FATIGUE REPORTING GUIDE

The Voice Of UK Pilots:
Safety, Strength, Unity

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1. INTRODUCTION

Dear BALPA member

As you know from our published FTL guide, the current rule sets derived from EASA FTL regulations rely less on prescriptive limits and instead place greater emphasis on Safety Management Systems involving FRM, FRMS and self regulation. Such systems are data-driven and to be fit for purpose rely heavily on reporting data such as fatigue reports.

The reporting of fatigue is becoming fundamental to the regulation process and it is of paramount importance that we embrace it. As crew we are better placed to judge whether a duty or combination of duties pose a fatigue hazard or not. If we do not report such hazards we cannot expect them to change.

Our Safety Department has constructed this guide to help in the diagnosis of fatigue including when, why and how to report it. We hope you find it a useful addition to your flight bag.

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In the first instance, please direct queries on fatigue to your Company Council's FTL Rep

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"FATIGUE IS THE SUBJECTIVE FEELING OF WEARINESS THAT MAY BE ASSOCIATED WITH REDUCED PERFORMANCE SUCH AS MAY ENDANGER THE SAFETY OF THE AIRCRAFT"

2. The obligation to report

It is criminal offence to fly if you know or suspect that you are or are likely to suffer from such fatigue or sleepiness as may endanger the safety of the aircraft or its occupants. The UK Basic Regulation (2018/1139) states: "no crew member must allow their task achievement/decision-making to deteriorate to the
extent that flight safety is endangered because of the effects of fatigue, taking into account, inter alia, fatigue accumulation, sleep deprivation, number of sectors flown, night duties or time zone changes". You are legally obliged to comply with the reporting schemes in your company. You are legally obliged to report any incident which endangers or, if not corrected, would endanger an aircraft, its occupants or any other person.

3. What to report

In virtually all cases the occurrence or potential for fatigue and sleepiness exists as a combination of work-related demands and how you manage your rest and commuting. You are legally obliged to properly manage your rest. In rare circumstances your rest may come under particular scrutiny. Such scrutiny may include reviews of witness accounts, records of social media use or other electronic information such as mobile phone use and/or location services.

Fatigue is the subjective feeling of weariness that may be associated with reduced performance. Sleepiness refers to the propensity to fall asleep. For more detail on the definition of fatigue, see the back page.

"YOU ARE LEGALLY OBLIGED TO REPORT ANY INCIDENT WHICH ENDANGERS OR WHICH, IF NOT CORRECTED, WOULD ENDANGER AN AIRCRAFT."

3.a. Definition of fatigue and sleepiness

The contributors to sleepiness and fatigue include:

Length and quality of sleep

Both adequate sleep duration and good quality sleep is required for alert day time functioning. Recent sleep is most important but sleep loss can be cumulative over a week or so.

Circadian rhythm

This refers to your natural rhythm of sleep and wakefulness that is adjusted in accordance with environmental factors, which act as time cues to regulate your daily sleep-wake cycle. The most prominent time cue is light.

Environment

Environmental factors such as ambient lighting, noise and temperature can act to enhance or degrade sleep quality and maintenance. Too much light can disrupt sleep because it is a primary external cue that the brain uses to encourage wakefulness. An environment that is either too hot or cold will also cause frequent awakenings due to discomfort, and loud intermittent sounds interrupt sleep as the brain is unable to habituate to these types of noise intrusions.

Workload and perception of demands

High external demands and challenging mental tasks such as task-switching can cause an acceleration in the onset and development of fatigue; at the other end of the scale, low effort monotonous tasks causing boredom can also promote greater levels of fatigue and sleepiness.

Stress

How hard you have been working both physically and mentally and other stressors that might occupy your mind can affect your level of fatigue. The relationship between stress and fatigue arising from sleep loss appears to be bi- directional: stress can disrupt sleep and degrade sleep quality, and sleep loss can be seen to increase subsequent stress levels. Sleep loss also appears to lower the threshold at which an individual experiences an event as stressful, meaning that sleep deprived individuals are more likely to show stress reactions to relatively mild performance demands, than rested counterparts.

Food

Food quantity, type and timing can have an impact on your fatigue levels. High carbohydrate meals and high sugar snacks may encourage sleepiness. Regular meal times also act as a time cue to help regulate your circadian rhythm to the 24 hour cycle.

Stimulant drug intake

Stimulant drugs such as caffeine (contained in coffee and other products) interfere with sleep onset and maintenance. As such, caffeine can act as a pharmacological aid for sustaining alertness and performance, and can assist in nap recovery if taken just before the nap. It may be beneficial to save caffeine use for the times in which it is really needed, and avoid products high in caffeine when fatigue or sleepiness is not an issue. Thus, caffeine can help to temporarily relieve some, but not all of the effects of sleepiness.

