 - 10 days will exacerbate this fatigue contributor. The survey found that inconsistent roster patterns increased the odds of pilots experiencing a substantial or major fatigue problem by 75 percent.

Further to the fatigue management related reasons outlined above, the AFAP also rejects this Recommendation on the basis that it is essentially founded mostly on operations that do have adequate forward planning time and opportunity.

We note that the supportive text for making Recommendation refers to CAAP 48.1, section 3.6.3 (it is quite likely that the section reference should read 4.6.3 as that is the section that relates to Publishing of Rosters). Notwithstanding this error, the relevant CAAP section that is being quoted in the report is referring to augmented crew operations and complex operations. Both of these types of operation are overwhelmingly operated by High Capacity AOC operators, which promote and sell tickets for these services well in advance. The forward planning aspects in existence of the commercial aspects of services is a strong indicator that for most occurrences, a reduced forward planning timeframe for rosters and fatigue management, is more of a want, not a need. We consider that for most operators, it

is wholly reasonable that the publishing of rosters occurs in a timeframe equal to or greater than the current guidance of 14-30 days. In many cases, this already occurs.

There may be some distinction necessary for charter operators and/or airwork operations but Recommendation 11 lacks sufficient nuance related to these distinctions. Thus, we do not support unilaterally reducing roster publishing periods as it is not needed in many cases and also doesn't support best forward planning opportunities for FCMs.

Recommendation 12

That CASA amends the Appendix 2 four--hour FDP extension limit to one which better reflects international standards for similar operations. An extension to FDP in accordance with sector numbers and time of day limitations, similar to the EASA limits, would be a more appropriate method of balancing operational flexibility with fatigue mitigation.

The AFAP sees some merit in altering the current FDP extensions but believes that the Review Team hasn't provided a thorough enough recommendation to support in its current form. We therefore can't support this Recommendation or this type of recommendation without a greater provision of details for what amendments to FDP extensions would more accurately be and what their associated justifications are.

Considering the Review Team's Recommendation for FDP extensions, we were perplexed with some of the justification provided for the Recommendation. The example provided by the Review Team in the supporting text to this Recommendation is for a FDP of 2 hours however, this example is rather extreme and somewhat irrelevant. Given that Recommendation 12 refers to FDP extension limits for Appendix 2, and that that appendix is for multi-crew complex operations (i.e. operations where an FDP has a displacement time of 2 hours or more) this example can be taken as largely irrelevant. Multi time zone transient operations can't have a 2 hour FDP due to the preflight and post flight periods on the ground, unless there is a situation where an operator:

- is already engaged in Appendix 2 type operations; and
- is then operating a flight with a flight time of approximately one hour; and
- then requires the crew to provide an extension to duty;

Only under these very limiting circumstances would a FDP be affected by such an example.

Whilst there may be some less extreme scenarios relevant for the basis of Recommendation 12, and for some consideration of some minor amendments to the FDP extensions detailed in CAO 48.1 Appendix 2, we believe that the provision of such an unlikely and extreme example is indicative of the irrational and negative feedback to the updated Fatigue Rules from some stakeholders, rather than a well-considered approach to altering FDP extensions. The AFAP cautions against any erroneous justification for Recommendation 12, or its legitimacy and seeks that any alteration to FDP extensions be based on more meritorious reasons including:

- the consensus of science and international regulations defining the WOCL;
- fatigue science in general;

- the original intent of the changes to duty extension limits (see below);
- a considered approach to making any alterations in this area;
- ICAO/IFALPA recommendations for FDP Extensions;

The AFAP asserts that Recommendation 12 may be founded in some limited merit, however as it currently stands it lacks sufficient detail, misses most of the point of extensions and that true international standards should be applied but are not. As noted earlier, DAS Directive 01/2015 states that regulations should be consistent with international best practice. In our view, international best practice is to adopt and adhere to the ICAO SARPs. If international benchmarking is used, other than by reference to the ICAO SARPs, we first need to ensure that the primary WOCL is defined, and that the WOCL is protected, otherwise related FDP extensions should reflect a more restrictive limit where it hasn't been.

