



TC-1002866



TP 14574E

April 2007

Fatigue Risk Management System
for the Canadian Aviation Industry

Employee Training Assessment



Transport
Canada

Transports
Canada

Canada

edu.au

FRMS consultants
Adelaide, Australia

Project Team

Edu.au

Kirsty McCulloch
Angela Baker
Sally Ferguson
Adam Fletcher
Drew Dawson

Transport Canada

Isabelle Marcil, Transportation Development Centre (TDC)
Jacqueline Booth-Bourdeau, Civil Aviation
Mark Laurence, Civil Aviation
TDC Communications Unit

Notices

© Her Majesty the Queen in Right of Canada, as represented by the Minister of Transport, 2008.

All rights reserved. This document may be reproduced in part or in whole and by any means only in the context of personal or public non-commercial use only. Any other use or any modification of this document is strictly forbidden under the applicable copyrights law without prior written permission of Transport Canada. Please contact the Civil Aviation Communications Centre at 1-800-305-2059 (EST) for assistance. The information in this publication is to be considered solely as a guide and should not be quoted as or considered to be a legal authority. It may become obsolete in whole or in part at any time without notice.

Transport Canada does not endorse products or manufacturers. Trade or manufacturers' names appear in this report only because they are essential to its objectives.

Une traduction de ce document est également disponible en français : *Système de gestion des risques liés à la fatigue pour le milieu aéronautique canadien : Cahier d'évaluation de l'employé*, TP 14574F.

Contents

Introduction1

Fundamental Knowledge Questions3

Employee Logbook Instructions9

Acceptable Responses to Fundamental Knowledge Questions11

Logbook Checklist17

Competency Assessment Results19

Preface

This document is part of the Fatigue Risk Management System (FRMS) Toolbox for Canadian Aviation developed by Transport Canada and fatigue consultants *edu.au* of Adelaide, Australia.

The FRMS toolbox includes the following components:

1. *FRMS for the Canadian Aviation Industry: An Introduction to Managing Fatigue*, TP 14572E: introductory material intended to raise awareness about fatigue
2. *FRMS for the Canadian Aviation Industry: Fatigue Management Strategies for Employees*, TP 14573E: provides the knowledge and skills required to apply appropriate fatigue management strategies at the individual level
3. *FRMS for the Canadian Aviation Industry: Employee Training Assessment*, TP 14574E: an optional module intended to assess employee competence in topics covered in the *Fatigue Management Strategies for Employees* workbook
4. *FRMS for the Canadian Aviation Industry: Developing and Implementing a Fatigue Risk Management System*, TP 14575E: explains how to manage the risks associated with fatigue at the organizational level within a safety management system framework
5. *FRMS for the Canadian Aviation Industry: Policies and Procedures Development Guidelines*, TP 14576E: proposes a policy structure while providing examples and guidelines to help organizations through the process of designing fatigue risk management policies and procedures
6. *FRMS for the Canadian Aviation Industry: Introduction to Fatigue Audit Tools*, TP 14577E: provides an overview of tools available to employers to help determine whether scheduling provides employees with adequate opportunities to get sufficient sleep
7. *FRMS for the Canadian Aviation Industry: Trainer's Handbook*, TP 14578E: in addition to a training presentation on fatigue, fatigue management systems, and individual fatigue management strategies, the package includes background information for delivery of the workshop, learning outcomes, and questions frequently asked by participants

These documents are available on the Transport Canada web site at www.tc.gc.ca.

Introduction

The purpose of this assessment is to evaluate individual competence in each of the topics covered in *Fatigue Management Strategies for Employees*. Each chapter in the workbook begins with a set of learning outcomes that detail the knowledge and skills to be learned by the end of each chapter. Students should have completed each of the exercises and knowledge checks in the workbook before beginning this assessment.

The assessment process uses two approaches to evaluate employee competency in fatigue management. First, employees are asked direct questions intended to assess knowledge obtained from the workbook. Employees are asked to maintain a logbook to demonstrate competence in applying the concepts of fatigue risk management to their specific work, social, and family situations.