Overweight individuals, fitnes and activity

Obese and overweight individuals, and individuals who do not exercise may feel more fatigued than fitter, more active counterparts. However, it
should be noted that when you are feeling sleepy, exercise is not an effective countermeasure for reducing your sleepiness levels.

Medications

Many medications will interfere with the ability to go to sleep, to stay asleep or result in increased daytime sleepiness. Thus in the event of taking new medication, a qualified AME should be consulted about the potential for sleep-inducing effects. It is also important to be aware that over the counter medications can contain sufficient levels of either alerting or sleep promoting substance to affect alertness.

Genes

Resilience to sleep deprivation is in part genetically determined. This means that even with the same external factors some people will feel sleepier, and their performance will deteriorate more quickly than others. Your own genetic makeup also influences your tendency to be a morning – or evening – type individual, or somewhere in between. Typically morning types fare better (are more alert and perform better) in the early part of the day, but struggle with sleepiness relatively early in the evening. Conversely, evening types struggle in the early morning but tend to remain alert towards the end of the day.

Some signs and symptoms of sleepiness and fatigue

Involuntary lapses into sleep begin to occur	• Microsleeps (lapses in wakefulness) occur when then is an increasing physiological urge to sleep, and sleep processes begin to interfere with the waking state. • Microsleeps are accompanied by increasing subjective sleepiness, but often may occur without the individual's awareness. • The longer the flight, the greater the probability of spontaneous microsleeps. • Microsleeps are more likely to occur during night flights than day flights, but sleepy pilots will have microsleeps regardless of time of day.
Decreased attention	• Lapses in attention arise from the interaction between efforts to maintain wakefulness and processes that initiate involuntary sleep. • Lapses manifest as incorrect or delayed behavioural responses to salient stimuli. • Omission or displacement of individual elements in a sequential task. • Narrowing of attention to focus on one task at the expense of others. • Impaired ability to perform visual monitoring patterns. E.g. missing FMA changes.
Increased reaction time	• Slowed responses when performing tasks. • E.g. slower to respond to speed and fight path deviations when manually flying an approach.
Increased omissions and errors	• Increased risk of making mistakes during procedures by skipping steps and missing checks. • E.g. check list errors.

Some signs and symptoms of sleepiness and fatigue

Increased forgetfulness	• Increasingly impaired recall of recent events during flight. • Instructions may be more quickly forgotten or recalled incorrectly. E.g. forgetting to report at a reporting point. • Increased tendency to forget secondary tasks.
Decreased information processing ability	• Increasingly more time is needed to understand data or integrate information. This type of deficit may be seen in "poorly" managed diversions.
Decreased ability to make judgements and take decisions	• Increases in length of time needed to make decisions, and these may be of poorer quality, without the individual's awareness of the decline.
Social interactions decline	• Increasing tendency to avoid interacting with others, and become socially withdrawn. • Decline in levels of communication, and lowered sensitivity to others' needs.
Increased negative mood	• Increasing emotional irritability and moodiness, which may manifest in arguments or an attitude of indifference. • Reduced inhibitions.

"WE ADVISE THAT YOU ALSO DESCRIBE YOUR LEVEL OF SLEEPINESS USING THE PHRASES OF THE KAROLINSKA SLEEPINESS SCALE"

Karolinska Sleepiness Scale

A scientifically validated, subjective measure of sleepiness (your propensity to fall asleep) is the nine point Karolinska Sleepiness Scale (KSS)

9. Extremely sleepy, fighting sleep
8. Sleepy, some effort to keep awake
7. Sleepy, but no difficult remaining awake
6. Some signs of sleepiness
5. Neither alert nor sleepy
4. Rather alert
3. Alert
2. Very alert
1. Extremely alert

Samn Perelli Sleepiness Scale

In some airline fatigue report forms a different scale (Samn Perelli) is used. This scale has the following terms:

7. Completely exhausted
6. Extremely tired, very difficult to concentrate
5. Moderately tired, let down
4. A little tired, less than fresh
3. OK, somewhat fresh
2. Very lively, somewhat responsive but not at best
1. Fully alert, wide awake

However, this scale does not directly convey your risk of involuntary sleep. E.g. after running up a hill you might be completely exhausted but at little risk of falling asleep.

On this basis, in addition to whatever tick box categories your company fatigue report form may ask for, we advise that you also describe your level of sleepiness using the phrases of the Karolinska Sleepiness Scale, and indicate the numerical level.

E.g. During the approach I was sleepy, it was an effort to stay awake (Karolinska 8).
For some more detail on the Karolinska Sleepiness Scale, see the back page.

