

# Democratic Socialist Republic of Sri Lanka



## Civil Aviation Authority of Sri Lanka

### Implementing Standards

(Issued under Sec. 120, Civil Aviation Act No. 14 of 2010)

### **Title: Management of Fatigue in the provision of Air Traffic Control Services**

**Reference No: IS-11-2.28, App.05 & 06**

**S.N: 096**

**Date: 25<sup>th</sup> February 2021**

Pursuant to Sec.120 of the Civil Aviation Act No.14 of 2010, Director General of Civil Aviation shall have the power to issue, whenever he considers it necessary or appropriate to do so, such Implementing Standards for the purpose of giving effect to any provision of the Civil Aviation Act, any Regulations or Rules made thereunder including the Articles of the Convention on International Civil Aviation specified in the Schedule to the CA Act.

Accordingly, I, being the Director General of Civil Aviation do hereby issue the Implementing Standards on Management of Fatigue in the provision of Air Traffic Control Services as mentioned in the Attachment hereto (Ref. IS-11-2.28, App.05 & 06) elaborating the requirements to be satisfied for the effective implementation of the International Standard on Fatigue Management specified in Annex 11 – Air Traffic Services.

This Implementing Standard shall be applicable to the Aeronautical Service Provider responsible for the provision of Air Traffic Service in Sri Lanka and each holder of an Air Traffic Controller License.

This Implementing Standards shall come into force with immediate effect and remain in force unless revoked.

Attention is also drawn to sec. 103 of the Act, which states inter alia that failure to comply with Implementing Standard is an offence.

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Enclosure: Attachment No. IS-11-2.28, App.05 & 06

## **Implementing Standards**

### **SLCAIS – 096: Management of Fatigue in the provision of Air Traffic Control Services**

#### **1. Notice to the Recipient**

- 1.1. The requirements in this Implementing Standard are based on the Standards and Recommended Practices (SARPs) adopted by the International Civil Aviation Organization (ICAO) and incorporated in the Amendment No. 50 – B to Annex 11, Air Traffic Services.
- 1.2. In pursuance of the obligation cast under Article 38 of the Convention which requires the Contracting States to notify the ICAO of any differences between the national regulations of the States and practices and the International Standards contained in the respective Annex and any amendments thereto, the CAASL will be taking steps to notify ICAO of such differences relating to either a Standard or a Recommended Practice, if any. The CAASL will also keep the ICAO currently informed of any differences which may subsequently occur, or of the withdrawal of any differences previously notified. Furthermore, the CAASL will take steps for the publication of differences between the national regulations and practices and the related ICAO Standards and Recommended Practices through the Aeronautical Information Service, which is published in accordance with the provisions in the Annex – 15 to the Convention.
- 1.3. Taking into account of the ICAO council resolution dated 13 April 1948 which invited the attention of Contracting States of the desirability of using in the State's national regulations, as far as is practicable, the precise language of those ICAO Standards that are of a regulatory character, to the greatest extent possible the CAASL has attempted to retain the ICAO texts in the Annex in drafting this Implementing Standard.
- 1.4. The requirements contained in this document are applicable to the Aeronautical Service Provider responsible for the provision of Air Traffic Services in Sri Lanka and each holder of an Air Traffic Controller License.
- 1.5. The Aeronautical Service Provider responsible for the provision of Air Traffic Services in Sri Lanka and each holder of an Air Traffic Controller License shall strictly comply with the requirements published in this document when providing services within Sri Lanka airspace.
- 1.6. This Implementing Standards shall come into force with immediate effect and remain in force unless revoked.
- 1.7. This document may be amended from time to time and the amendments will be issued in the form of new pages to replace the relevant pages of this document.