The AFAP is concerned that there are many scenarios in which a FCM has obtained sufficient sleep for a relatively short FDP, and is subsequently re-assigned a significantly longer FDP after the original duty has commenced. This problem has greater fatigue risk implications if the re-assigned FDP encroaches the WOCL or if the FDP caused the WOCL to be disturbed in any manner, including transit time prior to a duty. Thus differences such as whether a FCM is at home base or away from home base are also relevant. The inclusion of such factors is considered relevant for minimum off duty periods and we see no reason that they are any less relevant for FDP extensions too.

We note the independent review's recommendation that EASA principles (which includes a definition of the WOCL) be used and support utilisation of these concepts to limit FDP extension limits for re-assigned FDP's that encroach the WOCL. (See the AFAP recommendation 1 on WOCL definition)

The AFAP is concerned that commercial pressure will be placed on FCMs to extend to the maximum FDP allowed according to their report time and number of sectors. The assumption that a FCM has obtained sufficient sleep prior to a FDP to enable extension to the theoretical maximum allowable FDP for a given report time is not valid. In reality, Recommendation 12 should not be required for the vast majority of FDPs anyway. CASA's own guidance material (CAAP 48.1) outlines that "*extensions beyond FDP limits may only be made in unforeseen operational circumstances, and should not be made on a regular basis*". It goes on further to say, "*extensions should only occur in less than 5 % in any sample of similar FDPs or similar operations*". AFAP questions whether the Review Team considered this underpinning intent whilst deliberating on the inclusion of Recommendation 12 into their report. The CAAP explains further that, "*the intention behind the use of the term 'unforeseen circumstances' is to prevent operators continually rostering flight and duty times to their maximum limits and regularly relying on extensions to achieve their operational goals*". The review team has failed to include these underpinning intentions and protections related to FDP extensions into this Recommendation but instead, have sought to provide for a balance of operator flexibility with fatigue mitigation. AFAP agrees with the intent documented in the CAAP and notes that this is more rightly explained as a priority of fatigue mitigation over operator flexibility. Therefore calling for and recommending that this be altered to be a balancing exercise, is quite inappropriate, dangerous and largely misses the intent of responsibly applying restrictions to FDP extensions . As a suggestion, the AFAP proposes requiring any extension in excess of 4 hours to be subject to clause 7.3A of

Appendix 2. This would confirm that the PIC is required to exercise discretion in relation to such an extension, and to confirm that the other FCM's are fit for the extension.

Recommendation 13

That CASA implements a rigorous, 'error tolerant' process for formally logging, recording and responding to industry submissions in a systematic and transparent way.

The AFAP supports Recommendation 13 and notes that inconsistency and a lack of transparency are on-going problems and concerns from a broad range of stakeholders across the industry about CASA in general. We believe that this recommendation relates to the whole of CASA operations, not just to the reform of the fatigue rules. Fully implementing this recommendation will help build trust in the CASA decision making processes and outcomes for the aviation industry. See the AFAPs recommendations 5 and 6.

Recommendation 14

That for future complex, industry--wide regulatory change, CASA considers 'road--testing' the proposed changes in a collaborative 'desk--top' exercise with a representative sample of operators, to identify critical stumbling blocks, before formal implementation of the legislation and industry--wide roll--out.

The AFAP supports this recommendation with the caveat that the consultation outlined by CASA will include all critical stakeholders including the safety and technical representatives of the professional pilot associations

CASA has communicated that it anticipates the Aviation Safety Advisory Panel (*ASAP*) will establish a Technical Working Group (TWG) to help review industry input on implementing the review recommendations. We support this communication and consultation as a positive step. However, we do have some concerns related to some aspects of the consultative approach and to the consultative model more generally. Some of the stakeholders relevant to the area of fatigue rules reform are represented within the ASAP and some others are not. Anticipating that CASA will do a good job of ensuring that the composition of the CAO 48.1 TWG is a fair and balanced representation of the stakeholders in this fatigue review area, we note that the TWG report produced by these stakeholders will then be provided to, and reviewed by, the ASAP. Thus, this then moves the official consultation to a consultative body where only some of the key stakeholders are represented. We believe that there is an established inbuilt bias in the ASAP and consultative process, which this particular consultative review will help to highlight but has existed since the inception of the ASAP and the current DAS consultative model.

