

RTG-320: Fatigue Management in Aircrew-- Fatigue Risk Management Systems (FRMS)

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**Federal Aviation
Administration**

Overview

- Introduction
- Fatigue Risks
- Fatigue Risk Management System
- FRM Processes
- Shared Responsibilities



ICAO Definition of Fatigue

A physiological state of reduced mental or physical performance capability resulting from sleep loss, extended wakefulness, circadian phase, and/or workload (mental and/or physical activity) that can impair a person's alertness and ability to adequately perform safety-related operational duties.

Fatigue Management Guide for Airline Operators, 2nd Ed., 2015



Simplest Breakdown

Fatigue results in a reduced ability to carry out operational duties and can be considered an imbalance between:

- Physical and mental exertion of all waking activities (not only duty demands)
- and,
- Recovery from that exertion, which (except for recovery from muscle fatigue) requires sleep

Fatigue and Safety

- Fatigue is a significant identifiable cause of accidents in safety-sensitive operations.
- Due to complex factors involved in fatigue development, its management must be equally comprehensive to address known risk factors.
- The formation of RTG-320 reflects NATO's acknowledgment of the importance of Management of fatigue in military aviation operations.
- Fatigue Risk Management Systems (FRMS) utilize a science-based approach to minimize the effects fatigue can have on performance



Fatigue Risks

1. Periods of being awake need to be limited. Getting enough sleep (both quantity and quality) on a regular basis is essential for restoring the brain and body.
2. Reducing the amount or the quality of sleep, even for a single night, decreases the ability to function and increases sleepiness the next day.
3. The circadian rhythm affects the timing and quality of sleep and produces daily highs and lows in performance on various tasks.
4. Workload can contribute to crew fatigue. Low workload may unmask physiological sleepiness while high workload may exceed the capacity of a fatigued individual.

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Fatigue Management

Requires strategies to manage the exertion of waking activities and/or to improve sleep. Should include:

Sleep science — particularly the effects of not getting enough sleep (on one night or across multiple nights), and how to recover from sleep loss; and,

Circadian rhythms — daily cycles in physiology and behavior that are driven by the circadian body clock. Circadian rhythms include:

- changes in body temperature and blood pressure
- changes in secretion of melatonin, growth hormone and cortisol
- changes in the ability to fall asleep and stay asleep (sleep propensity).

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Fatigue Risk Management

- A robust fatigue management approach must provide a framework for effective implementation and should empower personnel to actively participate in fatigue risk identification and management.
- Fundamentally, FRMS must be:
 - data-driven and continuously monitored to manage fatigue-related risks,
 - based on scientific principles, with operational knowledge and experience
 - aimed at ensuring personnel are performing at adequate levels of alertness.



Fatigue Mitigation in Aviation Operations

- a) Determine and document the relative fatigue risk and operational safety of flights as compared to a baseline of well-established current and safe operations.
- b) Establish a data-driven process for objectively determining and predicting relative aircrew fatigue risk across a continuous range of flight operations and duty times, and for validating effective procedures for mitigating any excess fatigue risk.



FRMS in Military Aviation

Command Responsibilities

- Promote training & education opportunities
- Smart scheduling
- Foster a “just-culture”
- Develop FRM policy (including MALA)
- Ongoing evaluation of fatigue & FRM policy

Risk Management Cycle

Operator Responsibilities

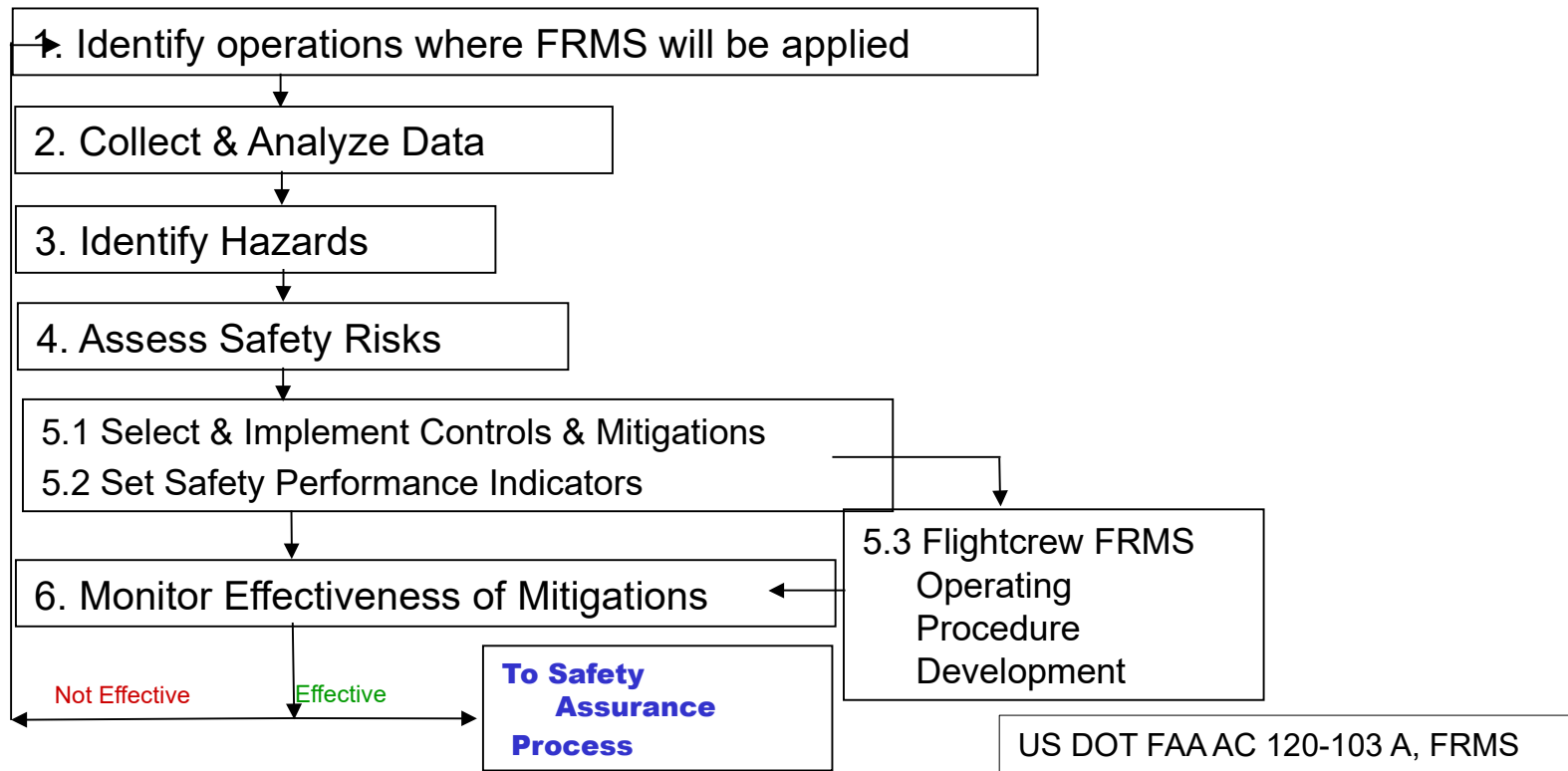
- Complete training and education
- Free and open reporting of hazards
- Tailor “toolbox” to unique environments
- Appropriately utilize sleep opportunities
- Provide input for policy evaluation

