



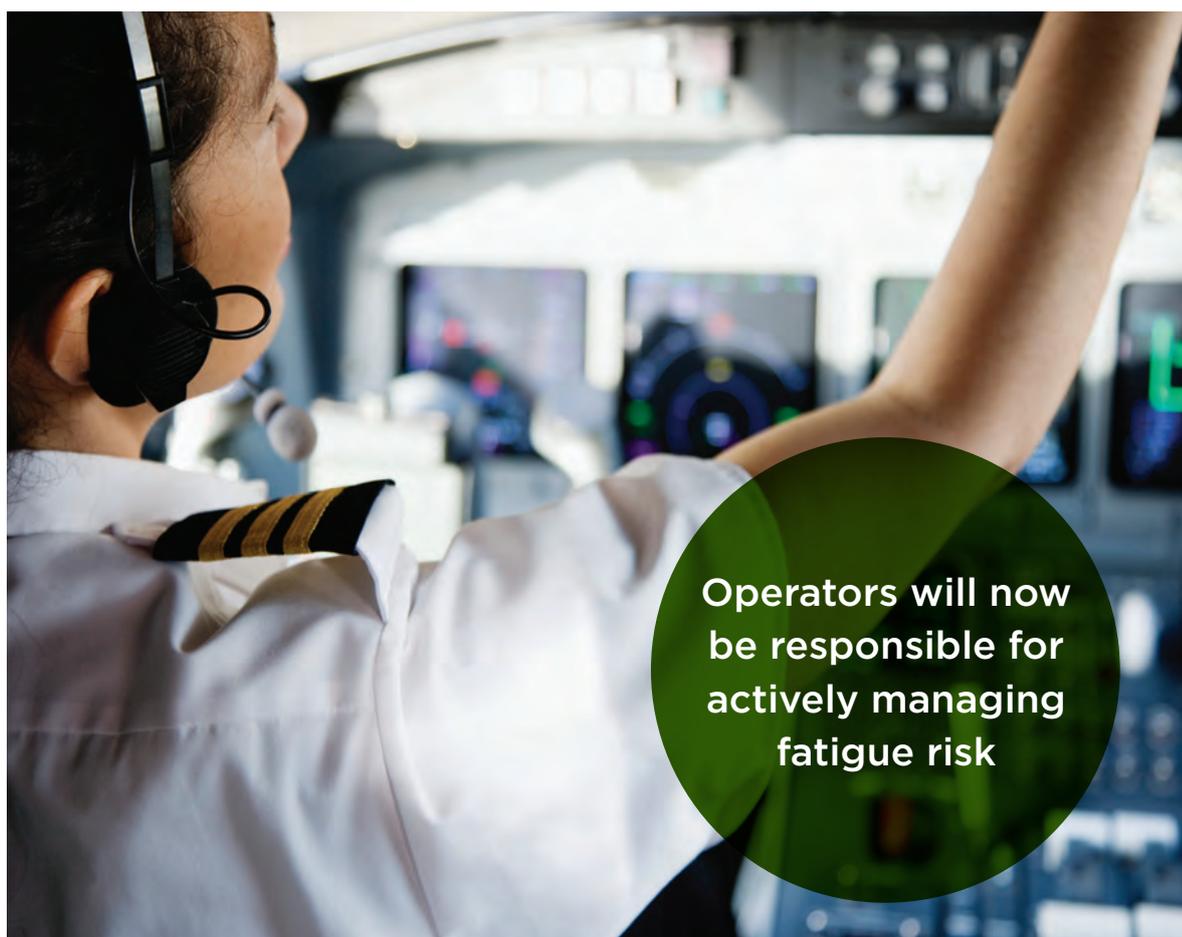
FATIGUE MANAGEMENT TRAINING FOR AVIATION PERSONNEL

Guidance for developing training
compliant with the new EASA
fatigue management regulations

PURPOSE OF THIS WHITE PAPER

This white paper aims to provide operators with an understanding of the new EASA requirements for fatigue management training and how to design an effective training programme. An example programme is provided and the various options for training delivery and evaluation are considered.