This booklet consists of five elements:

- Fundamental Knowledge Questions
- Employee Logbook Instructions
- Acceptable Responses to Fundamental Knowledge Questions
- Logbook Checklist
- Competency Assessment Results

The first two elements form the assessment tasks, and should be completed by employees. The Acceptable Responses and the Logbook Checklist are intended primarily for a designated assessor to determine whether employees have provided appropriate answers and information. However, it may be useful to provide this material to employees during the assessment. This will ensure employees know the types of answers/information they are expected to provide for each question. If the answers to the fundamental knowledge questions *are* provided to employees, the assessor should conduct a verbal assessment, asking questions at random. The assessor should primarily ask highlighted questions (see page 3).

The form provided in Competency Assessment Results serves as a certificate of competence. The feedback provided on this form should state whether the individual has demonstrated competence in fatigue risk management, and highlight any areas that need further attention.

The assessor may be a safety manager

within the organization, who has achieved competence in fatigue risk management principles. Alternatively, assessors can be commissioned from external sources (such as universities or private consultants) to provide a more objective examination of employee responses.

How to use this assessment unit

First, ensure the workbook exercises have been completed. These questions can be used to determine how well the topic information has been understood.

Employees should complete the first two parts of the assessment:

- Fundamental knowledge questions
- Employee logbook

The fundamental knowledge questions can be answered in the space provided in this booklet. The logbook should be completed in a separate notebook on a day-to-day basis for one month. Employee Logbook Instructions outline a number of elements that should be demonstrated and/or considered within the actual work environment. Employees should cover each in their logbooks. If the organization already practises good fatigue risk management principles, and the employee already understands and uses these principles, the logbook can be completed retrospectively. That is, employees can detail how they approached the required elements listed on pages 9-10 in their specific work environment in the past.

Assessment criteria

The knowledge questions and the logbook form the majority of the assessment criteria. To complete the course, employees should have a one-on-one interview with a designated assessor. The assessor asks random questions from the fundamental knowledge questions to test the employee's understanding. The assessor also asks questions based on the logbook, calling for the employee to describe how various components of fatigue risk management were applied to the specific work situation. Following the interview, the assessor completes the Competency Assessment from on page 19 and provides feedback to the employee based on the assessment.

Fundamental Knowledge Questions

Answer all questions. To pass the assessment, all highlighted questions (numbered in shaded box) and at least one of the other questions must be answered correctly.

1

List three examples of work-related factors that affect fatigue.

2

There are three categories of fatigue symptoms that may be observed at work or away from work: physical, mental, and emotional. List two examples of fatigue symptoms for each category of symptoms.

PHYSICAL SYMPTOMS

MENTAL SYMPTOMS

EMOTIONAL SYMPTOMS

3

What is the major shortcoming of simply relying on observations of symptoms to manage fatigue?

4 List four advantages of implementing fatigue management strategies in the workplace.

5 After waking from a nap, why is it critical to wait 15 to 20 minutes before you undertake any safety-critical tasks, including driving?

6 To recover from fatigue, a one-hour nap has the same restorative value as an eight-hour sleep.

* True * False

7 A 30-minute nap followed by at least 15 to 20 minutes to wake up significantly improves a person's alertness for the drive home.

* True * False

8 What is the shortest napping period that delivers measurable improvements to your alertness?

9 Food digestion becomes slower at night because the body is not programmed to process food at this time. Name three ways this can adversely affect you.

10 Drinks that contain caffeine, such as coffee, tea, cola, and energy drinks may help to increase your alertness levels. However, if you consume drinks like these frequently throughout the day, caffeine will not be as effective at improving your alertness. Explain why.