- 1.8. Status of ICAO Annex components in the Implementing Standard  
Some of the components in an ICAO Annex are as follows and they have the status as indicated:
- 1.8.1. **Standard:** Any specification for physical characteristics, configuration, materiel, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and to which Contracting States will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory under Article 38. The Standards are reflected in the Implementing Standards using the normal fonts and recipients are required to conform to such requirements invariably and the DGCA **will take appropriate enforcement action** when those requirements are not complied with.
- 1.8.2. **Recommended Practice:** Any specification for physical characteristics, configuration, materiel, performance, personnel or procedure, the uniform application of which is recognized as desirable in the interest of safety, regularity, efficiency or environmentally responsiveness of international air navigation, and to which Contracting States will endeavor to conform in accordance with the Convention. The Recommended Practices are reflected in the Implementing Standards in italic fonts and the Recipients are encouraged to implement them to the greatest extent possible. However, DGCA **will not take enforcement action** when a Recommended Practice is not satisfied by the recipient.
- 1.8.3. **Appendices:** Comprising material grouped separately for convenience but forming part of the Standards and Recommended Practices adopted by the Council. Enforcement action on such matters will be as in the case of Standards or Recommended Practices.
- 1.8.4. **Definitions:** A definition does not have independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.
- 1.8.5. **Tables and Figures:** add to or illustrate a Standard or Recommended Practice, and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

## CHAPTER 1 – DEFINITIONS

**Bio-mathematical Model.** A computer programme designed to predict aspects of a schedule that might generate an increased fatigue risk for the average person, based on scientific understanding of the factors contributing to fatigue. Bio-mathematical models are an optional tool (not a requirement) for predictive fatigue hazard identification within an FRMS. All bio-mathematical models have limitations that need to be understood for their appropriate use.

**Day shift.** A scheduled shift where the majority of the work hours fall between 0600h and 1400h.

**Evening shift.** A scheduled shift where the majority of the work hours fall between 1400h and 2200h.

**Duty.** Any task that an Air Traffic Controller is required by the Air Traffic Services (ATS) Provider to perform, including ATC duty, administrative work, training, positioning and standby when it is likely to induce fatigue.

**Duty period.** A period which starts when an Air Traffic Controller is required by the ATS 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.

**Fatigue Safety Action Group (FSAG).** A group comprised of representatives of all stakeholder groups (management, operational personnel) together with any additional specialist experts (i.e. scientists, data analysts, and medical professionals), that is responsible for coordinating all fatigue management activities in the organization.

**Fatigue Risk Management System (FRMS).** A data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles, knowledge and operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.

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

**Mitigations.** Interventions designed to reduce a specific identified fatigue risk.

**Night shift.** A scheduled shift where the majority of the work hours fall between 2200h and 0600h.

**Non-duty period.** A continuous and defined period of time, outside of a duty period, during which an air traffic controller is free of all duties.

**On-call.** A defined period of time, during which an Air Traffic Controller is required by the ATS provider to be available to receive an assignment for a specific duty. Synonymous with **Standby**

**Operational Duty.** The period during which an Air Traffic Controller is actually exercising the privileges of the controller's licence at an operational position.

**Operational personnel.** Personnel involved in aviation activities who are in a position to report safety information. (For the purposes of this Implementing Standards, the relevant operational personnel are those for whom these Standards and Recommended Practices apply).

**Rest period.** A continuous and defined period of time, subsequent to and/or prior to duty, during which personnel are 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.

**Safety oversight.** A function performed by CAASL to fulfil its responsibility for the effective implementation of safety related Standards and Recommended Practices (SARPs), guidance material and associated procedures, as well as local regulations, including SMS where required.

**Safety performance.** A State or a Service Provider's safety achievement as defined by its safety performance targets and safety performance indicators.

**Safety performance indicator.** A data-based parameter used for monitoring and assessing safety performance.

**Safety performance target.** The planned or intended objective for safety performance indicator(s) over a given period.

**Safety risk.** The predicted probability and severity of the consequences or outcomes of a hazard.

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

**(Verb).** To assign individuals to a roster or pattern of work. Synonymous with **Roster**.

**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.

**Standby.** 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 **on call**.

**Time-in-position.** The period of time spent by an air traffic controller in the provision of air traffic control clearances, instruction and flight information to facilitate air traffic management.