This recommendation by the Independent Review Team doesn't take into account that there isn't an equal voice for all significant stakeholders at all the stages of the review and consultation process, which is currently flagged as the likely next stages of the Fatigue Management Review. Given that Recommendation 14 is confidently providing recommendations for future complex, industry-wide regulatory change, beyond just regulatory change related to fatigue management, we are compelled to also provide feedback on the wider consultative scope of regulatory change too. Based on this, we therefore note that this particular Recommendation lacks sufficient scope and doesn't go far enough in providing acceptable recommendations related to how all aspects of the consultative effort should be reformed in order to best *"identify critical stumbling blocks, before formal implementation of the legislation and industry-wide roll-out*" occurs for all endeavours of significant aviation regulatory reform. We believe the safety and technical

representatives of Member Associations, such as from Professional Pilot Associations, are key and important aviation safety stakeholders, and as such, need to be included at all levels of collaborative industry-wide regulatory change, including during 'desk-top' exercises, relevant TWGs and in the ASAP composition. See the AFAP recommendation 6.

Recommendation 15

That as part of the regulatory package development process, CASA develops in--house training, guidelines and communication protocols to ensure that CASA staff supporting the implementation of new regulations are all 'on the same page' when advising industry.

The AFAP supports this Recommendation and believes that this Recommendation should be considered in relation to the need for greater systematic approach and transparency as proposed by Recommendation 13.

Recommendation 16

That CASA establishes a single point of contact for industry seeking advice on FRMS, to ensure that accurate, timely, complete and consistent information is provided. To accomplish this, CASA should consider the creation of a centralised (perhaps 'virtual') cell of fatigue management and FRMS expertise to ensure standardisation of the evaluation of applications for FRMS and the subsequent calibration and standardisation of FRMS oversight.

The AFAP supports Recommendation 16.

The establishment of a 'Fatigue Management and FRMS Office' would help to enhance a systematic and consistent approach and help create a fairer playing field for all operators. The customer base for such an office should include both external stakeholders and internal CASA stakeholders such as Flight Operations Inspectors (FOIs). It is an all too common criticism of the regulator that there is inconsistency of regulatory interpretation from within CASA. A centralised Fatigue Management Office within CASA could help to reduce this inconsistency if CASA's own staff were able to, and required to, seek advice and guidance from an internal specialist team.

Recommendation 17

That CASA implements a process which utilises standard templates to produce documents that are clearly identifiable, and presented in a consistent, 'user--friendly' format. Such documents would then be more easily stored and managed, creating a logical trail for future reference.

The AFAP supports this Recommendation

Recommendation 18

That CASA provides clearer guidance (on the website and elsewhere as necessary) on the current status of, and relationship between, all CAO 48.1 documentation.

The AFAP supports this Recommendation and notes that it links with Recommendations 6, 13 and 22.

The AFAP supports the recommendations for clearer processes, a systematic approach, consistency and transparency related to Fatigue Management and to all processes and decision making by CASA. We agree that these are areas for improvement where real gains can be seen and achieved for all.

Recommendation 19

That CASA allocates appropriate resources to the planning of a detailed, coordinated CAO 48.1 implementation strategy, as a matter of priority.

The AFAP supports this recommendation as an urgent and essential requirement.

AFAP notes that CASA has already provided a likely path forward for the CAO 48.1 implementation strategy and we'd like to note that that is a positive first step by the regulator in addressing this recommendation. We do, however, have some concerns that this implementation of CAO 48.1 could be further delayed, as it has already on a number of occasions. Any extension to the transition period dates should be kept to a minimum, such as no more than a six-month extension (if at all) on the currently published final transition dates. We believe that with an urgent and appropriate allocation of resources and planning, utilising industry expertise through a Technical Working Group, CASA can achieve a successful completion of this regulatory reform, and do so with minimal extension required. Thus, Recommendation 19 is key to ensuring other recommendations and other Fatigue Rules reform work can and will occur efficiently and effectively.

Recommendation 20

That CASA freezes CAO 48.1 transition dates for all elements of the aviation industry until recommended changes resulting from the current Review can be made to stabilise a final version of CAO 48.1 and all associated supporting documentation for implementation.

The AFAP supports this Recommendation with a caveat that an urgent timeline be determined if the current timeline is again altered.

We note that this Recommendation is related to Recommendation 19. It is important to note, that the more thoroughly and effectively that Recommendation 19 is implemented, the less Recommendation 20 becomes relevant. Thus the degree to which Recommendation 20 is enacted (if at all) will be a measure of accountability for how seriously CASA applies its efforts and resources to achieving Recommendation 19.