11 Name two strategies that help reduce fatigue levels.

12 At what time of day are fatigue levels generally at their highest?

13 Name one shift work related health issue that is experienced only by women.

14 List two factors that may disrupt your sleep without waking you up.

15 How does a pre-bed routine help you get to sleep?

16 When is the most effective time of day for recovery sleep?

17 Name three types of foods you should eat to reduce fatigue and maximize alertness.

18 What is the least amount of water you should drink each day to avoid dehydration?

19 If you do not drink enough water, you may become dehydrated. How does dehydration affect alertness levels?

20 List two signs you need to drink more water.

21 Describe three ways your sleep is affected by consuming more than four standard alcoholic drinks before bed.

22 List two dangers of taking sleeping pills over extended periods of time.

23 List three ways you can let your family and friends know your work schedule and when you are free.

24

Having a healthy social and family life is important for physical and mental well-being. Explain two things you can do to help balance your working hours and your family and social life.

25

Describe two strategies you can use to avoid falling asleep while driving.

26

Fatigue can cause performance impairment similar to alcohol in drivers.

* True * False

27

List five strategies that can help daytime sleep.

28

What are three common health problems experienced by shift workers?

29

List five potential advantages of physical exercise.

30

List two strategies that can ease the effects of jet lag.

Employee Logbook Instructions

After completing the *Fatigue Management Strategies for Employees*, employees should keep a logbook or diary for one month detailing how they have applied the strategies outlined in the workbook to their specific work situation.

If an organization is already active in managing fatigue, and employees regularly apply good fatigue risk management practices, they do not need to complete a day-by-day, one-month diary. Instead, their logbook may describe specific instances when they have applied the strategies outlined below.

The logbook should:

1. Detail specific instances of action employees have taken in the workplace to reduce potential causes of fatigue in themselves (at least two examples), such as:
 - developing interest in the job/task or motivation for the job/ task
 - opportunities to control the type or work or task, or when and where
 - physical activity (walking and stretching)

- conversation with work colleagues to improve alertness
 - eating stimulating foods or drinks, low GI or high-protein foods; strategic use of caffeine
 - improving environment (e.g., increasing light)
2. Detail specific instances of action taken in the workplace to reduce potential causes of fatigue in colleagues (at least one example). This may include some of the examples provided above, or direct confrontation and intervention with a colleague.
 3. Demonstrate that employees know where to find and have consulted relevant documentation available within the organization (e.g., FRMS policy and procedures, safety management system policy, labour standards, provincial or federal legislation).
 4. Demonstrate that employees apply fatigue management strategies in accordance with company policy:
 - roster/schedule/route concerns are raised and communicated with appropriate colleagues or supervisors

- company policies may include occupational health and safety rules, procedures manual, etc.

(Workplace examples of schedules/routes/job tasking could be provided to employees to help them suggest two improvements that might reduce fatigue. This may be done as an activity in groups of two or three during the face-to-face training workshop.)

5. Detail specific examples of how the employee's lifestyle has been modified to promote effective long-term management of fatigue in the workplace (at least three examples).

Examples include:

- managing sleep disorders
- using caffeine strategically
- reducing travelling time
- modifying sleep environment
- car pooling
- communicating needs and concerns with others
- improving diet and exercise
- reducing drug intake

6. Discuss personal sleeping habits and identify potential weaknesses or issues that can be worked on (at least two examples). For example:

- blocking out light
- reducing noise
- moderating ambient room temperature
- taking warm shower before bed
- relaxing before bedtime
- avoiding caffeine/alcohol before bedtime

Acceptable Responses to Fundamental Knowledge Questions

This section is primarily intended for use by assessors. It is useful to provide these answers to employees before they complete the assessment so that they are aware of the types of answers that are expected of them for each question. If the answers are provided to employees, the assessor should conduct a verbal assessment with employees, asking questions at

random from the fundamental knowledge questions. The assessor should predominately ask highlighted questions (numbered in shaded box).

The following content should be covered in employees' responses to the fundamental knowledge questions:

1

List three examples of work-related factors that affect fatigue.

