Civil Aviation Authority of Nepal

Advisory Circular
[AC/AD – 02]

Guidance Material

on

SMS for Aerodrome Operator

Second Edition
March 2022

RECORD OF AMENDMENTS

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Revision / Version	Date	Chapter/ Section	Details

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FOREWORD

Nepal as a Contracting State to the Convention on International Civil Aviation has an obligation to the international community to ensure that civil aviation activities under its jurisdiction are carried out in strict compliance with the Standards and Recommended Practices contained in the nineteen Annexes to the Convention on International Civil Aviation in order to maintain the required aviation standards.

As per the standards of the CAR- 14 Part 1 to the Convention, States are required to establish a State Safety Program (SSP) and as part of the SSP, certified aerodrome required to implement Safety Management System acceptable to CAAN. In addition, as per the Civil Aviation Authority of Nepal (CAAN), Airport Certificate Regulation, 2004. The Aerodrome requires to have a Safety Management System in place for any certified airport. This Advisory Circular provides guidance to aerodrome operator(s), the requirements to be fulfilled under the Safety Management System.

Users of this Advisory Circular are requested that the provisions of the ***Civil Aviation Authority Act - 1996 (2053 B.S.), CAAN Airport Certificate Regulations - 2004 (First Amendment - 2016), Civil Aviation Regulation 2002, (Third Amendment 2017) and Civil Aviation Requirements (CAR-19)*** rather than this Advisory Circular, determine the requirements of, and the obligations imposed by or under, the civil aviation legislation. Users should refer to the applicable provisions when any doubt arises.

It is also expected that the applicant of an Aerodrome Certificate will be benefited by this Advisory Circular as it provides an overall view of the Safety Management System.

This Authority may, without any prior notice, change the content of this Advisory Circular as appropriate.

Director General
Civil Aviation Authority of Nepal
Babar Mahal, Kathmandu, Nepal

March 2022

CHAPTER 1: GENERAL INFORMATION

1.1 Purpose

This Advisory Circular provides guidelines on the development of Safety Management System (SMS) Manual by certified aerodrome operators for the phase wise implementation of the SMS in aerodrome.

1.2 Definitions

Aerodrome - A defined area on land or water (including any buildings installations and equipment) intended to be used, either wholly or in part for the arrival, departure and surface movement of aircraft.

Aerodrome Safety Inspection - An act performed by the Aerodrome Safety Manager and/or Aerodrome Safety Officer to discharge his/her specific responsibilities under the SMS manual.

Aerodrome Safety Officer - A person with specific responsibilities under the SMS manual.

Aerodrome Safety Manager - A person with specific responsibilities under the SMS manual.

Authority - Civil Aviation Authority of Nepal.

Change Management - The capabilities and support required by an organization constantly evolving in response to the changing requirements of interested parties, a dynamic business environment and the process of continual improvement. Change may also require that there be associated cultural and behavioral adjustments within an organization. Where these are necessary they will take time and resources and must be led by management.

Airport Manager - A person with overall operational responsibility, delegated for the aerodrome.

Consigned freight - Cargo that is unaccompanied, therefore requiring it to be associated with appropriate documentation. Consigned freight is required to be formally accepted by an airlines operator.

Critical safety information - The type of information that staff and managementneed to be aware of, in order to do their job. Typically, this would include information like a change to the organization procedure required as part of a safety risk treatment option.

Defenses - Actions or elements of a design put in place to reduce the likelihood or consequence of an event. Risk treatment will normally involve the introduction or enhancement of defenses against a specific negative outcome.

Deficiency - The result of lacking something essential; imperfect, defective. Such as, hazards allowed to exist within a system result in System Deficiency.

Event - An incident or situation, which occurs in a particular place during a particular

interval of time. For the purpose of the SMS manual, an incident or accident occurring at an aerodrome is regarded as an event.

Facility - Premises being used, or to be used, for the operation of an aircraft on the aerodrome. These premises may be fixed or portable, and may include communication facilities.

Gap Analysis – Identification of existing safety components, compared to SMS program requirements. Gap analysis provides an airport operator an initial SMS development plan and roadmap for compliance.

Hazard - A condition or an object with the potential to cause injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function.

Hazard Assessment - An activity to determine whether or not a reported hazardis in fact a risk to aerodrome safety in any way. The outcome of an assessment is to classify all reported hazards, incidents and accidents as a risk of a certain magnitude. Assessment involves transitioning reported hazards and events into risks so that they can be dealt with in a meaningful way.

