

# Requirements for Fatigue Risk Management in Air Traffic Services



Civil Aviation Authority of Nepal  
First Edition – August, 2021



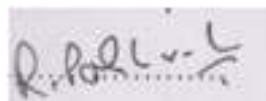
## FOREWORD

This Requirements for Fatigue Risk Management in Air Traffic Services, First Edition, August 2021 has been issued by the Director General, Civil Aviation Authority of Nepal pursuant to Rule 82 of Civil Aviation Regulation, 2058 B.S. (2002 A.D.) for implementation of Rule 40b of the same regulation. This Requirements contains the guidelines for the implementation of Fatigue Risk Management in ATS to prevent and/or mitigate the harmful effect of fatigue.

ANSSSD on behalf of CAAN is responsible for establishing this prescriptive limitation regulation related to fatigue risk management in ATS which shall prescribe maximums for work periods, minimums for non-work periods and other elements as relevant to the risks associated with a specific type of work (e.g. limiting consecutive work days, limiting consecutive night duties etc

The provisions in this Requirements are mainly based on Manual for the Oversight of Fatigue Management Approaches (ICAO Doc 9966) and Civil Aviation Requirements- Air Traffic Services.

This is a controlled document and is subject to periodic review. ANSSSD will maintain this document as complete, accurate and up-dated as possible. Comments and recommendations for revision/amendment action to this publication should be forwarded to the Director of ANS Safety Standards Department.



Director General

Civil Aviation Authority of Nepal

# Requirements for Fatigue Risk Management in Air Traffic Services

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## ACRONYMS

ANSSSD Air Navigation Services Safety Standards Department

ATC Air Traffic Controller

ATS Air Traffic Service

FRMS Fatigue Risk Management System

SMS Safety Management System

TIACAO Tribhuvan International Airport Civil Aviation Office

WOCL Window of circadian low

## Chapter 1. Definitions

**Accident.** An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

a) a person is fatally or seriously injured as a result of:

- being in the aircraft, or

- direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or

- direct exposure to jet blast,

except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which:

- adversely affects the structural strength, performance or flight characteristics of the aircraft, and — would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to the engine,(including its cowlings or accessories) to propellers, wings, tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear, doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the rudder);or

c) the aircraft is missing or is completely inaccessible.

Note 1.— For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified as a fatal injury.

Note 2.— An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.

Note 3.— The type of unmanned aircraft system to be investigated is addressed in Annex 13, 5.1.

Note 4.— Guidance for the determination of aircraft damage can be found in Annex 13, Attachment F.

**Air traffic service.** A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).

**Air traffic services unit.** A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.

**Circadian body clock.** A neural pacemaker in the brain that is sensitive to the day/night cycle (via a special light input pathway from the eyes) and determines our preference for sleeping at night. Shift work is problematic because it requires a shift in the sleep/wake pattern that is resisted by the circadian body clock, which remains ‘locked on’ to the day/night cycle. Jet lag is problematic because it involves a sudden shift in the day/night cycle to which the circadian body clock will eventually adapt, given enough time in the new time zone

**Duty.** Any task that an air traffic controller is required by the air traffic services provider to perform. These tasks include those performed during time-in-position, administrative work and training.

**Duty period.** A period which starts when an air traffic controller is required by an air traffic services provider to report for or to commence a duty and ends when that person is free from all duties.

**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 perform safety related operational duties.

**Hazard.** A condition or an object with the potential to cause or contribute to an aircraft incident or accident.

**Human performance.** Human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations

**Incident.** An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

Note.— The types of incidents which are of main interest to the International Civil Aviation Organization for accident prevention studies are listed in the Annex 13, Attachment C

**On-call.** A defined period of time, during which an individual is required by the service provider to be available to receive an assignment for a specific duty. Synonymous with standby.

**Non-duty period.** A continuous and defined period of time, subsequent to and/or prior to duty periods, during which the air traffic controller is free of all duties.

**Roster (noun).** A list of planned shifts or work periods within a defined period of time. Synonymous with Schedule;

(verb). To assign individuals to a schedule or pattern of work. Synonymous with Schedule.

**Safety.** The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.

**Safety management system (SMS).** A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.

**Shift work.** Any work pattern that requires an individual to be awake at a time in the circadian body clock cycle that they would normally be asleep.

**Sleep.** A reversible state in which conscious control of the brain is absent and processing of sensory information from the environment is minimal. The brain goes “off-line” to sort and store the day’s experiences and replenish essential systems depleted by waking activities.

**Sleep disorders.** A range of problems that make it impossible to obtain restorative sleep, even when enough time is spent trying to sleep. Examples include obstructive sleep apnea, the insomnias, narcolepsy, and periodic limb movements during sleep.

**Time-in-position.** The period of time when an air traffic controller is exercising the privileges of the air traffic controller’s licence at an operational position.

**Unforeseen operational circumstance.** Unexpected conditions that could not reasonably have been predicted and accommodated, such as bad weather or equipment malfunction, which may result in necessary on-the-day operational adjustments.

**Unrestricted sleep.** Sleep which is not restricted by any demands. Sleep can begin when an individual feels sleepy, and does not have to be delayed for any reason. In addition, the individual can wake up spontaneously and does not have to set the alarm.