Recommendation 21

That CASA adopts a staggered approach to the implementation of and transition to CAO 48.1, with initial transition proceeding first for elements of the industry with the highest risk exposure.

The AFAP agrees with this Recommendation however, we believe that there currently exists an ability to provide a staggered transition through the provision of the transition period.

CASA has already provided operators with the option of transitioning to the new rules prior to the transition date(s). Thus, AFAP believes that this Recommendation ignores this fact and that there is already an ability for a staggered approach to implementation. A limited number of operators have already taken up this opportunity to transition earlier than the 'final' date and they and CASA should receive some credit here for their proactive work on this aspect.

If any new transition dates are announced, we suggest that it is clearly communicated that operators are encouraged to provide documentation/manuals to CASA for assessment prior to the required date. The entire responsibility for a staggered approach shouldn't be borne by CASA alone, industry can also contribute to achieving the intent of this recommendation.

Implementation of Recommendation 19 will assist transitioning during the existing transition period, so too will the establishment of a single Fatigue Management office (Recommendation 16). The encouragement for the appropriate and timely allocation of resources to achieving these reforms is also important to communicate to Operators as much as it is for CASA to achieve. The Review Team has missed the opportunity to include this aspect.

Recommendation 22

That CASA initiates action to acquire and / or develop a significantly increased capability for FRMS evaluation and oversight. This action should be linked with the development of clear system / documentation outcomes, including timelines, and determining the particular skills required.

AFAP supports this recommendation and notes that it is closely linked with recommendations 6, 13, 16 and 18.

Recommendation 23

That CASA reviews the content and language used in CAO 48.1, Appendix 7, Section 7 to ensure that it allows operators sufficient autonomy to be able to manage and improve their FRMS efficiently.

The AFAP does not support amending Section 7 of appendix 7 (FRMS Change Management Procedures).

This Recommendation could be taken at face value to mean that there isn't any provision for an operator to make autonomous changes however, section 7.5 of Appendix 7 provides provision for operators to make changes to an FRMS. Although, these listed allowable changes are for autonomous tightening of fatigue restrictions within an FRMS. Thus we note that what this Recommendation is actually recommending is for the allowance of operators to have the ability to autonomously implement changes that allow for a relaxation to FRMS requirements once the FRMS is established. This is unacceptable to the AFAP.

The Review Report cites that considerations related to this Recommendation relate to some operators having doubts as to whether CASA would have the resources available and the capacity to provide timely support for operators making continuous improvement changes, as they are required to do. Points worthy of note here are:

- Timely improvement changes which are a tightening of limits are already allowed without CASA involvement
- The guidance material clearly states that Appendix 7 baseline limits are to be reference to a prescriptive appendix and alterations to these limits, are to be based on science. The scientific basis for any alteration will most likely be built up over time (such as through fatigue reports and crew fatigue surveys) and these will have to involve a longer time period anyway, so a call for expeditious process could tempt and undermine the process of building the science for change.

- The text of the report notes the concerns of operators experienced with FRMS but doesn't limit the use of this recommendation to only operators with a so called mature SMS. This recommendation seems to be applicable to any operator.
- The assumptions that "mature" operators actually manage fatigue risk better and that their risk mitigation wouldn't benefit from having a final check or accountability isn't discussed by the report. Given that commercial pressures are no less than in 'less mature' organisations or that individual managers' behaviour is any less affected by this, an assertion that there exists no need for Section 7 assurances isn't founded.
- Even if operators have the change management or fatigue management expertise, now or into the future, there's no guarantee that this will always be sufficiently so. The fatigue review report doesn't provide consideration of operators' future levels of expertise or resources as a relevant factor related to this recommendation but has so with CASA's future possible resources.
- The provision of a 'final check' through CASA is a good means of ensuring that only justifiable changes can occur and that purely commercial pressures are not the driver of change.
- The report text speculates that CASA may not have the future resources to evaluate FRMS changes but if recommendation 16 is successfully implemented, this would not be the case. Recommendation 23 is therefore biased to allowing operator flexibility whilst abrogating a similar assurance of ensuring that there is a 'floor' of responsibility provided and always available within an operators ranks.