Human Factors - Human Factors involves the study of the human's capabilities, limitations, and behaviors and the integration of that knowledge into the design of systems to enhance the safety, performance and the general well being of theoperators of the systems.

Investigation - An activity to determine and assess any risks associated with an event using the hazard assessment process.

Legal Entity - A person having legal personality (capable of enjoying and being subject to legal rights and duties). A legal entity may be:

- A natural person, or a group of natural persons;
- An incorporated company or association, or a group of such companiesor associations; or
- A body corporate or politic created by statute.

Likelihood - used as a qualitative description of probability or frequency.

Mitigation - The actions taken either to control, reduce or remove a hazard or toreduce the probability or the severity of a risk, the result of an action to make milder or less severe.

Monitor - To check, supervise, observe critically, or record the progress of an activity or system on a regular basis in order to identify change.

Non-critical safety information - Is the sort of safety information that staff and management only need a general awareness of as part of their job. Typically, the outcomes of safety assessments conducted would constitute non-critical safety information, whereas changes to a **CAAN** procedure would be critical safety information.

Owner - The legal entity holding the Aerodrome Certificate.

Organization – represents Certified Aerodrome operator's organization.

Probability - The likelihood of a specific outcome.

Risk - The chance of something happening that will have an impact uponobjectives. It is measured in terms of consequences and likelihood.

Risk analysis - A systematic use of available information to determine howoften specified events may occur and the magnitude of their consequences.

Risk assessment - The overall process of risk analysis and risk evaluation.

Risk evaluation - The process used to determine risk management priorities by comparing the level of risk against predetermined standards, target risk levels or other criteria.

Risk identification - The process of determining what can happen, why and how.

Risk level - The level of risk calculated as a function of likelihood and consequence.

Risk management - The culture, processes and structures that are directed towards the effective management of potential opportunities and adverse effects.

Safety - A state in which the risk of harm to persons or property damage isreduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management.

Safety programme - An integrated set of regulations and activities aimed at improving safety.

Safety management system - A systematic approach to managing safety including the necessary organizational structure, accountabilities, policies and procedures.

Short Term Corrective Actions - Short term corrective actions are those, which the Aerodrome Safety Manager considers, can be completed within 2 months of the receipt of report.

Works Safety Officer - A person responsible for the safety of works undertakenon an aerodrome.

1.3 Safety Culture

Along with the appropriate organizational structure, established rules and procedures, commitment to safety on the part of the senior management is very much essential element in the safety culture of any organization.

Safety policy, objectives and commitment of safety at the policy-making level must be demonstrated by the adequacy of resources. This is a key indicator of management's commitment to safety.

In effective safety culture, there are clear reporting lines, clearly defined duties and well understood procedures. Personnel fully understand their responsibilities and know what to report, to whom and when Senior management reviews not only the financial performance of the organization but also its safety performance.

Safety culture, then, is both attitudinal and structural, relating to individuals and organizations. It concerns the requirement to not only perceive safety issues but also match them with appropriate action. Safety culture relates to such intangibles as personal attitudes and the style of the organization. It is therefore difficult to measure, especially when the principal criterion for measuring safety isthe absence of accidents and incidents. Yet, personal attitudes and corporate style enable or facilitate the unsafe acts and conditions that are the precursors to accidents and incidents. Therefore, safety culture may affect systems safety either negatively or positively.

CHAPTER 2: ELEMENTS OF A SAFETY MANAGEMENT SYSTEM

2.1 General

As a commitment to safety and its effective management, the certified aerodrome operator has to develop safety policy, procedures and practices. Safety management system (SMS) requires planning, organizing, communicating and top level management directions.

The SMS provides a proactive, systematic and integrated method of managing safety at aerodrome. The ICAO SMS manual (Doc 9859) describes Safety Management System in terms of following four components and 12 elements:

2.1.1 Safety policy and objectives

- Management commitment and responsibility
- Safety accountabilities
- Appointment of key safety personnel
- Coordination of emergency response planning
- SMS documentation

2.1.2 Safety risk management

- Hazard identification
- Risk assessment and mitigation

2.1.3 Safety assurance

- Safety performance monitoring and measurement
- The management of change
- Continuous improvement of the SMS

2.1.4 Safety promotion

- Training and education
- Safety communication.

