CHAPTER 11 - AERODROME SAFETY MANAGEMENT SYSTEMS

11.1 Introduction

This chapter covers the principles for Aerodrome Safety Management Systems that should permeate throughout the aerodrome operator organization, and be implemented through a continuing safety program based on a coherent policy that leads to well-designed work procedures.

11.2 Safety management system

11.2.1 General

11.2.1.1 A Safety Management System (SMS) should be established by an aerodrome operator for operations and maintenance of its aerodrome.

11.2.1.2 Every operator of a certified aerodrome shall establish and implement an operating safety management system at the aerodromes.

11.2.1.3 The information contained in this section is not intended to be a prescriptive formula but serves to provide basic explanation of the essential components of an SMS. An aerodrome operator should start to develop its own SMS taking into account these guidelines and any other supplementary material that the Authority may publish from time to time.


11.2.2 General description

11.2.2.1 An SMS is a systematic, explicit and comprehensive process for the management of safety risks, one that integrates operations and technical systems with financial and human resource management. For the purpose of this Manual, the SMS applies to all activities related to the requirements for aerodrome certification and for ensuring the continuous safe functioning of aerodrome operations.

11.2.2.2 The SMS should be one that permeates throughout the aerodrome operator organization, and be implemented through a continuing safety program based on a coherent policy that leads to well-designed work procedures. The SMS should also extend to include interfaces between the aerodrome operator and its suppliers, sub-contractors, agents, business partners and other relevant external service providers.

11.2.2.3 The SMS should focus principally on the hazards associated with the operation of the aerodrome and their effects upon those activities critical to safety. It should provide for goal setting, planning and measuring performance, and should place emphasis on organizational safety rather than conventional health and safety-at-work concerns. Active monitoring and auditing processes should be applied to validate that
the necessary controls identified through the hazard management process are effectively put in place so as to ensure continuing active commitment to safety and to achieve continuous improvement in safety performance.

11.2.2.4 An aerodrome operator’s SMS defines how it intends to manage aerodrome safety as an integral part of its business management activities. The SMS should be woven into the fabric of an aerodrome operator’s organization and become part of its culture – the way people do their jobs.

11.2.3 Key components

An SMS, where provided, should include a Safety Management Plan that covers the following key components:

11.2.3.1 Safety policies

The SMS should have a clear definition of the philosophy and fundamental approach an aerodrome operator will adopt for the management of safety within its organization. This includes the setting of policies on the process of safety management and how they relate to the operations and maintenance processes at an aerodrome.

11.2.3.2 Safety roles and responsibilities

The SMS should have a well-defined organization structure, including staffing positions, lines of responsibility and clear assignment of group and individual safety accountabilities at all levels involved in the safety process within the organization. The staff positions responsible for the safety compliance of externally supplied services should also be identified. The dedication and involvement of top management towards safety and safety practices should be clearly visible, including their commitment to provide priority to tackle safety initiatives and setting aside adequate time, financial and human resources necessary to attain the strategic safety objectives established by the organization.

11.2.3.3 Safety committee(s)

The SMS should include forums for discussing safety-related issues from a cross-functional perspective and for streamlining the implementation of the safety management plan across the aerodrome operator organization. This will provide a means of looking at safety from a broader viewpoint, to review safety achievements and broadcast safety information. Safety committee(s) could take the form of a high-level committee(s) as well as sub-committees with specific areas of responsibility.

11.2.3.4 Safety standards, goals and strategy

The SMS should have a plan and strategy involving setting of safety performance targets and the establishment of a framework for controlling risks to a level as low as reasonably practicable.
11.2.3.5 Safety assessment

The SMS should comprise a proactive means to assess safety by seeking out potential safety hazards so as to enable the evaluation and sound management of the associated risks. Hazard identification is the act of identifying any condition with the potential for causing injury to personnel, damage to equipment, structures or property, loss of material, or reduction of the ability to perform a prescribed function. Risk management involves analyzing the risks associated with an identified hazard, making an assessment of its potential severity and likelihood of occurrence, and finally developing and implementing preventive or corrective actions to reduce the risks to an acceptable level. Appropriate tools/techniques for the identification of and action on critical safety areas, which require a higher level of safety management integrity, should also be used in the risk management process, where needed. Hazard identification and risk management should be performed in the following circumstances:

1) through regular reviews;

2) when major operational changes are planned;

3) when the organization is undergoing rapid change, such as expansion or downsizing; introduction of new facilities or procedures; decommissioning of existing facilities or modification of procedures, etc.; and

4) when key personnel change takes place.