3.b. Pre-flight reporting

Regardless of whether your fatigue or sleepiness is work or domestically related, if you don't feel you are going to be safe, do not fly. Give your employer as much early notice of this as you can to proactively manage this situation. We recommend at this time that you use phrases that provide factual information, and avoid using terms to describe your sleepiness and fatigue that are open to interpretation, e.g. "not fresh" etc.

DO	AVOID
• Use succinct language and provide factual information. • Consider using phrases such as: "I am suffering from fatigue such as may endanger the safety of my aircraft or its occupants." And/or – "I suspect that I am likely to suffer from fatigue such as may endanger the safety of my aircraft or its occupants." If you make your report by telephone keep a note of your conversation.	• Language that reflects any anger, frustration or broader misgivings about the company. • Long narratives that contain information dominated by opinion and not fact. • Using terms open to interpretation e.g. "not fresh", etc.

3.b.ii. Pre-flight reporting: the use of discretion

In pilot Flight Time Limitation (FTL) rules, "Discretion" refers to the entitlement of the commander to decide if they feel sufficiently fit to fly for a longer period than the normal flight duty period. Deciding to fly for this extra period is commonly referred to as "using discretion". Deciding not to fly for this period is commonly referred to as "not using discretion", although strictly speaking discretion has been used; it's just that the result of that discretion is a decision not to fly.

Use of Discretion: key points

• If you feel or expect to feel too fatigued to safely fly into the discretionary period, you should not fly into the discretionary period.
• As a set of general principles a person or organisation that exercises discretion not to fly should do so reasonably (with reason – e.g. "I had slept badly", "I felt too fatigued"), fairly (that your decision was proportionate – e.g. "I felt it was not safe to fly on, I was struggling to stay awake, there was no other safe option") and consistently (faced with the same situation in the past or future you did or would do the same).
• If you are unfairly pressured by an employer to fly at any time that you are or expect to be too fatigued, including into a discretionary period, your employer is potentially committing an offence.
• When giving a verbal statement, use the guidance given in 3b above. If you sense that situation is challenging try to have your comments witnessed.

"WE RECOMMEND AT THIS TIME THAT YOU USE PHRASES THAT PROVIDE FACTUAL INFORMATION, AND AVOID USING TERMS TO DESCRIBE YOUR SLEEPINESS AND FATIGUE THAT ARE OPEN TO INTERPRETATION."

3.c. Post-flight reporting

We encourage you to report not only on the categories provided by your company's report form, but to additionally report on the following features in the free text options if available, which relate to the safety impact of your fatigue:

• Describe your level of sleepiness using the terms of the Karolinska Sleepiness Scale. (see p9)
• Describe the phase/s of flight in which you experienced sleepiness or fatigue. (cruise, departure, approach)
• Describe the fatigue state of the other pilot.

An example:

E.g. During the approach I was sleepy, it was an effort to stay awake (KSS 8), I think I missed the four mile call during a micro sleep and when at around 800ft the PF called "correcting speed" I realised that I'd also failed to notice the speed decay. After the flight the co-pilot and I discussed the approach, she said that she was sleepy but had no difficulty in staying awake.

DO	AVOID
• Use succinct language and provide factual information.	• Language that reflects any anger, frustration or broader misgivings about the company.

"AVOID LANGUAGE THAT REFLECTS ANY ANGER, FRUSTRATION OR BROADER MISGIVINGS ABOUT THE COMPANY."

3.d. Driving

Sleepiness can be fatal during driving, and you should be particularly careful about driving at night during the 'deadly hours' between 2am-6am. If you are sleepy and finding it difficult to stay awake, you should not drive. Instead we recommend that you park at the nearest suitable place for a nap of 15 minutes. Naps beyond 20 minutes can be counterproductive as they transition into a more substantial sleep, leading to greater difficulty on waking up.

Instead, set your phone or an alarm for this 15 minute period. If possible, the best way to alleviate sleepiness is to have a cup of caffeinated coffee before you nap. As caffeine takes about 20-30 minutes to have an effect, this process allows for an effective combined countermeasure against sleepiness.

Summary

If you are aware of feeling sleepy and/or have any difficulty staying awake when driving:

- Park at the nearest suitable safe place
- Have a cup of coffee (if possible)
- Set alarm for 15 minutes
- Take a nap

"YOU SHOULD BE PARTICULARLY CAREFUL ABOUT DRIVING AT NIGHT DURING THE DEADLY HOURS BETWEEN 2AM AND 6AM."

4. Where and when to report

4.a. Your company

For any instance of fatigue warranting report, you should comply with your company reporting procedures. However, if you lack confidence in your company reporting systems, you are entitled to file your report directly to the CAA. This option is outlined in the Guidance Material to Regulation 376/2014 on the reporting, analysis and follow-up of occurrences.