2.2 Safety Policy and Objectives

2.2.1 Safety Policy

Management's commitment to safety should be expressed in the statement of the organization's safety policy. The safety policy outlines the methods and processes that the organization will use to achieve desired safety outcomes. A safety policy signed by the accountable executive should typically contain the following attributes:

- The commitment of senior management to implement SMS
- A commitment to continual safety improvement
- The encouragement of employees to report safety issues without fear of reprisal
- A commitment to provide the necessary safety resources
- A commitment to make safety the highest priority

2.2.2 Safety Objectives

Commitment, support, enforcement, comply and continuously improving safety with adequately controlled resources and understanding of using the SMS outputs as inputs to SMS lifecycle by the top decision making management is described in Figure 2-1 (SMS Lifecycle Overview) given below.

Executives and managers also understand when safety risk management is necessary, and when to elevate decisions and the supporting information to a higher level. Some key elements of accountability within the organization are:

- The organization's policy concerning responsibility and accountability, including written guidance regarding the safety authorities and responsibilities of all key personnel assigned to the airport.

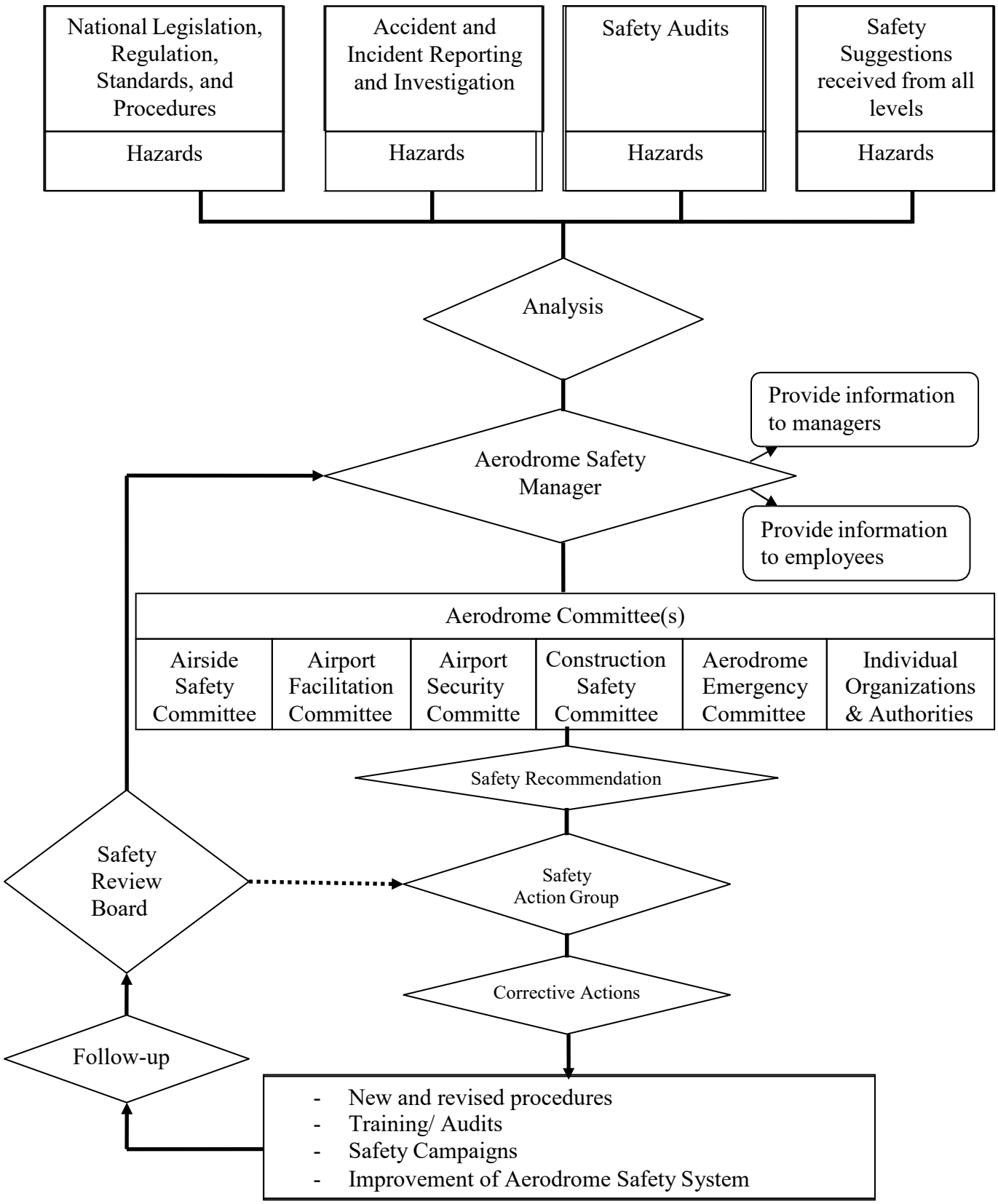

National Legislation, Regulation, Standards, and Procedures
Hazards
Accident and Incident Reporting and Investigation
Hazards
Safety Audits
Hazards
Safety Suggestions received from all levels
Hazards
Analysis
Provide information to managers
Aerodrome Safety Manager
Provide information to employees
Aerodrome Committee(s)
Airside Safety Committee
Airport Facilitation Committee
Airport Security Committe
Construction Safety Committee
Aerodrome Emergency Committee
Individual Organizations & Authorities
Safety Recommendation
Safety Review Board
Safety Action Group
Corrective Actions
Follow-up
- New and revised procedures
- Training/ Audits
- Safety Campaigns
- Improvement of Aerodrome Safety System

Figure 2-1 SMS Lifecycle Overview

- Safety Manger identified as official responsible for administration of the overall SMS. Safety Manager reports to the highest level of management to assure appropriate consideration of all reports, recommendations, and issues
- The responsibilities of the Safety Manager are clearly defined along with identified lines of communication within the organization and safety aspects are coordinated from Aerodrome Safety Office.
- There are various aerodrome committees, which act as source of expertise that recommend on the safety issues. The corrective actions regarding these recommendations are carried out after detailed consultation with Safety Action Group (SAG). The SAG reports to the Safety Review Board (SRB) and takes strategic direction from SRB, which is chaired by the accountable executive.
- The interrelation among the accountable executive, SRB, SAG and other concerning departments/divisions are as shown in Figure 2.2 (Safety Accountabilities) given below.