The safety assessment should extend to the management of contracts with external service providers. Tender or proposal invitation documents shall be assessed and reviewed to ensure that safety requirements are adequately defined and documented for the performance by the external service providers.

11.2.3.6 Safety monitoring

The SMS should have built-in active safety monitoring techniques for data collection, which should include

1) routine detailed inspections of specific task areas (e.g. using safety checklists);

2) regular reviews of appropriateness and effectiveness of current modes of operation – equipment performance, process, practices and procedures;

3) internal audits of compliance with SMS requirements; and

4) examination of adequacy of SMS setup and of management and line commitment.

Safety performance records should be documented and used as feedback to improve the system.
11.2.3.7 Safety reporting

Every event is an opportunity to learn valuable safety lessons. The lessons however, will only be understood if the occurrence is analyzed so that all staff, including management, are aware of not only what happened but also why it happened. This involves looking beyond the event and investigating the contributing factors, e.g. organizational and human factors within the organization that played a role in the event. The SMS developed and maintained by the aerodrome operator should therefore include procedures for the internal reporting and recording of occurrences, hazards and other safety related issues. The aerodrome operator should make use of appropriate, accurate and timely-collected data to identify the root cause and to apply the necessary corrective action to prevent a recurrence of the event. The aerodrome operator should also note the need to satisfy the regulatory requirements for aerodrome occurrence reporting and investigations, as detailed in section 11.3 of this Manual.

The safety reporting system should encompass the following fundamental elements:

1) system to allow staff to report hazards, events or safety concerns in a simple, convenient and non-punitive way;

2) procedures for investigating and analyzing safety data, safety reports and any other safety related information;

3) methods for the collection, storage and distribution of data;

4) corrective actions and risk reduction strategies;

5) ongoing monitoring; and

6) validation of the effectiveness of corrective actions.

11.2.3.8 Safety dissemination and awareness

The SMS setup should allow all safety-related information to be disseminated throughout the organization. An aerodrome operator should endeavour to inform all staff as to where safety related information and messages can be found, and provide a means to keep staff notified whenever a potential safety threat is discovered. In this way, the entire organization will become aware of safety issues and understand that the company is actively seeking to address these issues.

11.2.3.9 Safety improvement

The SMS should encourage and allow opportunities for all staff to proactively participate in the safety process. Staff should have the opportunity to feedback and contribute to the development and implementation of the SMS. Their involvement in the decision making process fosters ownership of the system and helps to promote a positive safety culture that is geared towards continuous improvement of safety performance.
11.2.3.10 Safety competencies

The SMS should account for staff training and competency, including review and evaluation on the adequacy of training provided to staff on safety related duties and of the certification system for testing their competency. An aerodrome operator should document the training requirements for each area of work within the organization, including those required of external service providers. The training should include initial, recurrent and update training requirements and, where necessary, training specific to the operation of the SMS. It is recommended that a training file be developed for each operational staff, including management, to assist in identifying and tracking staff competence and training requirements.

11.2.3.11 SMS documentation and records

Up to date information is essential for the aerodrome operator organization to operate in a safe and efficient manner in accordance with current aerodrome safety regulations, standards and exemptions.

The SMS developed by the aerodrome operator should have a process for documenting the regulations, standards and exemptions by which it is regulated for the various activities it conducts. Consolidated documentation describing each component of the SMS is essential if the aerodrome operator staff are to understand how the whole safety management system is integrated. The safety management plan should be documented in a SMS Manual, where all components of the system stipulated in this section and their interrelationships/interfaces clearly illustrated. The SMS Manual should be a controlled document, i.e. there should be a systematic process to distribute, keep track and update the SMS Manual. Safety assessments carried out, audit findings, preventive and corrective action and monitoring of follow-up procedures should be duly recorded to facilitate easy retrieval and auditing.

11.2.3.12 Safety culture and promotion

The SMS should include measures for safety promotion and publication of relevant educational materials on safety initiatives and accident prevention.

11.3 Aerodrome work safety

11.3.1 General

11.3.1.1 An aerodrome operator shall plan and implement works to be carried out at an aerodrome so as not to create any hazard to aircraft operations or confusion to pilots. The Aerodrome Manual submitted by an aerodrome operator shall include details of the procedures for planning and safe carrying out of such work activities at the aerodrome.

11.3.1.2 An aerodrome operator shall, in his Aerodrome Manual, address how aerodrome works are to be carried out so that:
a) where the works are of a nature that will disrupt operations, these works shall be carried out with proper planning, consultation and coordination with all pertinent parties in advance; and

b) where the works are of a minor/maintenance nature, these works may be carried out as time-limited works where normal aircraft operations are not disrupted and the movement area can be restored to normal safety standards and any obstacle created by those works removed in not more than 10 minutes. Depending on the nature and extent of each activity, time-limited works may include minor maintenance of markings and lights, grass mowing, sweeping of aircraft pavements, surveys and inspections, etc.

