

ANNEX B TO PP 2207AS

Extract of ICAO Annex 11 (15th Ed) - Fatigue management



ICAO

International Standards
and Recommended Practices

Annex 11 to the Convention on International Civil Aviation

Air Traffic Services

Air Traffic Control Service
Flight Information Service
Alerting Service

Fifteenth Edition, July 2018



This edition supersedes, on 8 November 2018, all previous editions of Annex 11.

For information regarding the applicability of the Standards and Recommended Practices, see Foreword.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

2.27 Establishment of requirements for carriage and operation of pressure-altitude reporting transponders

States shall establish requirements for carriage and operation of pressure-altitude reporting transponders within defined portions of airspace.

Note.— This provision is intended to improve the effectiveness of air traffic services as well as airborne collision avoidance systems.

2.28 Fatigue management

Note.— Guidance on the development and implementation of fatigue management regulations is contained in the Manual for the Oversight of Fatigue Management Approaches (Doc 9966).

2.28.1 States shall establish regulations for the purpose of managing fatigue in the provision of air traffic control services. These regulations shall be based upon scientific principles, knowledge and operational experience, with the aim of ensuring that air traffic controllers perform at an adequate level of alertness. To that aim, States shall establish:

- a) regulations that prescribe scheduling limits in accordance with Appendix 5; and
- b) where authorizing air traffic services providers to use a fatigue risk management system (FRMS) to manage fatigue, FRMS regulations in accordance with Appendix 6.

2.28.2 States shall require that the air traffic services provider, for the purposes of managing its fatigue-related safety risks, establish one of the following:

- a) air traffic controller schedules commensurate with the service(s) provided and in compliance with the prescriptive limitation regulations established by the State in accordance with 2.28.1 a); or
- b) an FRMS, in compliance with regulations established by the State in accordance with 2.28.1 b), for the provision of all air traffic control services; or
- c) an FRMS, in compliance with regulations established by the State in accordance with 2.28.1 b), for a defined part of its air traffic control services in conjunction with schedules in compliance with the prescriptive limitation regulations established by the State in accordance with 2.28.1 a) for the remainder of its air traffic control services.

2.28.3 Where the air traffic services provider complies with prescriptive limitation regulations in the provision of part or all of its air traffic control services in accordance with 2.28.2 a), the State:

- a) shall require evidence that the limitations are not exceeded and that non-duty period requirements are met;
- b) shall require that the air traffic services provider familiarize its personnel with the principles of fatigue management and its policies with regard to fatigue management;
- c) shall establish a process to allow variations from the prescriptive limitation regulations to address any additional risks associated with sudden, unforeseen operational circumstances; and

- d) may approve variations to these regulations using an established process in order to address strategic operational needs in exceptional circumstances, based on the air traffic services provider demonstrating that any associated risk is being managed to a level of safety equivalent to, or better than, that achieved through the prescriptive fatigue management regulations.

Note.— Complying with the prescriptive limitations regulations does not relieve the air traffic services provider of the responsibility to manage its risks, including fatigue-related risks, using its SMS in accordance with the provisions of Annex 19.

2.28.4 Where an air traffic services provider implements an FRMS to manage fatigue-related safety risks in the provision of part or all of its air traffic control services in accordance with 2.28.2 b), the State shall:

- a) require the air traffic services provider to have processes to integrate FRMS functions with its other safety management functions; and
- b) approve an FRMS, according to a documented process, that provides a level of safety acceptable to the State.

Note.— Provisions on the protection of safety information, which support the continued availability of information required by an FRMS, are contained in Annex 19.

2.29 Safety management

Note.— Annex 19 includes the safety management provisions applicable to ATS providers. Further guidance is contained in the Safety Management Manual (SMM) (Doc 9859) and associated procedures are contained in the PANS-ATM (Doc 4444).

Any significant safety-related change to the ATS system, including the implementation of a reduced separation minimum or a new procedure, shall only be effected after a safety risk assessment has demonstrated that an acceptable level of safety will be met and users have been consulted. When appropriate, the responsible authority shall ensure that adequate provision is made for post-implementation monitoring to verify that the defined level of safety continues to be met.

Note.— When, due to the nature of the change, the acceptable level of safety cannot be expressed in quantitative terms, the safety risk assessment may rely on operational judgement.