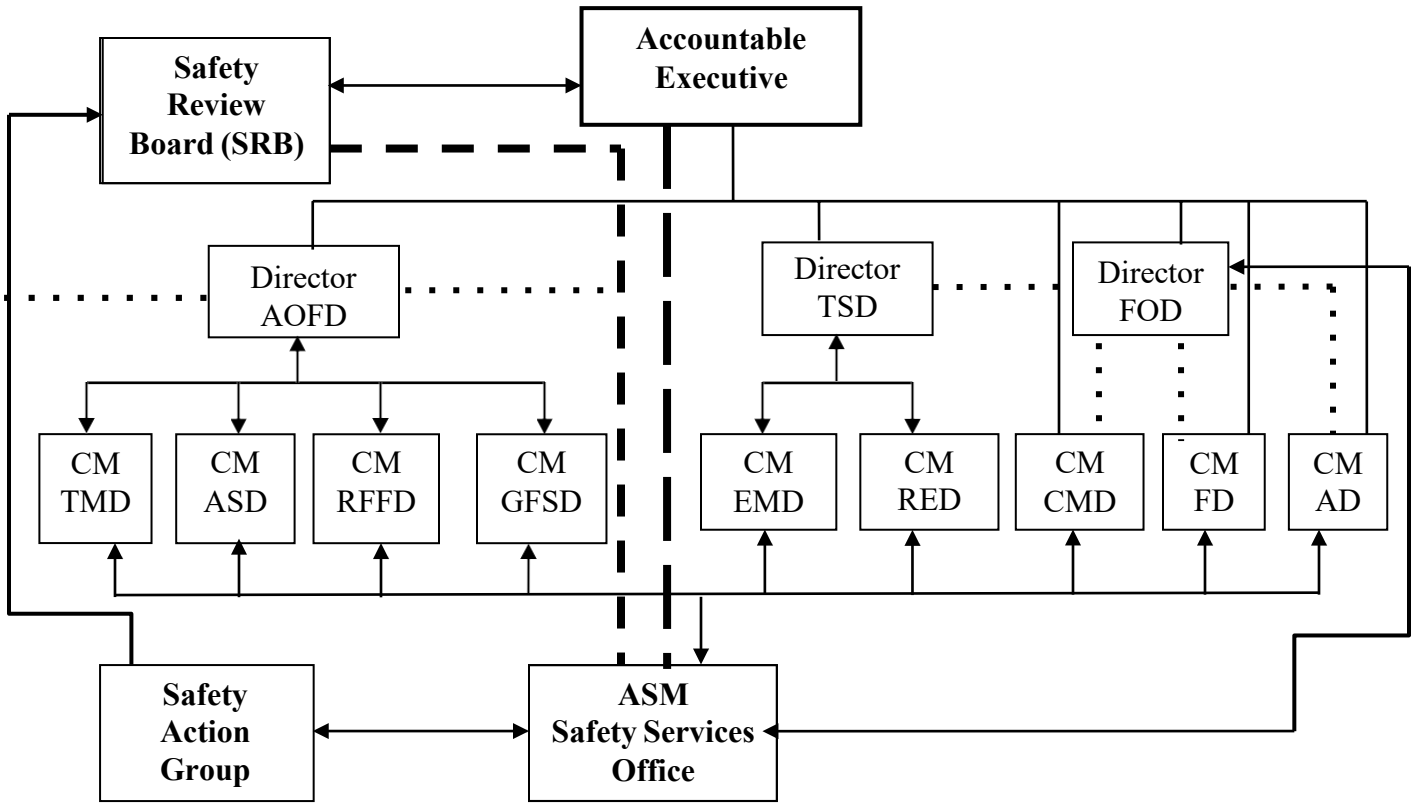


Figure 2-2 – Safety Accountabilities of Aerodrome Operator [an example]

2.3 Safety Risk Management

The core function of the Safety Management System is Safety Risk Management (SRM), through which identifies hazards, determines potential risks, and designs appropriate risk mitigation strategies.

2.3.1 SRM Background

SRM is a systematic, explicit, and comprehensive approach for managing safety risk at all levels throughout the airport. A comprehensive SMS using SRM will develop layers of safety built upon the measures taken to mitigate risk. These layers are examples of implemented protective measures such as vehicle driver's training programs, marking and lighting standards and reflective vests. An unsafe event can occur when gaps occur in the system's protective layers. These gaps are not static and may appear unexpectedly. In order for an incident or accident to take place there is normally a succession of gaps in a system that will line up and enable an event to occur.

When considering the environment of the airport system, consideration is given to all of the safety-related functions already outlined in the Aerodrome Manual of that particular airport. The SRM at airport is divided into two broad phases, namely Hazard Identification and Safety Risk Assessment and Mitigation.

2.3.2 Hazard Identification Phase:

In this phase, hazards to the system (i.e., operation, equipment, people, and procedures) are identified in a systematic, disciplined way, which requires at least following four elements:

- Operational expertise
- Training in SMS and hazard analysis techniques
- A simple, but well-defined, hazard analysis tool
- Adequate documentation of the process

The hazard identification phase considers all the possible sources of system failure. Depending on the nature and size of the system under consideration, these are:

- The equipment (example: construction equipment on a movement surface)
- Operating environment (example: cold, night, low visibility)
- Human element (example: shift work)
- Operational procedures (example: staffing levels)
- Maintenance procedures (example: nightly movement area inspections by airport electricians)
- External services (example: ramp traffic by Fixed-Base Operator (FBO) orlaw enforcement vehicles)