We therefore don't support the alteration of the language in Appendix 7, Section 7. We believe that this Recommendation seeks to remove crucial accountabilities and essential mitigators and it would create mechanisms to allow commercial imperatives to override safety. Additionally, if the Recommendations related to CASA's application of appropriate resources are properly implemented, and maintained, there exists no basis or need for this recommendation.

The AFAP has a further caution related to this Recommendation. Many operators have begun to build their FRMS and have begun to present these draft versions to CASA. On too many occasions, many of our member pilots at these organisations have informed us that there hasn't been any non-management pilot included in the consultation process for the development of these FRMS, even though there is a requirement to consult with stakeholders. These events highlight that without protections in place, operators will ignore their requirements and strive steadfastly for the goal of expeditiously achieving flexibility of operations.

Recommendation 24

That CASA provides clear and comprehensive information to operators and flight operations inspectors on the FRMS assessment process, including differences between requirements and guidelines at different levels of operational scale.

The AFAP supports this Recommendation however, in our view, this recommendation is addressed already through other recommendations, such as Recommendations 6, 10, 13, 15, 16, 17, 18, 19 and 22, especially through Recommendations 16 and 19.

AFAP RECOMMENDATIONS

1 Define the WOCL (0200-0600).

There is scientific consensus regarding the importance of protecting the WOCL (0200-0600) to maximise recuperative rest and prevent cumulative fatigue, but there are no WOCL protections in CAO 48.1 with how Late Night Operations (LNO) and early starts are defined. Early starts result in sleep restriction for short haul pilots leading to cumulative fatigue, yet CAO 48.1 does not define an early start. EASA define an early start as sign on before 0700, which will still act to truncate or restrict the sleep opportunity. Night duty is associated with work during the circadian trough and extended time awake and studies show that night hours are especially vulnerable to severe fatigue. A LNO is defined in CAAP 48.1(1) as greater than 30 minutes FDP between 2300-0500. IFALPA define a LNO as any FDP between the hours 0100-0700, i.e. a one-hour buffer around the WOCL whereas CASA's definition appears much more akin to that period outside the normal domestic airline schedule.

This following information is relevant and comes from one of the ICAO SARPs drafting committees:
http://www.icao.int/safety/fatiguemanagement/Pages/Resources.aspx#FMGM
Both Doc9966 Manual for Oversight of Fatigue Management Approaches and the FMG for Airline Operations

"The glossary (Doc9966) at page xv defines the WOCL, and also indicates there is individual variability in the exact timing of the WOCL.

> *"3-5am" is mentioned on page 28 where it says "sleepiness is greatest when people are awake during the WOCL, which occurs around 3-5am for most people on a normal routine with sleep at night". This should not be confused with the definition in the glossary, and it is incorrect for CASA to say that ICAO differs in their interpretation of the WOCL from other regulators; refer to the glossary. We believe that CASA may have been using an earlier version of what was drafted which was corrected by IFALPA. All regulators I am aware of still use 0200-0600 to define the period of the WOCL and this is also referred to in NASA TM 110404 (see page 10 of PDF)* **http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19990063635.pdf**"

IFALPA Guidance material for the development of prescriptive fatigue management regulation POL-STAT 2009:

http://www.ifalpa.org/downloads/Level1/Fatigue%20Resource%20Library/Scientific%20Background/Guidance%20Material%20for%20Fatigue%20Risk%20Management.pdf

A.1 GUIDANCE MATERIAL

4.2 Definitions

Window of Circadian Low (WOCL). The period between 02:00 hours and 05:59 hours referred to a crew member's acclimated location.

This definition is replicated in the EU and EASA guidance materials at the EASA FTL Regulations Combined Document and CAA Guidance to Developing an FTL Scheme

(Including Compliance Table) ORO.FTL.105 Definitions
https://www.easa.europa.eu/sites/default/files/dfu/NPA%202010-14.pdf

Given that the Review Team has proposed many recommendations to align the Australian aviation fatigue rules with those of other jurisdictions and or to use international averages, it is quite inappropriate to not also have an equally sufficient consideration and definition of the WOCL as one of the report recommendations.

2. Tighten the limitations on extended duties:

Limiting extended wakefulness past 16 hours helps prevent fatigue, however the FDP and provision for extensions in CAO 48.1 are not restrictive enough to achieve this. While CASA have tightened the FDP from the SIE by an average of 2 hours, a 14 hour FDP is still allowed. There is scientific consensus that 13 hours FDP should be the hard limit (duties starting 0800-1100 with one sector and no extensions), and the maximum FDP for overnight operations (encompassing the WOCL) should not exceed 10 hours.