2.30 Common reference systems

2.30.1 Horizontal reference system

World Geodetic System — 1984 (WGS-84) shall be used as the horizontal (geodetic) reference system for air navigation. Reported aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.

Note.— Comprehensive guidance material concerning WGS-84 is contained in the World Geodetic System — 1984 (WGS-84) Manual (Doc 9674).

APPENDIX 5. PRESCRIPTIVE FATIGUE MANAGEMENT REGULATIONS

Note.— Guidance on the development and implementation of prescriptive fatigue management regulations is contained in the Manual for the Oversight of Fatigue Management Approaches (Doc 9966).

1. States shall establish prescriptive limitation regulations that take into account acute and cumulative fatigue, circadian factors and the type of work being undertaken. These regulations shall identify:

- a) the maximum:
 - i) number of hours in any duty period;
 - ii) number of consecutive work days;
 - iii) number of hours worked in a defined period; and
 - iv) time-in-position;
- b) the minimum:
 - i) duration of non-duty periods;
 - ii) number of non-duty days required in a defined period; and
 - iii) duration of breaks between periods of time-in-position in a duty period.

2. States shall require that the air traffic services provider identify a process for assigning unscheduled duties that allows air traffic controllers to avoid extended periods of being awake.

3. The processes established by States in accordance with 2.28.3 c) and d) to allow variations from 1 a) and b) above shall include the provision of:

- a) the reason for the need to deviate;
- b) the extent of the deviation;
- c) the date and time of enactment of the deviation; and
- d) a safety case, outlining mitigations, to support the deviation.

APPENDIX 6. FATIGUE RISK MANAGEMENT SYSTEM (FRMS) REQUIREMENTS

Note.— Guidance on the development and implementation of FRMS regulations is contained in the Manual for the Oversight of Fatigue Management Approaches (Doc 9966).

States shall require that an FRMS contain, at a minimum:

1. FRMS policy and documentation

1.1 FRMS policy

1.1.1 The air traffic services provider shall define its FRMS policy, with all elements of the FRMS clearly identified.

1.1.2 The policy shall:

- a) define the scope of FRMS operations;
- b) reflect the shared responsibility of management, air traffic controllers, 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, air traffic controllers, and all other involved personnel are identified; and
- j) require periodic reviews to ensure it remains relevant and appropriate.

Note.— Effective safety reporting is described in the Safety Management Manual (SMM) (Doc 9859).

1.2 FRMS documentation

An air traffic services provider shall develop and keep current FRMS documentation that describes 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, air traffic controllers, 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

Note.— *Significant deviations are described in the Manual for the Oversight of Fatigue Management Approaches (Doc 9966).*

- g) FRMS outputs including findings from collected data, recommendations, and actions taken.

2. Fatigue risk management processes

2.1 Identification of fatigue-related hazards

Note.— *Provisions on the protection of safety information are contained in Annex 19.*

An air traffic services provider shall develop and maintain three fundamental and documented processes for fatigue hazard identification:

2.1.1 *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) air traffic services or industry 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.

2.1.2 *Proactive.* The proactive process shall identify fatigue hazards within current air traffic services 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.

2.1.3 *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.

2.2 Fatigue-related risk assessment

2.2.1 An air traffic services provider shall develop and implement risk assessment procedures that determine when the associated risks require mitigation.

2.2.2 The 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.

2.3 Risk mitigation

An air traffic services 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.

3. FRMS safety assurance processes

The air traffic services 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:
 - 1) hazard reporting and investigations;
 - 2) audits and surveys; and
 - 3) 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:
 - 1) identification of changes in the operational environment that may affect the FRMS;
 - 2) identification of changes within the organization that may affect the FRMS; and
 - 3) consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes; and
- c) provide for the continuous improvement of the FRMS. This shall include, but is not limited to:
 - 1) 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;
 - 2) routine evaluations of facilities, equipment, documentation and procedures; and
 - 3) the determination of the need to introduce new processes and procedures to mitigate emerging fatigue-related risks.

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 air traffic service provider as part of its FRMS:

- a) training programmes to ensure competency commensurate with the roles and responsibilities of management, air traffic controllers, and all other involved personnel under the planned FRMS; and
- b) an effective FRMS communication plan that:
 - 1) explains FRMS policies, procedures and responsibilities to all relevant stakeholders; and
 - 2) describes communication channels used to gather and disseminate FRMS-related information.