The hazard identification effort should reflect the management structure and complexity of the airport. Figure 2-1 shows the SMS cycle which integrates hazard and its occurrence reporting, analysis, responsibilities for hazard identification and control and documentation of hazard.

In this phase, there is no determination of the severity or potential of the risk occurring. First, all potential hazards are identified and documented. Next, the hazards are subjected to an assessment of the possible severity and potential risk in next phase.

2.3.3 Safety Risk Assessment and Mitigation Phase:

In this phase the identified and documented hazards are assessed under safety risk assessment for level of severity and likelihood of occurrence using Safety Risk Probability Table (Table 2-1) and Safety Risk Severity Table (Table 2-2). With the probability and severity levels the risk is assessed using the safety risk assessment matrix (risk index) Table 2-3. Then the assessed level is checked against the organization's safety performance criteria (acceptable level of safety) using safety risk tolerability matrix Table 2-4. If the assessed risk is within the organization's safety performance criteria then the risk is accepted and if not, then the risk is reduced to an acceptable level.

Table 2 – 1 Safety Risk Probability Table

Probability of Occurrence		
Qualitative Definition	**Meaning**	**Value**
Frequent	Likely to occur many times [has occurred frequently]	**5**
Occasional	Likely to occur sometimes [has occurred infrequently]	**4**
Remote	Unlikely to occur, but possible [has occurred rarely]	**3**
Improbable	Very unlikely to occur [not known to have occurred]	**2**
Extremely improbable	Almost inconceivable that the event will occur	**1**

Severity is determined by the worst credible potential outcome. Less severe effects may be considered in addition to this, but at a minimum, the most severe effects are considered. Determination of severity is independent of likelihood, and likelihood should

not be considered when determining severity. Over time, quantitative data may support or alter the determinations of severity and probability, but the initial risk determinations will most likely be qualitative in nature, based on experience and judgment more than data.