This guidance has been produced by Clockwork Research, fatigue risk management specialists, who provide classroom-based and online fatigue management training for aviation operators, as well as for the JAA-Training Organisation, Baines Simmons and Cranfield University.



1 THE NEW EASA FATIGUE MANAGEMENT TRAINING REQUIREMENTS

In January 2014, the new ‘European Regulation for Flight Time Limitations (FTL)’¹ for commercial air transport (CAT) air operator certificate (AOC) were published. The regulations include a European FTL scheme and multiple Operator Responsibilities (ORO.FTL.110) for managing fatigue.²

Operators will now be responsible for actively managing fatigue risk, and one of the mandatory controls that must be put in place is fatigue management training (ORO.FTL.250):

“ORO.FTL.250

(a) The operator shall provide initial and recurrent fatigue management training to:

- a. crew members,*
- b. personnel responsible for preparation and maintenance of crew rosters, and*
- c. management personnel concerned.*

(b) This training shall follow a training programme established by the operator and described in the operations manual. The training syllabus shall cover the possible causes and effects of fatigue and fatigue countermeasure.”

The content and frequency of fatigue management training should be proportional to the operator’s fatigue risk exposure. Compared to a scheduled airline operating only during the daytime, an on-demand night cargo operator is likely to require a more involved training syllabus and more frequent refresher training. It is up to the operator to design and submit to the local regulator a fatigue management training programme that it believes is going to be effective.

¹ COMMISSION REGULATION (EU) No. 83/2014

² Operators have the option of developing a more extensive fatigue risk management (FRM) approach, sometimes known as a FRM system (FRMS), which is described in AMC1 ORO.FTL.120.

2 SYLLABUSES FOR A FATIGUE MANAGEMENT TRAINING PROGRAMME

2.1 CREW MEMBERS

The crew fatigue management training syllabus should be comprehensive and provide crew with the knowledge to manage fatigue effectively. The training is an opportunity to equip crew with an understanding of the effective countermeasures for fatigue that can be implemented when on duty and at home. In addition, the training should introduce the operator's new approach to fatigue management, including the fatigue management policy, crew member responsibilities and crew fatigue reporting system.

A fatigue management training syllabus for crew is suggested in the new EASA fatigue management regulations (AMC1 ORO.FTL.250) and listed in Table 1 below.

Table 1: EASA suggested syllabus for crew fatigue management training

(a)	Applicable regulatory requirements for flight, duty and rest;
(b)	The basis of fatigue including sleep fundamentals and the effects of disturbing circadian rhythms;
(c)	The causes of fatigue, including medical conditions that may lead to fatigue;
(d)	The effect of fatigue on performance;
(e)	Fatigue countermeasures;
(f)	The influence of lifestyle, including nutrition, exercise and family life, on fatigue;
(g)	Familiarity with sleep disorders and their possible treatments;
(h)	Where applicable, the effects of long range operations and heavy short range schedules on individuals;
(i)	The effect of operating through and within multiple timezones; and
(j)	The crew member responsibility for ensuring adequate rest and fitness for flight duty

NB. There are other existing training requirements that are relevant,³ for example regarding crew resource management (CRM) training.

³ The relevant training requirements are described in the following EASA regulations and guidance:

- For Flight Crew – ORO.FC.115 & 215;
- For Cabin crew – ORO.CC.115 & CC.TRA.215 & 220;
- For Senior cabin crew – AMC1 ORO.CC.200(c) (e/f) - human factors, CRM & FTL requirements

Crucially, the syllabus should provide crew with an understanding of their responsibilities regarding fatigue management. The training should thus provide crew with information on:

1. The operator's fatigue management procedures, and the responsibility of management and employees to manage fatigue risk.
2. Crew members' responsibility to:
 - i. Prior to beginning a duty, to declare to the operator if they are unfit to operate;
 - ii. Not begin a duty or continue to operate during a duty, if they know they are, or believe they will become, unfit to operate safely;
 - iii. Inform the Commander and/or other crew members of their situation if, during a duty, the crew member becomes unfit to continue to operate;
 - iv. Report to their operator all issues relating to fatigue and their fitness to fly; and
 - v. Engage in the safety system of their operator.
3. How to manage off-duty time and make optimum use of rest opportunities.
4. The effects of fatigue as a result of commuting.