**Window of Circadian Low (WOCL).** Time in the circadian body clock cycle when subjective fatigue and sleepiness are greatest and people are least able to do mental or physical work. The WOCL occurs around the time of the daily low point in core body temperature - usually around 0200-0600 when a person is fully adapted to the local time zone. However, there is individual variability in the exact timing of the WOCL.



## **Chapter 2 General**

### **2.1. Introduction**

Fatigue is a hazard that degrades various types of human performances, and can contribute to aviation accidents or incidents. Since fatigue is affected by all waking activities (not only work demands), fatigue risk management has to be considered as a shared responsibility between the State, service providers and individuals. Fatigue management refers to the methods by which ATS providers address the safety implications of fatigue.

This requirement has been developed to set out the prescriptive guidelines for the Fatigue Risk Management in Air Traffic Services. It is developed based on following scientific principles, knowledge and operational experience:

- the need for adequate sleep (not just resting while awake) to restore and maintain all aspects of waking function (including alertness, physical and mental performance, and mood);
- the circadian rhythms that drive changes in the ability to perform mental and physical work, and in sleep propensity (the ability to fall asleep and stay asleep), across the 24h day;
- interactions between fatigue and workload in their effects on physical and mental performance; and
- the operational context and the safety risk that a fatigue-impaired individual represents in that context.

### **2.2. Objective**

Establish prescriptive limitation regulation related to fatigue in ATS thereby ensuring that the ATS provider is managing fatigue-related risks to achieve an acceptable level of safety performance.

### **2.3. Scope**

These requirements are applicable to the ATS units of TIACAO and air traffic controllers of those units. CAAN may identify other airports where such requirements could be applicable in future.

## **Chapter 3. Prescriptive Limitation Parameters for Air Traffic Controllers**

The following material comprises a set of parameters that may be considered in the development of prescriptive limitations for air traffic controllers.

### **3.1. The ATS Provider's Responsibilities**

The ATS provider shall prepare and publish duty roster sufficiently in advance to provide air traffic controllers the opportunity to plan adequate rest. Consideration shall be given to the cumulative effects of undertaking long duty hours intermixed with minimum non-work periods, and of avoiding rosters that result in the serious disruption of an established pattern of working and sleeping. Rosters shall cover a period of at least 15 days.

The ATS provider shall ensure that the minimum non-work periods provide adequate rest for the air traffic controllers to achieve a suitable sleep period, as well as allowing for consideration of other physiological requirements and any associated travelling or commuting time.

In order to avoid any impairment to an air traffic controllers' performance, the ATS provider shall manage opportunities for the air traffic controllers to consume a meal such that the duty period doesn't exceed more than 5 hours.

The ATS provider shall not require an air traffic controller to undertake any safety related task if it is known or suspected that the air traffic controller is fatigued to the extent that safety may be adversely affected.

To provide evidence of compliance with prescriptive limits, the ATS provider shall maintain records of the duties performed and non-duty periods achieved so as to facilitate audit by the State of the ATS provider for the period of at least 90 days.

### **3.2. Air Traffic Controllers' Responsibilities**

The air traffic controller shall not perform any safety relevant tasks when he or she knows that he or she is fatigued or feels unfit to the extent that safety may be adversely affected.

The air traffic controller shall make best use of the facilities and opportunities that are provided for rest and for the consumption of meals. They shall plan and use rest periods to ensure that they are fully rested.

## Chapter 4. Prescriptive Requirements

- 4.1. The following prescriptive requirements shall be complied by the ATS providers:
- a) The maximum
    - i. number of hours in any duty period for air traffic controller shall be 10 hours.
    - ii. number of consecutive work days for air traffic controller shall be 6 days.
    - iii. number of hours worked within a period of 28 days for air traffic controller shall be 200 hours.
    - iv. time-in-position for an air traffic controller in one sitting shall be 3 hours.
  - b) The minimum
    - i. duration of non-duty periods for air traffic controller shall be 10 hours before and after the night duty period.
    - ii. number of non-duty days required in a 7 consecutive days for air traffic controller shall be 1 day.
    - iii. duration of breaks between periods of time-in-position in a duty period for air traffic controller shall be as following:
      - if the time-in-position in a duty period is 1 hour or less, the minimum duration of break shall be 15 minutes.
      - if the time-in-position in a duty period is more than one hour but less than or equal to 2 hours, the minimum duration of break shall be 30 minutes.
      - if the time-in-position in a duty period is more than 2 hours but less than or equal to 3 hours, the minimum duration of break shall be 45 minutes.
- 4.2. ATS providers shall identify a process for assigning unscheduled duties that allows air traffic controllers to avoid extended periods of being awake.
- 4.3. ATS providers shall ensure that no more than 3 on-call or standby duties shall be worked in a 7-day period.
- 4.4. ATS providers shall ensure that the maximum number of consecutive night duty period (wholly or partly) shall not exceed 3 times within a 10 consecutive days' period.
- 4.5. The variations from prescriptive limitation regulation established above by CAAN shall include the provision of:
- i. the reason for the need to deviate;
  - ii. the extent of the deviation;
  - iii. the date and time of enactment of the deviation; a safety case, outlining mitigations, to support the deviation.