The risk levels used in the matrix can be defined as:

High risk – Unacceptable level of risk: The proposal cannot be implemented or the activity continued unless hazards are further mitigated so that risk is reduced to medium or low level. Tracking and management involvement are required, and management must approve any proposed mitigating controls. Catastrophic hazards that are caused by:

(1) single-point events or failures

(2) common-cause events or failures

(3) undetectable latent events in combination with single point or commoncause events are considered high risk, even if extremely remote

Medium risk – Acceptable level of risk: Minimum acceptable safety objective; the proposal may be implemented or the activity can continue, but tracking and management are required.

Low risk – Target level of risk: Acceptable without restriction or limitation; the identified hazards are not required to be actively managed, but are documented.

Hazards are ranked according to the severity and the likelihood of their risk,which is illustrated by where they fall on the risk matrix. Hazards with high risk receive higher priority for treatment and mitigation.

Table 2 – 2 Safety Risk Severity Table

Severity of Occurrences		
Aviation Definition	**Meaning**	**Value**
Catastrophic	▪ Equipment destroyed. ▪ Multiple deaths.	**A**
Hazardous	▪ A large reduction in safety margins, physical distress or a workload such that the operators cannot be relied upon to perform their tasks accurately or completely. ▪ Serious injury. ▪ Major equipment damage.	**B**

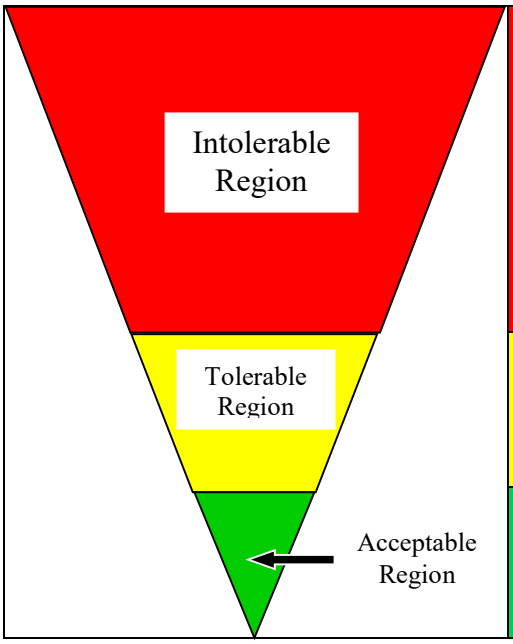
Major	▪ A significant reduction in safety margins, a reduction in the ability of the operators to cope with adverse operating conditions as a result of an increase in workload, or as a result of conditions impairing their efficiency. ▪ Serious incident. ▪ Injury to persons.	**C**
Minor	▪ Nuisance. ▪ Operating limitations. ▪ Use of emergency procedures.	**D**
	▪ Minor incident.	
Negligible	▪ Little consequences.	**E**

Table 2- 3 Safety Risk Assessment Matrix (Risk Index)

Risk probability	**Risk severity**				
	Catastrophic (A)	**Hazardous (B)**	**Major (C)**	**Minor (D)**	**Negligible (E)**
Frequent (5)	**5A**	**5B**	**5C**	**5D**	**5E**
Occasional (4)	**4A**	**4B**	**4C**	**4D**	**4E**
Remote (3)	**3A**	**3B**	**3C**	**3D**	**3E**
Improbable (2)	**2A**	**2B**	**2C**	**2D**	**2E**
Extremely Improbable (1)	**1A**	**1B**	**1C**	**1D**	**1E**

Table 2-4 Safety Risk Tolerability Matrix

Suggested Criteria	**Assessment Risk Index**	**Suggested Criteria [Acceptability/Action Required]**



5A, 5B, 5C, **4A, 4B,** **3A**	Unacceptable under the existing circumstances. [Do not permit any operation until sufficient control measures have been implemented to reduce risk to an acceptable level.]
5D, 5E, **4C, 4D, 4E,** **3B, 3C, 3D** **2A, 2B, 2C,1A**	Acceptable based on risk mitigation. It may require management decision.
3E, **2D, 2E,** **1B, 1C, 1D, 1E**	Acceptable

2.4 Safety Assurance

Assurance can simply be defined as "something that gives confidence". Self- auditing, external auditing, and safety oversight are the most important tools to develop confidence, or to provide safety assurance. Safety oversight can be achieved through auditing and surveillance activities. In addition to the airport operator's existing responsibilities for self-inspection and correction of discrepancies under ACR 2004, an effective airport SMS audit program should:

- Develop identified safety performance indicators and targets
- Monitor adherence to safety policy through internal auditing
- Allocate adequate resources for safety oversight
- Solicit input through a non-punitive safety reporting system
- Systematically review all available feedback from daily self-inspections, assessments, reports, safety risk analysis, and safety audits
- Communicate findings to staff and implement agreed-upon mitigation strategies
- Promote integration of a systems approach to safety into the overall operation of the airport.