Ideally, the fatigue management training syllabus should incorporate lessons learned regarding the effects of fatigue and mitigation initiatives that are specific to each airline.



Syllabus should provide crew with an understanding of their responsibilities

2.2 SYLLABUS FOR CREWING, SCHEDULING AND ROSTERING STAFF

The design of crew rosters is a powerful determinant of the level of fatigue a crew population will encounter. Therefore, under the new EASA regulations, operators are required to ensure that rosters are constructed to provide crew with sufficient opportunity to achieve adequate rest, and to ensure that fatigue does not reach an unacceptable level.

The individuals responsible for constructing and administering rosters (e.g. rostering, crewing or scheduling personnel) clearly have a vital role to play in managing crew fatigue. According to the new EASA regulations, it is now necessary for these personnel to receive fatigue management training. EASA has not provided a suggested syllabus for these groups, but clearly the training should be designed to equip staff with the knowledge and skills required to carry out their considerable fatigue management responsibilities.

Table 2 provides a list of suggested topics to be covered by training for crewing, scheduling and rostering personnel.

Table 2: Suggested topics to be covered by training for crewing, scheduling and rostering personnel

1	All of the topics considered in the crew fatigue management training syllabus
2	The factors that may affect a crew member's ability to obtain sufficient sleep for them to be properly rested for duty
3	How relationships between duties (frequency, length and pattern), as well as their associated rest periods, contribute to fatigue
4	Concept of Block Windows - the impact on planned rest of changing report / off duty times
5	Delayed reporting - impact of delaying crew v new crew
6	Use of standby crew - recognising time and nature of the impact of standbys on subsequent duty
7	Crew member's requirement to have knowledge of rostered duties, rest periods and recovery periods in advance, in order to plan use of rest periods
8	The effects of long duty periods on rest requirement
9	Clear guidance on when to call crew members who are off duty
10	Roster disruption and its effects on human performance ⁴
11	How fatigue risk can be compounded, or alleviated, depending on other associated risks (e.g. training, weather, airfield categorisation, crew experience).

⁴ In accordance with ARO.OPS.230

2.3 SYLLABUS FOR MANAGEMENT

The new regulations (ORO.FTL.250) state that fatigue management training should be provided to 'management personnel concerned'. EASA does not define who these personnel are, but presumably it includes managers who make decisions that have the potential to impact on roster design and other contributors to crew fatigue. Thus, the group would include, for example, the CEO, safety, operational and commercial managers.

There is no guidance from EASA on what should be included in training for managers, but it seems reasonable to expect that it would focus on their fatigue management responsibilities, and include a condensed version of the training provided for crew and crewing, scheduling and rostering personnel.



Fatigue management training should be provided to 'management personnel concerned'

3 METHODS FOR DELIVERING FATIGUE MANAGEMENT TRAINING

This section aims to assist operators to decide which methods to use for delivering fatigue management training.

The interactivity and knowledge sharing offered by classroom training sessions led by an experienced, knowledgeable trainer is hard to beat, and for smaller groups (e.g. management, crewing and scheduling staff) the classroom format is ideal. The drawbacks of this approach, of course, are access to competent trainers and the time and costs involved when training distributed and/or large groups of flight and cabin crew.

3.1 AN EXAMPLE FATIGUE MANAGEMENT TRAINING PROGRAMME

Table 3 outlines the fatigue management training programme of medium-sized, ABC airline. The airline operates frequently at night and many of the crew commute from different European countries. The airline uses a combination of classroom-based workshops, delivered by in-house CRM instructors who have attended the JAA-TO 'Introduction to FRMS' course, and online training for crew.