"Indeed, situations may occur where reporters are not confident in the reporting system of their organisations and may wish to use another reporting channel. This is consistent with the objective of fostering such a 'Just Culture' which is pursued by Regulation 3/6/2014 and which aims in particular, at ensuring the confidence of aviation professionals into occurrence reporting systems and encourage them to report any relevant safety information in view of contributing to the enhancement of aviation safety and the prevention of accidents."

Moreover, if you are concerned that you may be penalised by your company for doing this then you may tick the anonymous box on the MOR form.

4.b. The Civil Aviation Authority

Under the Air Navigation Order, and Regulation 376/2014, you are legally obliged to use the Mandatory Occurrence Reporting (MOR) Scheme for any incident which endangers or which, if not corrected, would endanger an aircraft, its occupants or any other person. The occurrence reporting regulations include a list of occurrences to be mandatorily reported, including crew fatigue that is

'impacting or potentially impacting [one's] ability to perform safely [one's] flight duties.'

It is for you to judge if your fatigue is impacting on the safety of flight, and such occurrences might happen in any phase of flight. However, we recommend that all occurrences of it being an effort to stay awake or falling asleep (KSS greater than or equal to 8) that occur during critical phases of flight should be filed as an MOR.

Effort to stay awake or falling asleep (KSS greater than or equal to 8) during critical phases of flight = MOR to the company. Or, if you are not confident in the company reporting scheme = anonymous MOR to the CAA.

Critical phases of flight would include parts of the departure and approach, or other phases of flight that became critical because a problem occurred.

For pilots filing MORs in critical phases of flight it is important to state how operational conditions made that phase 'critical'. There are many factors; use of automation, weather, fuel state, pilot experience, technical faults, proximity to the ground and other aircraft etc.

To submit a Mandatory Occurrence Report (MOR) to the CAA, use the occurrence reporting portal which can be accessed via:

https://e2.aviationreporting.eu/reporting

NB. An MOR report needs to be submitted within 72 hours of becoming aware of the occurrence.
Voluntary occurrence reports are also accepted under the MOR scheme i.e. a report not formally required to be reported by the legislation but which the reporter believes should be brought to the attention of the CAA because of the safety implications.

4.c. The Confidential Human Factors Incident Reporting Scheme (CHIRP)

CHIRP is an independent, confidential reporting system for air transport and other transport safety industries. This is an option if you are fearful of company reprisal. To file a CHIRP report visit www.chirp.co.uk and submit through a secure encrypted online form. Alternatively, you can also email mail@chirp.co.uk or fill out a downloadable form from the website.

4.d. The AAIB

Any person can ask the Chief Inspector of Air Accidents to consider the investigation of a serious occurrence. To report an accident or serious incident to the AAIB please see their website www.aaib.gov.uk or use their 24 hour phone number **01252 512299**.

We suggest that you discuss with us first if you wish to consider this option.

Some more detail

What is fatigue?

The meaning of the term 'fatigue', in everyday and in some scientific usages is often determined by the context. In scientific papers on a specific aspect of fatigue, there will often be a definition of terms that is bespoke to that paper and/or the wider specific aspect that is being discussed. For example, where some aspect of fatigue is being objectively measured, say with a reaction time test, authors may define this parameter as "drowsiness" and its opposite as "alertness". Hence, it would be possible to subjectively feel OK, but following reaction time testing be demonstrated to be drowsy.

The ICAO definition of fatigue is: "A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety related duties". However, in our view fatigue is likely to be not just a physiological state, there may also be a psychological state component. Moreover, to the list of contributing factors: sleep/wakefulness; circadian phase and workload, there should also be added medical conditions such as obesity and obstructive sleep apnoea which are so common as to be in a sense "normal". Individual variation, some of which is genetically determined, is also an important factor.

Why use the Karolinska Sleepiness Scale?

Scales should ideally use the same parameter with an ordered increasing magnitude. The Karolinska Sleepiness Scale reasonably achieves this by using the same parameter throughout the scale; sleepiness. The Samn Perelli scale mixes parameters that have an uncertain relationship to one another, for example "very lively" has a connotation of physical performance whereas "very difficult to concentrate" has a connotation of mental performance.

The greater scientific validation of the Karolinska Sleepiness Scale (KSS) also means that brainwave states, performance losses and risks of involuntary sleep can be more reliably inferred from KSS scores. The provision of a KSS score in a commercially provided fatigue risk management product may commercially disadvantage the product because the KSS provides too much information. Following validation studies it is known that high KSS scores are associated with firm increases in risk; motor vehicle accident risk is doubled with each increasing point of the KSS. The interpretation of high Samn Perelli scores is less certain and therefore less alarming. Although the KSS is not the whole story of the performance losses seen in fatigue, it is a particularly reliable part of the story.



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