High number of hours of work; high number of consecutive shifts; not being provided with or not taking breaks; working significant hours during the night or early morning; monotonous, boring tasks; long shifts; high physical or mental job demands

2

There are three categories of fatigue symptoms that may be observed at work or away from work: physical, mental, and emotional. List two examples of fatigue symptoms for each category of symptoms.

PHYSICAL SYMPTOMS: involuntarily nodding off; waves of sleepiness; poor hand-eye coordination; yawning; sore eyes; etc.

MENTAL SYMPTOMS: trouble focussing on tasks; making errors; having lapses in attention; being unable to recall the last five minutes; problems communicating effectively; etc.

EMOTIONAL SYMPTOMS: lack of energy; irritability; moodiness; etc.

3

What is the major shortcoming of simply relying on observations of symptoms to manage fatigue?

Although effective at low to moderate levels of fatigue, high levels of fatigue cause judgment to be impaired which can result in no action or the wrong action being taken.

4

List four advantages of implementing fatigue management strategies in the workplace.

Higher alertness; improved safety; improved communication; more effective work capability

5

After waking from a nap, why is it critical to wait 15 to 20 minutes before you undertake any safety-critical tasks, including driving?

To ensure sleep inertia has passed; to allow time to become fully awake and alert

6

To recover from fatigue, a one-hour nap has the same restorative value as an eight-hour sleep.

False

7

A 30-minute nap followed by at least 15 to 20 minutes to wake up significantly improves a person's alertness for the drive home.

True

8

What is the shortest napping period that delivers measurable improvements to your alertness?

Ten minutes

9

Food digestion becomes slower at night because the body is not programmed to process food at this time. Name three ways this can adversely affect you.

Indigestion; feeling bloated; build-up of stomach acid; disruption of sleep; constipation; weight gain or loss; peptic ulcers

10

Drinks that contain caffeine, such as coffee, tea, cola, and energy drinks may help to increase your alertness levels. However, if you consume drinks like these frequently throughout the day, caffeine will not be as effective at improving your alertness. Explain why.

Tolerance to caffeine develops with frequent use, meaning that the same amount of caffeine is no longer as effective.

11

Name two strategies that help reduce fatigue levels.

Optimize sleep periods; use the sleep opportunities provided in the roster; promote a good sleeping environment (plus additional strategies outlined in the workbook, e.g., strategic use of food and drinks, naps, etc.).

12

At what time of day are fatigue levels generally at their highest?

Midnight to 6 a.m. (and especially 3 a.m. to 5 a.m.)

13

Name one shift work related health issue that is experienced only by women.

May take longer to get pregnant; increased risk of miscarriage; pre-term birth; slower fetal growth rate; irregular menstrual cycle

14

List two factors that may disrupt your sleep without waking you up.

Outside noise; bright light; hot bedroom temperature; alcohol

15 *How does a pre-bed routine help you get to sleep?*

It programs your body and mind to prepare for sleep. It helps your body wind down towards sleep as you make your way to bed. This should reduce the time it takes for you to fall asleep.

16 *When is the most effective time of day for recovery sleep?*

At night (between midnight and 6 a.m.)

17 *Name three types of foods you should eat to reduce fatigue and maximize alertness.*

Low fat, high protein; fruits and vegetables; whole-grain breads and cereals

18 *What is the least amount of water you should drink each day to avoid dehydration?*

Two litres

19 *If you do not drink enough water, you may become dehydrated. How does dehydration affect alertness levels?*

It makes you feel lethargic and sluggish. This can increase the feeling of fatigue.

20 *List two signs you need to drink more water.*

Feeling thirsty or dehydrated; light-headed; headache; your urine is bright yellow or orange as opposed to pale yellow.

21 *Describe three ways your sleep is affected by consuming more than four standard alcoholic drinks before bed.*

Alcohol significantly reduces the quality of sleep; sleep is lighter, fragmented, and you need to get up to go to the toilet more often.