11.3.1.3 At a controlled aerodrome, the air traffic control unit may, at the request of the aerodrome operator, vary the time limits set out in paragraph 11.2.1.2 (b) above for restoring normal safety standards or resuming aerodrome works. A variation under this paragraph is subject to such conditions as the air traffic control unit may impose.

11.3.2 Aerodrome work plans

11.3.2.1 Unless an aerodrome is closed during works in progress, or the work is of an emergency nature, an aerodrome operator shall not carry out aerodrome works, other than time-limited works, without proper planning in advance.

11.3.2.2 A plan shall be established, setting out the arrangements for carrying out those aerodrome works in coordination with all other operational, maintenance and development activities at the aerodrome.

11.3.2.3 When preparing a work plan, an aerodrome operator should consult:

a) commercial air transport operators using the aerodrome;

b) the aerodrome’s air traffic control unit; and

c) if the work plan may affect its operations, the Rescue and Fire Fighting Service unit at the aerodrome so that the scope and impact of work is understood by related aerodrome users and service providers and to ensure the safety of aircraft operations at the aerodrome.

11.3.2.4 The aerodrome operator shall ensure that clear and ample prior notification is provided to the Aeronautical Information Services, the aerodrome air traffic control unit, aircraft operators and other users or service providers of the aerodrome. Such notification shall include timely and accurate promulgation of AIP Supplements or NOTAMs, with clear details of the extent and period of works.

11.3.2.5 An aerodrome operator shall be required to provide an explanation of his work plan, and any alterations or updates thereof, to the Authority upon request.

11.3.2.6 Aerodrome works, for which a work plan is required, shall be carried out
in accordance with the arrangements set out in the work plan and any subsequent alterations or updates.

11.3.2.7 The work plan should address details of any special requirements or restrictions arising during or on completion of the works.

11.3.2.8 The work plan should outline details, if any, of special arrangements to be made during works if emergencies or adverse weather conditions occur.

11.3.2.9 A work plan may not be required if the aerodrome operator closes the aerodrome to aircraft operations while aerodrome works are being carried out. The Authority, commercial air transport operators and all organizations and persons likely to be affected by the closure shall be given reasonable notice of intention to close the aerodrome.

11.3.2.10 An aerodrome operator shall not close the aerodrome to aircraft operations due to aerodrome works unless an AIP Supplement or a NOTAM giving notice of the closure has been issued not less than 14 days before the closure takes place.

11.3.2.11 A work plan is not required for emergency aerodrome works carried out to repair damage to part of the manoeuvring area, or to remove an obstacle, or if the works do not require any restrictions to aircraft operations. Where practicable, a NOTAM giving the nature and time and date of the commencement of the urgent repair works should be issued, as early as possible, before the commencement of the works.

11.3.3 Management and control of aerodrome works

11.3.3.1 An aerodrome operator should ensure that aerodrome works are carried out in accordance with the requirements of this Manual.

11.3.3.2 An aerodrome operator should appoint a person responsible for the safe and proper execution of each item of aerodrome works. This person shall be required to

1) ensure the safety of aircraft operations is not affected by the aerodrome work plan;

2) ensure that, where applicable, the aerodrome works are notified by the issue of an AIP Supplement or a NOTAM and that the text of each AIP Supplement or NOTAM pertaining to such notification conveys the information on operational restrictions accurately and clearly to aerodrome users and service providers;

3) supply the air traffic control unit with whatever information necessary to ensure the safety of aircraft operations;

4) discuss with the work organizations involved, on a regular basis, any matters necessary to ensure the safety of aircraft operations;

5) ensure that unserviceable portions of the movement area, temporary obstructions and limits of the work areas are correctly marked and lit in accordance with the required standards and the work plan;
6) ensure that vehicles, plant and equipment carrying out aerodrome works are properly marked and lit or are properly supervised;

7) ensure that all requirements under the work plan pertaining to vehicles, plant and equipment and materials are complied with;

8) ensure that access routes to work areas are in accordance with that designated in the work plan and are clearly identified and that access is restricted to these routes;

9) ensure that excavation is carried out in accordance with the work plan and relevant requirements, and in particular, that sufficient precautions are taken so as to avoid damage or loss of calibration to any underground power or control cable, utilities or other services associated with a precision approach and landing system, any navigational aid or facility or equipment essential for the safety of aerodrome operations;