## CHAPTER 2– GENERAL

- 2.1 The ATS provider shall comply with the Regulations established in this Implementing Standards for the purpose of managing fatigue in the provision of Air Traffic Control Services, based on;
- (a) *a prescriptive approach* that requires the ATS provider to comply with duty time limits and non-duty time minimums, while managing fatigue hazards using the existing SMS processes.
  - (b) *FRMS-based approach* that requires the ATS provider to implement a Fatigue Risk Management System (FRMS), acceptable to the Director General of Civil Aviation (DGCA).
- 2.2 For the purposes of managing fatigue-related safety risks, the ATS provider shall establish one of the following,
- (a) Air Traffic Controller Duty Rosters commensurate with the service(s) provided and in compliance with the prescriptive limitations prescribed in Chapter 3 of this Implementing Standards; or
  - (b) a Fatigue Risk Management System (FRMS) for the provision of all air traffic control services in compliance with the requirements established in Chapter 4 of this Implementing Standards; or
  - (c) an FRMS, in compliance with the requirements established in Chapter 4, for a defined part of air traffic control services in conjunction with duty rosters in compliance with the prescriptive limitation prescribed in Chapter 3, for the remainder of its air traffic control services.
- 2.3 To enable fatigue on duty to be maintained at an acceptable level the ATS provider shall provide;
- (a) Adequate resourcing for fatigue management;
  - (b) A working environment that has appropriate emphasis on controls and/or mitigations for fatigue-related risk;
  - (c) A fatigue reporting system;
  - (d) Evidence of appropriate responses to fatigue reports;
  - (e) Schedules/ Rosters that enable fatigue while at work to be maintained at an acceptable level, as well as providing adequate opportunities for rest and sleep; and
  - (f) Education and awareness training on the organizational fatigue management approach and how Air Traffic Control Officers (ATCOs) can better manage their own fatigue.
- 2.4 An individual ATCO shall also manage fatigue by;
- (a) Making optimum use of off-duty periods to get adequate sleep;
  - (b) Reporting to work fit for duty;

- (c) Using personal fatigue mitigation strategies while on duty;
- (d) Reporting fatigue issues;
- (e) Responsible use of individual authority

2.5 Whether in application of prescriptive approach or an FRMS approach, the ATS provider shall establish a Fatigue Reporting System to encourage an ongoing commitment by the operational personnel to report fatigue hazards. ATS provider's Fatigue reporting system shall;

- (a) Be non – punitive;
- (b) Have clear processes for fatigue hazard reporting;
- (c) Have clear expectations for individuals to report fatigue hazards;
- (d) A process for what to do when an individual considers him/herself too fatigued to perform safety-critical tasks to an acceptable standard;
- (e) identifies the implications for individuals of submitting a fatigue hazard report;
- (f) Identify how the organization will respond to reports of fatigue hazards (acknowledgements, feedback etc.)
- (g) Include appropriate actions in response to fatigue reports;
- (h) Maintain the integrity of the safety reporting system and reporter confidentiality;
- (i) Provide feedback on changes made in response to identified fatigue hazards.

2.6 The ATS provider shall incorporate fatigue management related topics in his awareness and/or training programmes which shall cover:

- (a) The underlying scientific principles;
- (b) Personal strategies for the mitigation of fatigue; and
- (c) Organization – specific policies related to the mitigation of fatigue, as minimum.