A system approach to safety management addresses significant hazards and the possible risks to employees and the public. The three committees(as per above example) namely Safety Review Board withaccountable executive as Chairperson and all the chiefs of Department/Division/Section and ASM as member secretary; Safety Action Group with chief managers from Division/Section/Unit as members and ASM again as member secretary and SMS implementation plan group headed by Aerodrome Safety Manager (ASM) and representatives from mechanical engineer, electrical engineer, civil engineer and RFF officer as members clearly indicates the direct involvement of responsible individuals for developing the SMS and analyzing hazards, identifying control measures

derived from that analysis, and ensuring those measures are effective.
A continuous improvement of the system is vital for the sustainability of SMS and for this along with the defined safety oversight, safety surveys, safety studies, performance monitoring, internal and external auditing; SMS manual has also incorporated other safety reporting systems as a feedback. The report and the reporting system in the manual is simple to fill in and is open to all staff, management, customers or passengers and others. Manual encourages stake holders to submit reports and management commits to consider and make decision in a timely manner. The organization reiterates its commitments to accept all the information positively and fully supports the non-punitive safety reporting system.

2.4 Safety Promotion

Safety Promotion includes:

- Training and education
- Safety communication

The Aerodrome Safety Manager (ASM) is the main source who can provide current information and training relating to safety issues relevant to the specific operation of the airport. The provision of appropriate training to all staff, regardless of their level in the organization, is an indication of the organizations commitment to an effective SMS. Safety training and education consists of:

- A documented process to identify training requirements
- A validation process that measures the effectiveness of training
- Initial (general safety) job-specific training
- Recurrent safety training
- Indoctrination/initial training incorporating SMS
- Training that includes human factors and organizational factors

The ASM communicates safety goals and procedures to all employees. The ASM indicates at all times that safety system is a good business practice and indicates through bulletins, briefings and training. The safety manager should ensure that lessons learned from hazardous occurrence investigations and case history or experiences, both internally and from other organizations, are distributed widely. There is a continuous flow of communication between the safety manager and the organization. The SMS manual indicates followings as means of organizational communication:

- Safety seminars
- Safety letters, notices and bulletins
- Safety lessons-learned
- Bulletin boards, safety reporting drop boxes, and electronic reportingthrough

email

- A method to exchange safety-related information with other airport operators through regional offices or professional organizations.

Applying the Concept of SRM: Appendix 1 provides an example of how Safety Risk Management could be applied to enhance safety during the airfield construction.

CHAPTER 3: SAFETY MANAGEMENT SYSTEM IMPLEMENTATION PLAN

3.1 General

The elements of safety management systems at an airport in itself are very important and show the commitments of the high level management. On top of it, safety management system implementation plan further enforces the commitments in a systematic and planned manner. Implementation plan is divided into following three phases:

3.2 Phase I: Planning

In this phase the chief executive of the organization will be designated as accountable executive of the airport. Furthermore, gap analysis of the existing system; establishment of safety policy and objectives; development of organizational structure and appointment of key safety officials; incorporation of Aerodrome Emergency Plan and SMS manual in a coordinated manner. Safety promotion is very important for the implementation of the SMS and therefore special emphasis is provided for training and communication among the stakeholders. Within a fixed timeframe proposed for this phase, following deliverables are expected:

- Safety policy signed by the chief executive.
- Safety policy communicated to all staff.
- System description completed.
- Gap analysis completed.
- SMS organizational structure in place.
- SMS implementation plan approved.
- Training on SMS planning phase delivered.
- Initial draft of SMS Manual published.
- Means to communicate safety issues established.

3.2 Phase II: Reactive safety Management Process

In this phase the potential hazards should be identified and assessed on the basis of reactive process; safety risk matrix should be developed; safety training should be developed for the directly involved front line officials; a test period should be established to implement reactive safety management process; a safety library and documentation for hazard identification and risk management should be established; and safety newsletters, notices, bulletins, websites, email etc. should be established for safety promotion and communication. Within a fixed timeframe proposed for this phase, following deliverables are expected:

- Safety library established.
- Reactive safety management process implemented.
- Training relevant to SMS implementation plan components and safety risk management on reactive processes completed.
- Safety-critical information based on safety data captured from reactive processes distributed to the organization.