10) report immediately to the aerodrome air traffic control unit and the aerodrome operator any incident, or damage to facilities, likely to affect air traffic control services or the safety of aircraft;

11) provide adequate supervisors duty at the work areas while major works are in progress and the aerodrome is open to aircraft operations;

12) ensure that the aerodrome air traffic control unit is kept informed of the radio call signs of vehicles used by the work organizations that are operating in the aircraft movement areas;

13) remove vehicles, plant and personnel from the movement area immediately, where necessary, to ensure the safety of aircraft operations;

14) ensure that the movement area is safe for normal aircraft operations following the removal of vehicles, plant and equipment and personnel from the work areas;

15) in the case of time-limited works, ensure that the work areas are restored to normal safety standards not less than 11 minutes before the time scheduled for opening the work areas to aircraft operations; and

16) ensure that floodlighting or any other lighting required for carrying out aerodrome works is shielded so as not to present a hazard to aircraft operations.

11.3.3.3 The person responsible for the aerodrome works should be satisfied that the work plan is adequately prepared and that sufficient safety measures are put in place on the work site at all times during the execution of the aerodrome works when the aerodrome is open to aircraft operations.
11.3.3.4 An aerodrome operator should take all reasonable measures to ensure that aerodrome works are well-organized and that all work personnel carry out aerodrome works in a manner that will ensure the safety of aircraft operations.

11.3.3.5 Persons, vehicles, plant and equipment required for carrying out aerodrome works must not be permitted to enter the movement area or remain on it except for the purpose of carrying out those works.

11.3.3.6 Procedures for entering the work areas shall be addressed in the work plan.

11.3.4 Markers, markings, signs and lights

11.3.4.1 Aerodrome markers, markings, signs and lights required for, or affected by, aerodrome works shall be adjusted or installed in accordance with the appropriate aerodrome standards.

11.3.4.2 Parts of the movement area that are unserviceable as a result of the aerodrome works being carried out shall be marked and lit in accordance with the appropriate aerodrome standards.

11.3.4.3 All obstacles created as a result of aerodrome works being carried out shall be marked and lit in accordance with the appropriate aerodrome standards.

11.3.4.4 Vehicles and plant used in carrying out aerodrome works shall be marked and lit, where necessary, in accordance with the appropriate aerodrome standards.

11.3.5 Communication equipments

11.3.5.1 At a controlled aerodrome, a vehicle used by work parties carrying out aerodrome works on the movement area should be equipped with a radio for two-way communications with the aerodrome air traffic control unit.

11.3.5.2 For the purpose of communication with the air traffic control unit, each vehicle used for carrying out aerodrome works on the movement area should be given a call sign.

11.3.5.3 Any vehicle or plant that is not:

a) marked or lit in accordance with section 11.1.4 above; or

b) if applicable, equipped with a two-way radio, may only be used in carrying out aerodrome works if it is:

1) used under the direct supervision of another vehicle that is equipped with a two-way radio set and which is responsible for escorting the vehicle or plant without radio when carrying out aerodrome works; or

2) used only within the limits of appropriately marked and lit work areas.
11.3.5.4 The drivers of vehicles equipped with a radio for two-way communications with the aerodrome air traffic control unit shall be properly trained and be responsible for checking that their radio sets are switched on and serviceable at all times when working on the movement area.

Note - The training requirements for airside vehicle drivers are contained in ICAO Airport Service Manual Part 8 – DOC 9137.

11.3.6 Works near aircraft movement areas

11.3.6.1 The aerodrome operator shall refer to chapters 6 and 7 of this Manual, ICAO Airport Services Manual Part 6 to determine the extent of work allowed near aircraft movement areas.

11.3.6.2 Works on or near aircraft movement areas or runway strips should be carried out as quickly as practicable to minimise any potential risks arising out of changes associated with the works in progress.

11.3.6.3 Where works are to be undertaken in the vicinity of navigational or landing aids located within the runway strips, considerations should be taken to ensure that neither the works nor vehicles or plant associated with the works may affect the performance of the aids.

11.3.7 Completion

11.3.7.1 On the completion of aerodrome works and restoration of normal safety standards to the movement area, the aerodrome operator should cancel any AIP Supplement or NOTAM issued to advise of those works.

11.3.7.2 Attention is drawn to the requirements for an aerodrome operator to inspect his aerodrome, as circumstances require, to ensure aviation safety during and immediately after any period of construction or repair of an aerodrome facility or equipment that is critical to the safety of aircraft operations, and at any other time when there are conditions at the aerodrome that could affect aviation safety.