## **CHAPTER 3 – THE PRESCRIPTIVE APPROACH**

### **3.1 Compliance with prescribed limits and associated requirements**

- 3.1.1 When the ATS provider applies the prescriptive approach method for the management of Fatigue, it shall comply with duty time limits and non-duty time minima defined in this implementing Standards, while managing fatigue hazards using his SMS processes that are in place for managing safety hazards in general.
- 3.1.2 ATS provider shall document duty and non-duty period determination factors and practices, based on scientific principles, which comply with the prescriptive limitations and associated requirements detailed in this Implementing Standards.
- 3.1.3 Breaks longer than 30 min minimum prescribed under section 3.4.2.3 shall be allowed by the ATS provider to provide relief from periods of intense workload in an operational duty slot at a duty position within a duty period which should be determined based on:
- (a) The nature and amount of work to be done (including time on task, task difficulty and complexity and work intensity).
  - (b) Factors relating to the performance capacity of an individual (for example experience, skill level, effort, sleep history and circadian phase).
- 3.1.4 ATS provider shall prepare Duty Rosters for ATCOs, based on the prescribed limits specified in this Implementing Standards. Scientific Principles for managing fatigue, operational knowledge and experience shall also be considered in order to predict and minimize fatigue hazards relating to scheduling.
- 3.1.5 When preparing the Duty Rosters, ATS provider shall also consider cumulative effects of undertaking long duty hours interspersed with minimum non – work duty periods, and of avoiding rosters that result in the serious disruption of an established pattern of working and sleeping.
- 3.1.6 The Duty Roster shall cover a period of one (1) month as minimum and be published sufficiently in advance to provide ATCOs the opportunity to plan for duty and non-duty periods.
- 3.1.7 Changes to the roster at short notice shall be kept at minimum to minimize their impact.



- 3.1.8 To provide evidence of compliance with the prescribed duty period limits and non-duty period minima, ATS Provider shall keep records of planned (scheduled) and actual working hours of duty periods.
- 3.1.9 To provide evidence of compliance with the prescribed operational duty period limits and non-operational duty period minima, ATS Provider shall keep records of planned (scheduled) and actual working hours of operational duty periods (ex. Position logs).
- 3.1.10 Records of Duty Rosters and records of operational duty hours which include the details of the duties performed and non-duty periods achieved, shall be kept for a minimum period of six (6) months so as to facilitate the audits and inspection by the CAASL.
- 3.1.11 Minimum non-work periods shall provide adequate rest such that the ATCOs can achieve a suitable sleep period, as well as allowing for consideration of other physiological requirements and any associated travelling or commuting time.
- 3.1.12 *ATCOs should make best use of the facilities and opportunities that are provided for rest and for the consumption of meals. They should plan and use rest periods to ensure that they are fully rested.*
- 3.1.13 *In order to avoid any detriment to an ATCO's performance, opportunities to consume a meal shall be arranged when the duty period exceeds 6 hours.*
- 3.1.14 An ATCO shall not be allocated to undertake any safety related task if it is known or suspected that the ATCO is fatigued to the extent that safety may be adversely affected.
- 3.1.15 An ATCO 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.
- 3.1.16 The ATS provider shall establish procedures to ensure that the assignment of unscheduled duties to meet unpredictable operational needs or disruptions is actively managed through Periods of scheduled time on-call and the use of last-minute duty extensions that allows an ATCO to avoid extended periods of being awake.
- 3.1.16.1 When developing such procedures for the management of assigning unscheduled duties, the ATS provider shall consider;
- (a) minimizing the extent of disruption to the timing of a planned duty;
  - (b) providing protected sleep opportunities, prior to, during and after unscheduled duties;
  - (c) identifying minimal notification periods for changes to planned duties; and
  - (d) Limiting the number of consecutive days that they may be subject to being assigned unscheduled duties.

- 3.1.17 The ATS provider shall allow individuals to engage in ‘shift swapping’ ensuring that;
- (a) Prescriptive limitations are not exceeded at the time of the shift swap or at a later time during the work schedule; and
  - (b) Shift swapping is monitored to avoid conflict with scheduling principles or practices of the organization and those developed by the ATS provider.