From the European Transport Safety Council (ETSC) Position on Flight Time Limitations 2013:

> *"The consensus of scientific evidence, however, is clear. Several scientific reports commissioned by EASA over the past years concluded that "FDPs for minimum crew should not exceed 10 hours overnight" since any overnight period would impinge upon the Window of Circadian Low (WOCL)."*

CAAP 48.1 also stated that the maximum FDP limits in all CAO 48.1 appendices are not designed with the expectation that there would be extensions, and the scientific literature supports no extensions for any FDP starting outside 0800-1200 hours.

CAO 48.1 spilt duty and standby rules allow for extended wakefulness over 16 hours due to the difficulty of achieving restorative rest outside the WOCL and/or with very limited sleep opportunities. The science recommends the FDP of a split duty should not cover the hours between 2200-0600; split duty should only be applied to day operations, with a 14 hour maximum FDP. For standby, scientific research has shown that day sleep taken on standby is shorter and of poorer quality then other sleep due to both physiological and environmental factors; crews are unlikely to achieve 8 hours total sleep even in a daytime rest of 16 hours. For example, a pilot that commences a standby period under Appendix 2 at 0600 in the morning, and is then called out after 12 hours, would have 22 hours from the end of their WOCL to the completion of their FDP; a period where restorative sleep would be difficult.
We also note that CASA has already provided clear guidance material (CAAP 48.1) on duty extensions and the intent which underpins why and what is an allowable FDP extension. We believe there is a need to recommend that FDP extensions be tightened in many regards and not relaxed as recommended by the Review Team.

3. Ensure that Sleep Opportunity is realistic:

Sleep opportunity is a critical factor in mitigating fatigue. CAO 48.1 allows for a sleep opportunity of 8 hours in a 12 hour ODP (Home) and 8 hours in a 10 hour ODP (Away). The Allied Pilots Association determined that non-sleep related tasks are (1) getting ready for bed (15 minutes), getting ready for the next duty period (45 minutes), and eating (30-60 minutes). This adds up to a minimum of 1.5 hours for non-sleep activities. To protect an 8 hour sleep opportunity, a FCM would need a minimum of 9.5 hours of rest time, in addition to travel time. However people do not fall asleep the minute they go to bed, thus the science supports 30 minutes prior to sleep to account for sleep latency. Therefore, the scientific literature supports a sleep opportunity of 8 hours in a 13-hour ODP (Home), and 8 hours in a

11 hour ODP (Away). Therefore the ODP prescribed in CAO 48.1 is 1 hour less than the scientific consensus.

The UNSW survey results show that nearly 30% of pilots commute more than an hour and approximately 30% have a commute time of 30-60 minutes. Add in the possibility of other factors such as staff bus times, security screening, home based aspects (shower & eating etc) then pilots most likely require more than an hour and a half prior to their sign on, from the alarm clock time.

0600 sign on means that most have their Primary WOCL disturbed at 0430. Even the 0500 definition of an end of WOCL is disturbed with these facts. A realistic Primary WOCL (0600) is impeded even more.

4. Regularly Survey for Pilot fatigue.

AFAP recommends that CASA and or the ATSB run a regular (suggest biennial) survey of Commercial Pilots in Australia to determine improvements in the fatigue experience of these pilots. This survey would also capture the SMS and reporting culture of Australian aviation operational certificate holders.

Under an FRMS, operators are required to conduct surveys and it is equally, if not more, important to gather the whole of industry perspective on fatigue matters.

Evidence based regulations require the collection of evidence, the UNSW survey of over 10% of Australia's commercial pilots is a good benchmark to collect some relevant evidence.

The AFAP's Safety and Technical department offers to assist with the collection of this survey data. The UNSW survey of pilot fatigue for Australian Commercial pilots is available as a template

5. Include pilot representation in organisation's fatigue working groups.

The AFAP strongly recommends that CASA includes pilot member associations in the make up of Fatigue Safety Action Groups (FSAG) when companies operate to Appendix 7. The AFAP agrees with AIPAs position as below and has confirmed with the ICAO drafters of Doc 9966 that their intent was to include relevant pilot associations where they exist.