22

List two dangers of taking sleeping pills over extended periods of time.

The body develops a tolerance and will need more of the drug to get the same effect; addiction; impaired performance the following day.

23

List three ways you can let your family and friends know your work schedule and when you are free.

Talk to them about your schedule; write it in a household diary/calendar; stick your schedule on the fridge; plan activities with them as far ahead as possible; tell them what you are doing day to day.

24

Having a healthy social and family life is important for physical and mental well-being. Explain two things you can do to help balance your working hours and your family and social life.

Talk to friends and family about your work hours and the effect this has on you to help them gain a better understanding and to enable them to be supportive; let your family and friends know when you are sleeping, busy, or free; give a copy of your schedule to your family and friends; arrange events yourself so that you do not feel socially isolated.

25

Describe two strategies you can use to avoid falling asleep while driving.

Don't drive if you're tired; stop when you're tired; use caffeine strategically; make sure you're adequately rested before driving; use napping strategically, including allowing adequate time to recover from sleep inertia.

26

Fatigue can cause performance impairment similar to alcohol in drivers.

True

27

List five strategies that can help daytime sleep.

Sleeping in a dark, cool, and quiet room; talking with your family or household about your sleep requirements; establishing a good sleep environment; wearing earplugs; turning off the phone; putting a sign on your door to let people know you are sleeping; using foil or heavy curtains to block out the sunlight; establishing a pre-bed routine; avoiding caffeine two to four hours before bedtime; minimizing alcohol consumption prior to sleep; using white noise to dampen external noises; using an answering machine; telling your neighbours when you are sleeping so they don't mow the lawn or perform other noisy tasks; getting your partner to take preschool children out for a few hours so you can sleep in a quiet house; having a bath to relax before bed; learning relaxation techniques; learning to meditate; not panicking if you can't sleep; do something else and then try again.

28

What are three common health problems experienced by shift workers?

Sleeping problems; fatigue; stomach and digestive complaints; stress; irritability; weight gain or loss; cardiovascular disease

29

List five potential advantages of physical exercise.

Improved sleep; decreased fatigue; increased energy levels; reduced muscle tension; reduced stress; improved muscular tone and strength; reduction in body fat; improved bone density; increased stamina; improved circulation with better digestion and body functioning; greater flexibility

30

List two strategies that can ease the effects of jet lag.

Be well rested before the flight; drink lots of water; set up a healthy sleeping environment; maintain physical fitness; shift meal times to match new time zone.

Logbook Checklist

Supervisors or assessors should use this checklist to confirm that information detailed in the employee logbooks (or retrospective reports) covers all required components.

Name of employee: _____

The employee logbook:

- | | | |
|--|-------|------|
| • provides two different examples of appropriate action taken in the workplace to minimize potential causes of fatigue | * Yes | * No |
| • provides one example of appropriate action taken in the workplace to minimize potential causes of personal fatigue in colleagues | * Yes | * No |
| • demonstrates the employee uses strategies to manage fatigue in accordance with company policy | * Yes | * No |
| • demonstrates the employee knows where to find and how to use relevant documentation available in the workplace | * Yes | * No |
| • provides two to three examples of how the employee has made lifestyle changes to better manage fatigue in the workplace | * Yes | * No |
| • identifies two to three potential weaknesses in sleeping habits | * Yes | * No |
| • Employee's logbook entries authenticated | * Yes | * No |

Competency Assessment Results

Employee assessment

Name of employee: _____

Employee's performance on the fundamental knowledge questions was:

- ★ Satisfactory
- ★ Not satisfactory

Employee's logbook was:

- ★ Satisfactory
- ★ Not satisfactory

The employee needs to improve in the following areas before re-assessment:

Feedback to employee:

Signatures:

The employee has been informed of the assessment decision and provided with appropriate feedback.

Name of assessor: _____

Signature of assessor: _____

Date: _____

I have been informed of the assessment decision and provided with appropriate feedback.

Signature of employee: _____

Date: _____