11.4 Aerodrome accident/incident reporting and investigation procedures

11.4.1 Aerodrome occurrence reporting

11.4.1.1 This section prescribes the requirements for reporting the occurrence or detection of defects, failures or malfunctions at an aerodrome, its components or equipment, which could jeopardize the safe operation of the aerodrome or cause it to become a danger to persons or property.

11.4.1.2 The objectives of the Aerodrome Occurrence Report is as follows:
a) To ensure that knowledge of these occurrences is disseminated so that other persons and organizations may learn from them.

b) To enable an assessment to be made by those concerned (whether internal or external to the aerodrome operator) of the safety implications of each occurrence, both in itself and in relation to previous similar occurrences, so that they may take or initiate any necessary action.

### 11.4.2 Reportable occurrences and reporting procedures

11.4.2.1 An aerodrome operator shall notify the Authority of any accident, serious incident, fatal or serious injury occurring at his aerodrome – in accordance with aerodrome operator’s standard operating procedures or as soon as practicable – and provide a detailed occurrence report thereafter.

11.4.2.2 The definitions for accident, serious incident and fatal or serious injury are as follows:

a) Accident – See definition under section 1.2 of this Manual

b) Serious incident – See definition under section 1.2 of this Manual

Examples are:

1) A near collision requiring an avoidance manoeuvre to avoid a collision or an unsafe situation or where an avoidance action would have been appropriate.

2) A controlled flight into terrain only marginally avoided.

3) An aborted take-off on a closed or engaged runway.

4) A take-off from a closed or engaged runway with marginal separation from an obstacle.

5) A landing or attempted landing on a closed or engaged runway.

6) A take-off or landing incident such as undershooting, overrunning or running off the side of runways.

7) A major failure of any navigation aid when a runway is in use.

c) Serious injury – See definition under section 1.2 of this Manual

11.4.2.3 The owner or operator of an aerodrome in partner state shall also notify the Aircraft Accident Investigation Branch (AAIB) where the accident or serious incident occurs on or adjacent to his aerodrome in accordance with the civil aviation aircraft accident/incident investigation regulations in the case of an accident in Partner State. In addition, other emergency agencies shall also be notified as may be required by the regulations and in accordance with the aerodrome operator’s procedures.
11.4.2.4 Information to be provided in the reporting and notification of an accident, serious incident or serious injury shall at least include, as far as possible, the following:

a) the date and local time of occurrence;

b) the exact location of the occurrence with reference to some easily defined geographical point;

c) detailed particulars of the parties involved, including the owner, operator, manufacturer, nationality, registration marks, serial numbers, assigned identities of aircraft and equipment;

d) a detailed description of the sequence of events leading up to the incident;

e) the physical characteristics, environment or circumstances of the area in which the incident occurred and an indication of the access difficulties or special requirements to reach the site;

f) the identification of the person sending the notice and where the incident occurred, the means by which the chief investigator of accidents may be contacted;

g) in the case of an aircraft accident, the number of crew members, passengers or other persons respectively killed or seriously injured as a result of the accident; and

h) a description of the follow-up action being taken after the incident has occurred.

11.4.3 Aerodrome occurrence records

11.4.3.1 An aerodrome operator shall establish and maintain Aerodrome Occurrence Reports for any accident, serious incident, serious injury or any occurrence or event that has a bearing on the safety of aerodrome operations.

11.4.3.2 Aerodrome Occurrence Reports should be used by an aerodrome operator to monitor and improve the level of operational safety, including reviews of safety standards required.

11.4.3.3 The Authority may require the aerodrome operator to produce and provide information contained in the Aerodrome Occurrence Report relating to any safety occurrence or event.

11.4.4 Aerodrome accident/incident investigations

11.4.4.1 In the event of an accident or serious incident, an aerodrome operator shall carry out its own investigations.
11.4.4.2 The investigations carried out by the aerodrome operator shall be in addition to that carried out by the Aircraft Accident Investigation Branch (AAIB).

11.4.4.3 The investigator, or team of investigators, shall be technically competent and shall either possess or have access to the background information, so that the facts and events are interpreted accurately. The investigations shall be a search to understand how the mishap happened, why it occurred, including organizational contributing factors, and to recommend action to prevent a recurrence, and shall not be intended to apportion blame.

11.4.4.4 The lesson learnt derived from an aerodrome incident/accident investigation shall be disseminated to staff to provide feedback for safety improvement.

11.4.4.5 The Authority may require the aerodrome operator to produce and provide information contained in the aerodrome accident/incident investigation report relating to any such event.

11.4.4.6 Attention is also drawn to the requirement of the aerodrome regulation that an aerodrome operator shall inspect his aerodrome, as circumstances require, ensuring safety as soon as practicable after any aircraft accident or incident.