### **3.2 Compliance with variation process requirements**

- 3.2.1 When the ATS provider deviates from the prescribed limits specified in this Implementing Standards due to an unexpected operational circumstances that do not occur on a regular basis or cannot be reasonably predicted to occur based on past experience, additional mitigations actions (ex. providing additional resources and buffer periods etc.) shall be used.
- 3.2.2 In any such unexpected operational circumstance requiring a variation to the prescribed limits, the following areas shall be identified by the ATS provider;
- (a) the circumstances in which the variation may be used;
  - (b) the operations to which the variation may be applied;
  - (c) the necessary mitigations to address the increased fatigue risks; and
  - (d) The variation limits (i.e. extension limits and/or limits for minimum rest reductions).
- 3.2.3 *The ATS Provider should monitor the frequency of their use of immediate variations, and provide evidence of compliance according to the regulatory requirements.*
- 3.2.4 When applying for minor or temporary variations to the prescribed limits, the ATS provider shall demonstrate how the specific fatigue risks associated with the variations will be actively managed under their SMS, along with a *Risk Assessment Report* which shall contain as minimum;
- (a) The nature and scope of the variation, including which of the prescriptive rules it affects, the operations to which it applies, and why it is needed.
  - (b) The operating environment in which the variation will apply (this may include people, procedures, equipment, stakeholders, the physical environment, the organizational culture, the legal and regulatory environment, natural hazards, and external threats).
  - (c) Potential impact of the variation on other service providers and associated services, (Ex. other Air Traffic Control units, airlines or airport services).
  - (d) A well-substantiated estimate of the impact of the variation on ATC fatigue, for example using published data from scientific studies or appropriate bio-mathematical models.

- (e) Explanation of how the potential effects of the variation on fatigue will be monitored and documented.
- (f) Description of the processes for risk assessment, if new fatigue hazard(s) are identified as a result of the variation.
- (g) Description of additional mitigations that can be put in place, if needed.

3.2.5 The ATS provider shall retain the record of planned and actual work and non-work periods, with significant deviations which exceed the outer limits or reduced minima from prescribed standards, noted.

### **3.3 Compliance with SMS requirements**

3.3.1 The ATS Provider shall use their existing SMS processes to manage all risks, including those related to fatigue.

3.3.2 When using existing SMS processes to managing fatigue risks within constraints of prescribed limits;

- (a) ATS Provider's SMS policy shall include fatigue as a hazard to be managed.
- (b) ATS Provider shall document duty time limits and non-duty time minimums in his Operations Manual.
- (c) ATS Provider shall establish a mechanism within his existing safety reporting system that can be used to identify where fatigue might constitute a hazard. That Fatigue reporting mechanism shall encourage each operational personnel to identify and report fatigue hazards as a part of their professional role. (ref. 3.3.5)
- (d) ATS provider shall consider changes to his operating environment and any impacts these changes may have on fatigue risks.
- (e) ATS provider's safety training shall include fatigue management, specific to the operational context. Records of those training shall be maintained.
- (f) ATS provider shall consider fatigue when reporting on safety performance.
- (g) ATS provider shall include general fatigue information in internal safety communications.

3.3.3 The ATS Provider's process for assigning responsibilities for risk assessment of fatigue hazards and mitigation shall be the same as is used for other hazards within their SMS.

- 3.3.4 To encourage open and honest reporting of hazards, the ATS Provider shall clearly distinguish between:
- (a) unintentional human errors, which are accepted as a normal part of human behaviour and are recognized and managed within the SMS; and
  - (b) Deliberate violations of rules and established procedures. The ATS Provider shall have processes independent of the SMS to deal with intentional non-compliance.
- 3.3.5 ATS provider's Fatigue reporting mechanism shall encourage his operational personnel to use the existing voluntary reporting system to identify fatigue hazards when:
- (a) a duty period has not commenced or is not completed, due entirely or in part, to fatigue. Filing of such reports should be included as part of an established process for reporting 'not fit for duty' due to fatigue identified by the ATS Provider. Also identified should be the subsequent ATS Provider actions that will be enacted in such situations.
  - (b) a duty period has been completed in which the individual believes that the level of fatigue they or other individuals were suffering meant sufficient safety margins had not been maintained throughout the operation or were only maintained following some unplanned mitigating action (e.g. task rotation, reducing the workload of the duty, delaying the reporting time, creating the opportunity for a nap, increasing supervision/monitoring etc.).
  - (c) The ATCO notices something in their operating environment that is likely to impact on their or other individuals' alertness to such an extent that safety margins could be reduced to unsatisfactory levels.
- 3.3.6 *An effective fatigue reporting system should capture data on recent sleep and duty history (minimum last 3 days), time of day of the event, and measures of different aspects of fatigue related impairment. It should also provide space for written commentary. Information on how to report should be covered in fatigue management training.*
- 3.3.7 Even within the prescriptive limits, ATS provider's SMS processes shall still require the risk mitigations are regularly reviewed and assessed to ensure their desired outcome continues.
- 3.3.8 ATS Provider's managing fatigue using a prescriptive approach shall require to provide basic fatigue management training to his operations personnel. Each person, whose role in the organization can influence ATC fatigue needs to have an appropriate level of fatigue management information and training. This may be achieved by including fatigue management-related topics in the SMS training programme of the ATS provider, or as stand-alone training programmes. Recurrent training shall also be conducted as appropriate to the level of fatigue risk in the operations.