> *"AIPA also reminds CASA that it has elected not to apply the ICAO Doc 9966 recommendations of having pilot representatives as part of the decision process in Australian FRMS development and implementation. While pilots may be involved in groups such as a Fatigue Safety Action Group (FSAG), ICAO's clearly established intention was that pilot representatives meant pilot associations where they exist, rather than individual pilots."*

Like the principles of flight data management (FDM) in CASA's own Guidance CAAP SMS-4(0) on the establishment of a Flight Data Analysis Program (FDAP) – Safety Management Systems (SMS).

> *"3.3 A key element in developing any FDAP is gaining the support of the pilot group. This can be achieved by management and the pilot group entering a formal agreement or FDA procedure document. Amongst other things, the core conditions of the agreement will ensure that the program is non-punitive and de-identifies crew whilst ensuring the data gathered is secure."*

These principles also apply to fatigue management. It is well known by foreign operators with mature FRMS's that support of the pilot group can only occur when their representatives are included in the FSAG or equivalent body.

It can be seen in the UNSW survey 2017 that Australian pilots have reservations trusting our operators SMS.

A summary of the Australian industry pilot fatigue reporting culture:

- 42% have never reported fatigue
- 40% can see no benefit in reporting
- 30% say there would be an adverse response from the company
- 45% report sick instead of fatigued

Page 49 of the survey states:

> *"Analysis of the reasons for not reporting fatigue ……..shows considerable similarity between pilots doing different types of work. For almost all groups, the most common two reasons for not reporting fatigue were that there were no benefits in reporting or that there was likely to be an adverse response from the company if they reported. More than half of the domestic and international pilots, in particular, reported that there were no benefits of reporting and around one-third felt that there was likely to be an adverse response from the company. A similar percentage of regional and helicopter pilots reported that the company would have an adverse response, whereas a smaller percentage of air ambulance and charter pilots held this view. Notably, more than one-third of domestic pilots and just over 25 percent of international pilots and regional pilots said that they didn't report because they were too tired and couldn't be bothered."*

Including pilots representatives in fatigue action or working groups and for that matter industry consultative groups would go a long way to effecting a positive reporting culture.

6. Include Professional pilot representation on the CASA Aviation Safety Advisory Panel (ASAP)

The AFAP and AusALPA strongly recommends that CASA include professional pilot Safety and Technical representation on the ASAP. This will assist in a balanced consultation and review process and help develop the general pilot communities trust in CASA's consultation process.

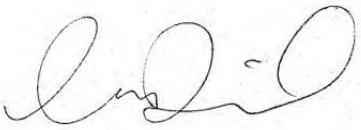
GLOSSARY

AFAP	**Australian Federation of Air Pilots**
AIPA	**Australian International Pilots Association**
ASAP	**Aviation Safety Advisory Panel**
AusALPA	**Australian Airline Pilots Association**
CAP 371	**UK Civil Aviation Publication** http://publicapps.caa.co.uk/docs/33/CAP371.PDF
CAAP	**Civil Aviation Advisory Publication**
DAS	**Director of Aviation Safety**
EASA	**European Aviation Safety Agency**
FAA	**Federal Aviation Administration (USA)**
FCM	**Flight Crew Member**
FDA	**Flight Data analysis**
FDAP	**Flight Data Analysis Program**
FDP	**Flight Duty Period**
FMG	**Fatigue Management Guidance**
FRM	**Fatigue Risk Management**
FRMS	**Fatigue Risk Management System**
FSAG	**Fatigue Safety Action Group**
FTL	**Flight Time Limitations**
HF	**Human Factors**
IATA	**International Air Transport Association**
ICAO	**International Civil Aviation Organisation**
IFALPA	**International Federation of Airline Pilots Association**
LNO	**Late Night Operation**
NASA	**National Aeronautics & Space Administration (USA)**

NTS	**Non- Technical Skills**
ODP	**Off Duty Period**
PIC	**Pilot in command**
SARPs	**Standards and Recommended Practices**
SIE	**Standard Industry Exemption**
SME	**Subject Matter Expert**
SMS	**Safety Management System**
TC	**Transport Canada**
TOR	**Terms of Reference**
TWGs	**Technical Working Groups**
UNSW	**University of New South Wales**
WOCL	**Window of Circadian Low (i.e. the Primary WOCL)**

Further information

Written by the Australian Federation of Air Pilots and Authorised by:



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