3.1.1 TRAINING FOR THE SAFETY TEAM AND CRM INSTRUCTORS

ABC airline's safety team and CRM instructors attended a specialist fatigue management training course delivered by the JAA-TO entitled 'An Introduction to Fatigue Risk Management'.⁵ The course enables these individuals to develop training material for other groups and to provide in-house informed advice and guidance on fatigue risk management.



⁵ See <https://jaato.com/courses/75/>

Table 3: Overview of ABC airline's Fatigue Management Training Programme

Course Title		Fatigue Awareness and Countermeasures Training (FACT)	Managing roster-related fatigue	Introduction to fatigue management	Essentials of fatigue management
Group	Safety Department			•	
	CRM Instructors			•	
	Crewing, Scheduling and Rostering		•		
	Senior Management				•
	Flight Crew	•			
	Cabin Crew	•			
Format		Online	Classroom	Classroom	Classroom
Frequency		Initial training and annual refresher training	Once	Once	Once
Duration		Approx. 3 hours self-paced	1 day	2 days	1/2 day
Developed by		Clockwork Research	CRM Instructors/ Safety Department	JAA-TO	Safety Department

3.1.2 TRAINING FOR ROSTERING, CREWING AND SCHEDULING PERSONNEL

ABC airline's rostering, scheduling and crewing personnel attended a bespoke 1-day training course delivered by Clockwork Research.⁶ The course was designed to equip scheduling and rostering staff with a scientific understanding of how schedules interact with sleep/wake and circadian rhythms, to cause fatigue.

Having learned the science, the personnel were then presented with a series of rostering scenarios, using actual rosters typical of the work patterns in their organisation, and tasked with using what they had learned to construct a realistic solution that minimised fatigue risk.

⁶ See <http://www.bainessimmons.com/training-courses/ts66-fatigue-risk-management-systems-frms-air-operations/>

3.1.3 **ONLINE FATIGUE MANAGEMENT TRAINING FOR CREW**

For organisations with a large, distributed workforce, online training (e-Learning) can be the most consistent, time efficient and cost-effective option. As well as being readily accessible, online training can be quickly updated to respond to changes in the operation or fatigue risk exposure.

Airline ABC favours an option also used by many operators, whereby e-Learning is used to set out important standard content, supported with classroom sessions to explain company-specific policies and procedures and to enable discussion. This approach has the dual benefit of ensuring that important content is delivered in a standardised way (i.e. there is no variation between instructors), while enabling the instructor to engage with crew to tackle issues that relate to the operation.

Clockwork has developed Fatigue Awareness and Countermeasures Training (FACT) programmes for a wide variety of clients, including crew training for easyJet, Cargolux and Jetairfly, and organisation-wide global programmes for BP and Newmont Mining. FACT programmes are tailored to reflect an operator's specific fatigue risk profile, and the policy and procedures they have implemented to manage fatigue risk. FACT programmes normally consist of c.6-8 short modules, each lasting approximately 10-15 minutes and addressing an element of the EASA syllabus (see Table 1).

These modules can be supported by a library of materials, accessible from within the training, for those who want to learn more about sleep, fatigue and fatigue risk management.

3.2 **PAPER-BASED GUIDANCE MATERIAL**

The most basic approach to delivering fatigue management training is to gather together relevant material and distribute this, for example in the company safety magazine.

This approach may 'tick the box' for a small operator with low fatigue risk, assuming the material covers all the areas listed in Tables 1 and 2 and is tailored to the operator's specific risks. However, such an approach - placing the emphasis on crew to educate themselves and take the necessary steps to ensure that they are sufficiently rested - goes against one of the fundamental principles of fatigue management: that of shared responsibility. Guidance material could be provided to accompany a classroom-based training course, but it should not be the training.



4 REFRESHER TRAINING: CONTENT AND FREQUENCY

EASA requires that fatigue management training is provided initially and refresher training is provided on a recurrent basis (ORO. FTL.250). The content and frequency of the recurrent training should be proportional to the airline's size, complexity and potential fatigue risk exposure.