### **3.4 Prescriptive Duty limitation parameters for Air Traffic Controllers**

#### **3.4.1 Duty Period**

- 3.4.1.1 The duty period of an ATCO shall not exceed 12 hours.
- 3.4.1.2 The aggregate of duty period hours of an ATCO shall not exceed 200 hours within a defined period of 720 consecutive hours or 30 consecutive days.
- 3.4.1.3 There shall be at least 12 hours between the end of one duty period and the beginning of the next.
- 3.4.1.4 An ATCO shall not be worked more than 6 consecutive days of duty.
- 3.4.1.5 When the maximum number of consecutive days of duty is rostered, there shall be a minimum interval of 60 hours between the end of one consecutive period of duty days and the commencement of the next period of duty.

#### **3.4.2 Operational Duty**

- 3.4.2.1 No period of operational duty of an ATCO shall exceed 2 hours.
- 3.4.2.2 No operational duty shall exceed 2 hours without there being a break taken during or at the end of that period.
- 3.4.2.3 A break during or at the end of the operational period shall be 30 minutes as minimum.
- 3.4.2.4 *At units where workload for any period of the day is judged to be low and the traffic flow is occasional rather than continuous, period of operational duty, at these times may be extended to a maximum of three (3) hours, provided that the following break is taken pro-rata (ex. 45 minutes after 3 hours).*
- 3.4.2.5 *Judgments on unit workload should be evaluated by the Senior Managers (SMATCs) of respective ATS Units.*

#### **3.4.3 Night Duty**

- 3.4.3.1 A period of night duty shall be defined as starting at 2200 (local) and ending at 0600 (local).
- 3.4.3.2 A duty which covers all or part of the period of night duty shall not exceed 12 hours.
- 3.4.3.3 No more than three (3) consecutive night duties shall be worked.

3.4.3.4 A minimum period of 48 hours shall occur between the end of one night duty period and the commencement of the next period of duty.

**3.4.4 On – call Duty**

3.4.4.1 No more than 3 on-call duties shall be worked in a 7 day period.

3.4.4.2 The maximum length of on call period of duty where the ATCO does not attend the place of work shall be 24 hours.

## **CHAPTER 4 – THE FRMS APPROACH**

### **4.1 Establishment of Fatigue Safety Action Group (FSAG)**

- 4.1.1 When the ATS provider deviates from the prescriptive limitation regulations specified in Chapter 3 of this Implementing Standards, a *Fatigue Risk Management System (FRMS)* with additional resources, enhanced processes specifically established to address fatigue risks, and more comprehensive fatigue management training shall be established.
- 4.1.2 The ATS provider shall establish a Fatigue Safety Action Group (FSAG) with responsibility for coordinating FRMS activities. The FSAG of the ATS provider shall be appropriate to the size and complexity of the operations covered by the FRMS, and to the level of fatigue risk in the operations.
- 4.1.3 The FSAG shall be responsible for following functions as minimum;
- (a) oversee the development of the FRMS;
  - (b) assist in FRMS implementation;
  - (c) oversee the ongoing operation of the FRM processes;
  - (d) contribute as appropriate to the FRMS safety assurance processes;
  - (e) maintain the FRMS documentation; and
  - (f) Be responsible for ongoing FRMS training and promotion.
- 4.1.4 The FSAG shall operate under Terms of Reference and shall clearly specify its activities, lines of accountability and interactions with other parts of the organization, in the FRMS documentation.