Health Services Support

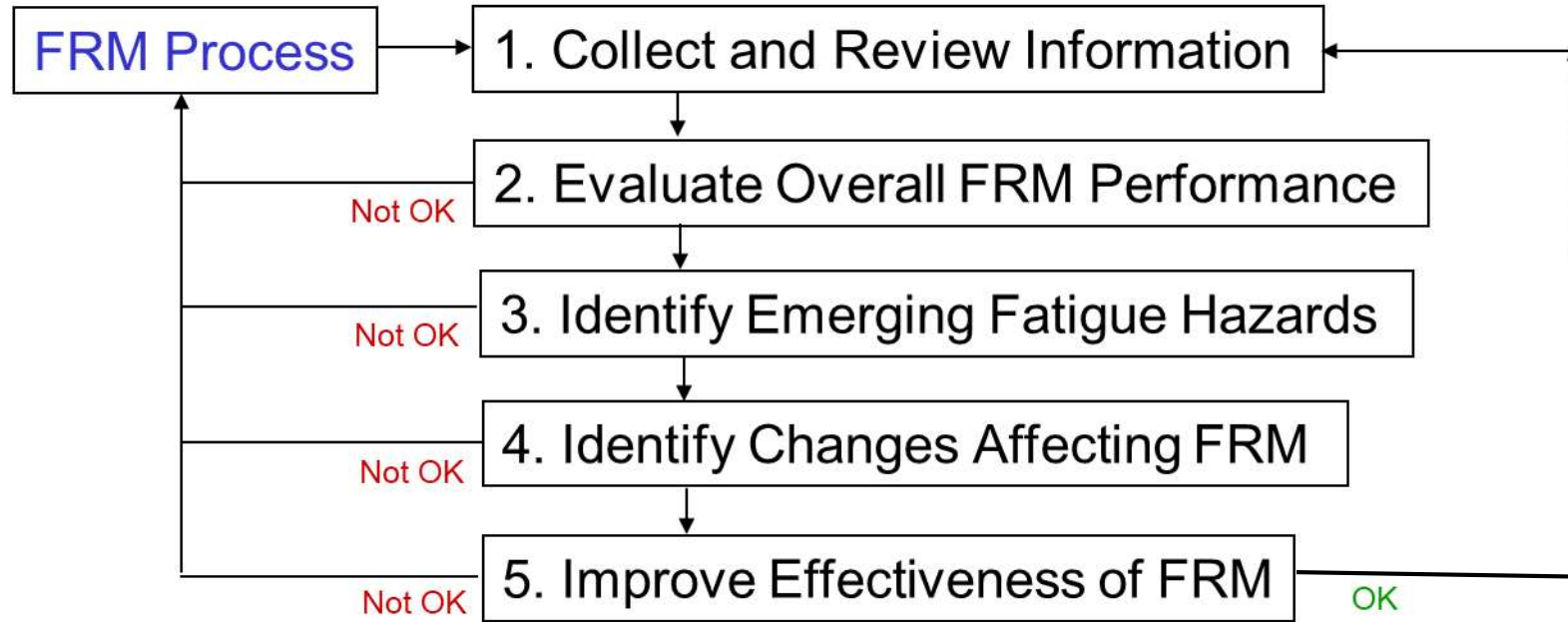
- Surveillance
- Evidence-Based interventions for identified medical hazards



FRMS Process



Safety Assurance Process



US DOT FAA AC 120-103 A, FRMS



FRMS requires shared responsibility between Command, Health Services support, and crew members

- Command support should provide for an operational fatigue management framework, including education and training, flight ops scheduling that ensures aircrew can manage their fatigue-related risks at an acceptable level of safety.
- Health Services support should provide critical surveillance, develop evidence-based interventions for fatigue, medical hazards, and follow-up.
- Crew members are responsible for arriving fit for duty, including making appropriate use of rest breaks to obtain sleep, and for reporting fatigue hazards.

Questions?