When significant changes are made to the flying operation (e.g. the addition of new routes, destinations or bases), additional route-specific training may be required to reflect the changes in risk profile. Refresher training provides an opportunity to review existing fatigue training and to publicise the results of research conducted (e.g. crew fatigue surveys, a summary of fatigue reports submitted to the safety team), as well as explaining new procedures (e.g. incident investigation) and tools for managing fatigue that may have been introduced since the training was last conducted.



5 **ASSESSING THE EFFECTIVENESS OF FATIGUE MANAGEMENT TRAINING**

The effectiveness of training should be regularly assessed to ensure that it still meets the organisation's requirements and reflects current operational risks.

At the simplest level, an assessment can consist of students completing a before/after test designed to measure change in knowledge. A more useful method for evaluating training effectiveness is to assess, after the training, the competency of the attendees to use what they have learnt to actually manage fatigue risk. For example, a set of operational scenarios could be devised, presenting fatigue risks which may be encountered when on duty. The student's task is then to use the information acquired during the training to develop solutions to manage the risk.

However, ultimately, the true test of the effectiveness of fatigue management training is whether it contributes to a long-term change in attitude, behaviour and a reduction in fatigue risk. Assessing this requires the identification of relevant fatigue metrics and long-term monitoring. Example metrics could include: an increase in the number of crew using crew accommodation before driving home after duty; or an increase in the number of crew using the fatigue reporting system.

5.1 **WHAT TRAINING RECORDS NEED TO BE KEPT?**

In accordance with the EASA regulations regarding training record keeping (AMC1 ORO.MLR.115), records of training content and attendance should be maintained to show satisfactory completion of the fatigue management training by all crew and other relevant personnel.

For crew members, training records should be kept for 3 years and for other personnel, it is sufficient to keep details of the last two training sessions. Ideally the training should include an assessment and show satisfactory completion of the fatigue management training by all attendees.



6 NEXT STEPS

6.1 CONDUCT A GAP ANALYSIS

The first step towards developing a fatigue management training programme is to conduct a gap analysis of any existing training against the new EASA regulations and other relevant regulatory requirements.

If your organisation already has fatigue management training, will new elements need to be added to reflect the EASA regulations? Does the training in its current format meet the EASA requirements, or could parts be modified and built upon to make them compliant with the requirements?

6.2 DECIDE ON THE MOST APPROPRIATE DELIVERY APPROACH

Next, decide how the training is going to be delivered – via classroom sessions, online or computer-based training, or maybe a combination? If classroom-based training is the preferred choice, have those who will be delivering the training received appropriate training – and is their knowledge current, or would they benefit from a refresher?

If you plan to deliver some or all of the training via computer-based training or an e-Learning programme, do you have the necessary skills in-house to develop the training? Does your organisation currently use a Learning Management System (LMS) to deliver other forms of training?

6.3 CONTACT CLOCKWORK

Whether you are looking to develop your training in-house and want to run a train-the-trainer session for your CRM instructors or safety specialists, or are interested in a computer-based solution for a larger crew group, we would love to hear from you.

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ABOUT THE AUTHORS

Clockwork Research specialises in assisting aviation operators to manage their fatigue risk. We also research and assemble safety cases and can assist in building all elements of an FRMS.

Operators with whom we work include:



We have also provided training and guidance for a number of regulatory authorities, including the UK CAA and the Australian Civil Aviation Safety Authority (CASA).



Clockwork has developed training in a variety of formats (e.g. web-based training, CD-ROM, PowerPoint slides, and workbooks). We have developed Fatigue Awareness and Countermeasures Training (FACT) programmes for a wide variety of clients, ranging from targeted, role-specific programmes for airlines such as easyJet, Cargolux and Jetairfly to organisation-wide programmes for multinationals such as BP and Newmont Mining.

Since 2007 Clockwork has hosted easyJet's fatigue training programme for flight crew. Since then nearly 2000 easyJet pilots have completed the training. Currently approximately 100-200 flight and cabin crew undertake the training each month, in their own time and at their own pace. Clockwork provides monthly statistics to the easyJet FRMS team, detailing the numbers who have accessed the training, non-completers, and pass rates.

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