### **4.2 Necessary Components of an FRMS**

The FRMS of the ATS provider shall include the following components;

- (a) FRMS Policy and Documentation
- (b) FRMS Risk Management
- (c) FRMS Safety Assurance processes
- (d) FRMS promotion processes

#### **4.2.1 FRMS policy and documentation**

##### **4.2.1.1 FRMS policy**

The ATS provider shall define their FRMS policy that clearly specifies their commitment and approach to the management of fatigue risks and define all elements of their FRMS.

The ATS Provider's FRMS policy shall:

- (a) define the scope of FRMS operations;
- (b) reflect the shared responsibility of management, ATCOs, and other involved personnel;
- (c) clearly state the safety objectives of the FRMS;
- (d) be signed by the accountable executive of the organization;
- (e) be communicated, with visible endorsement, to all the relevant areas and levels of the organization;
- (f) declare management commitment to effective safety reporting;
- (g) declare management commitment to the provision of adequate resources for the FRMS;
- (h) declare management commitment to continuous improvement of the FRMS;
- (i) require that clear lines of accountability for management, ATCOs, and all other involved personnel are identified; and
- (j) Require periodic reviews to ensure it remains relevant and appropriate.

#### **4.2.1.2 FRMS documentation**

All the elements of the FRMS shall be documented either in a separate FRMS Manual or integrated into the SMS Manual, in order to be easily accessible to the personnel concerned and to facilitate the audits and inspections by the CAASL.

The ATS provider's FRMS documentation shall describe and records:

- (a) FRMS policy and objectives;
- (b) FRMS processes and procedures;
- (c) accountabilities, responsibilities and authorities for these processes and procedures;
- (d) mechanisms for ongoing involvement of management, ATCOs, and all other involved personnel;
- (e) FRMS training programmes, training requirements and attendance records;
- (f) scheduled and actual duty and non-duty periods and break periods between periods of time-in-position in a duty period with significant deviations and reasons for deviations noted; and
- (g) FRMS outputs including findings from collected data, recommendations, and actions taken.
- (h) FSAG Terms of Reference.

#### **4.2.2 Fatigue Risk Management**

Fatigue Risk Management (FRM) processes of the ATS provide shall involve;

- (a) identification of situations or conditions where fatigue may constitute a hazard;
- (b) evaluation of the level of fatigue risk;
- (c) introduction of risk mitigations when needed; and



- (d) Establishing metrics to measure the effectiveness of the risk mitigations and the overall FRMS.

#### 4.2.2.1 Identification of fatigue-related hazards

ATS provider shall develop and maintain 3 fundamental and documented processes for fatigue hazard identification:

**Predictive** – The predictive process shall identify fatigue hazards by examining air traffic controller scheduling and taking into account factors known to affect sleep and fatigue and their effects on performance. Methods of examination may include, but are not limited to:

- (a) ATS operational experience and data collected on similar types of operations or from other industries with shift work or 24-hour operations;
- (b) evidence-based scheduling practices; and
- (c) Bio-mathematical models.

**Proactive** – The proactive process shall identify fatigue hazards within current ATS operations. Methods of examination may include, but are not limited to:

- (a) self-reporting of fatigue risks;
- (b) fatigue surveys;
- (c) relevant air traffic controller performance data;
- (d) available safety databases and scientific studies;
- (e) tracking and analysis of differences in planned and actual worked times; and
- (f) Observations during normal operations or special evaluations.

**Reactive** – The reactive process shall identify the contribution of fatigue hazards to reports and events associated with potential negative safety consequences in order to determine how the impact of fatigue could have been minimized. At a minimum, the process may be triggered by any of the following:

- (a) fatigue reports;
- (b) confidential reports;
- (c) audit reports; and
- (d) Incidents.

#### 4.2.2.2 Fatigue-related risk assessment

ATS provider shall apply an ICAO accepted risk assessment procedures to determine when the associated risks require mitigation. This risk assessment procedures shall review identified fatigue hazards and link them to:

- (a) operational processes;
- (b) their probability;
- (c) possible consequences; and

(d) The effectiveness of existing preventive controls and recovery measures.

#### **4.2.2.3 Risk mitigation**

4.2.2.3.1 The ATS provider shall establish fatigue safety performance indicators to monitor the effectiveness of fatigue controls and mitigations.

4.2.2.3.2 For the fatigue safety performance indicators to be useful, the ATS provider shall set acceptable values and targets appropriate to the level of risk in a given operation, and in the 'tolerable' or 'acceptable' regions of risk assessments.

4.2.2.3.3 The fatigue safety performance indicators of the ATS provider shall be acceptable to the DGCA and need to be reviewed at regular intervals.

4.2.2.3.4 The ATS provider shall develop and implement fatigue risk mitigation procedures that:

- (a) select the appropriate mitigation strategies;
- (b) implement the mitigation strategies; and
- (c) Monitor the strategies' implementation and effectiveness.

#### **4.2.3 FRMS safety assurance processes**

4.2.3.1 The ATS provider shall develop and maintain FRMS safety assurance processes to:

(a) Provide for continuous FRMS performance monitoring, analysis of trends, and measurement to validate the effectiveness of the fatigue safety risk controls. The sources of data may include, but are not limited to:

- i. hazard reporting and investigations;
- ii. audits and surveys; and
- iii. reviews and fatigue studies (both internal and external);

(b) Provide a formal process for the management of change. This shall include, but is not limited to:

- i. identification of changes in the operational environment that may affect the FRMS;
- ii. identification of changes within the organization that may affect the FRMS; and
- iii. consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes; and

4.2.3.2 The FSAG shall record all fatigue hazards identified in the FRM processes, together with any actions taken to mitigate those hazards, in the FRMS documentation. The fatigue hazard register shall be regularly evaluated to ensure that it contains current, valid fatigue hazards and appropriate mitigation measures, as part of the FRMS safety assurance processes.

- 4.2.3.3 ATS provider shall conduct internal audits by a unit within the organization that is external to the FSAG.
- 4.2.3.4 ATS provider shall conduct safety reviews to evaluate whether the FRMS is likely to be adequate to deal with a change with the introduction of a new type of operation or a significant change to an existing operation.
- 4.2.3.5 ATS provider's FRMS safety assurance processes shall provide a formal process for the management of change. This shall include, but is not limited to:
- (a) Identification of changes in the operational environment that may affect the FRMS;
  - (b) Identification of changes within the organization that may affect the FRMS; and
  - (c) Consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes.
- 4.2.3.6 When a planned change is identified, the ATS provider shall:
- (a) Use the FRMS and SMS processes to identify fatigue hazards, assess the associated risk, and propose controls and mitigations;
  - (b) Obtain appropriate regulatory agreement that use of the proposed controls and mitigations will result in an acceptable level of residual risk;
  - (c) Document the strategy for managing any fatigue risk associated with changes.
- 4.2.3.7 The FRMS Safety assurance processes of the ATS provider shall provide for the continuous improvement through;
- (a) the elimination and/or modification of preventive controls and recovery measures that have had unintended consequences or that are no longer needed due to changes in the operational or organizational environment;
  - (b) Routine evaluations of facilities, equipment, documentation and procedures; and
  - (c) The determination of the need to introduce new processes and procedures to mitigate emerging fatigue-related risks.

#### **4.2.4 FRMS promotion processes**

FRMS promotion processes support the ongoing development of the FRMS, the continuous improvement of its overall performance, and attainment of optimum safety levels. The following shall be established and implemented by the ATS provider as part of his FRMS:

- (a) Training programmes to ensure competency commensurate with the roles and responsibilities of management, ATCOs, and all other involved personnel under the planned FRMS; and

- (b) an effective FRMS communication plan that:
    - i. explains FRMS policies, procedures and responsibilities to all relevant stakeholders; and
    - ii. describes communication channels used to gather and disseminate FRMS-related information.
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