3.3 Phase III: Proactive and predictive safety Management Processes

In this phase the potential hazards should be identified and assessed on the basis of proactive and predictive process; safety risk matrix and safety training should be developed for the directly involved officials; a test period should be established to implement proactive/predictive safety management process; a safety library and documentation for hazard identification and risk management should be established; and safety newsletters, notices, bulletins, websites, email etc. should be established for safety promotion and communication. Within a fixed timeframe proposed for this phase, following deliverables are expected:

- Initial testing period for proactive and predictive means to collect hazard identification established.
- Proactive and predictive safety management processes implemented.
- Training relevant to SMS implementation plan components and safety risk management based on proactive and predictive processes completed.
- Safety performance indicators and safety performance targets developed.
- Critical safety information based on safety data captured by reactive,proactive and predictive processes distributed to the organization.

Sum of the time frame for the above three phases will be the total working period for the implementation of the SMS and the countdown should start from the date of approval of the SMS manual.

Appendix – 1

……. AIRPORT
CONSTRUCTION PLAN

1. Scenario

1.1 Airport has two parallel runways, one main and one secondary, and is planning to install drainage near the approach end of the secondary runway. Construction vehicles must cross the primary runway to gain access to the construction site. Because there are numerous operations during the day, a decision is made to do work at night, during lighter traffic, to avoid disruption of day operations. The safety manager must evaluate the safety consequences of the plan for night construction of the drainage.

1.2 The Safety Action Group (SAG) has been tasked to support the AIA safety manager in evaluating the safety consequences of the construction plan. One immediate and obvious generic area of concern is the movement of construction vehicles to and from the work site, which could lead to runway incursions. The SAG applies a safety risk management process to evaluate the safety consequences of the construction plan.

2. System Description

One of the first tasks of the SAG is to describe the modified system under which theairport will conduct operations while construction is being carried out, as follows:

a) the runway environment during construction at night, including a high volume of construction vehicle traffic between the ramp and the construction site;
b) the existing driver training programme and the use of escorts for construction vehicles;
c) the air traffic control tower and the fact that there is no radio communication with construction vehicles, which are not radio-equipped; and
d) signs, markings and lighting for the taxiways, runways and construction areas.

3. Hazard Identification Process

The second task of the SAG is to identify the hazards and their possible consequences that may affect the aerodrome operation during construction, as follows:

a) State the generic hazard
   - Airport construction.

b) State the specific component(s) of the hazard

   - Construction vehicles crossing the primary runway.

c) Assess the consequences of the specific components of the generic hazard

   1) Construction vehicles may deviate from prescribed procedures and cross theprimary runway without an escort.
   2) Aircraft could conflict with a crossing vehicle.

A1

4. Safety Risk Assessment Process

The third task of the SAG is to identify and assess the safety risks of the consequences of the hazards, and the existing defenses, as follows:

a) The SAG assessment leads to the conclusion that there is a remote probability that a construction vehicle will deviate from prescribed procedures and cross the primary runway without an escort.
b) There are night air carrier operations at the airport, so there is a remote probability that an aircraft could conflict with a crossing vehicle.
c) While the probability of an aircraft/construction vehicle conflict is remote, the SAG assesses that, should such conflict occur, the severity of the occurrence could be catastrophic.
d) The SAG assesses existing defenses (driver training programme, use of escorts for construction vehicles, signs, markings and lighting).
e) Using the safety risk assessment matrix (Table 2-1) and the safety risk tolerability matrix (Table 2-2), the SAG assesses the safety risk index as 3A (unacceptable under the existing circumstances).
f) The SAG concludes that the safety risk of the consequences of the hazard generated by movement of construction vehicles to the construction site is, under the prevailing conditions, unacceptable and that control/mitigation is necessary.

5. Safety Risk Control/Mitigation Process

The fourth and last task of the SAG is to mitigate the safety risk of the consequences of the hazards, as follows:

a) The SAG decides to control the safety risk of the consequences of the hazard by using an existing aerodrome perimeter road to gain access to the construction site. All construction vehicles will be escorted on the perimeter road.
b) With this mitigation, the SAG reassesses the probability of construction vehicles crossing the primary runway without an escort, or that aircraft could conflict with a crossing vehicle, as being extremely improbable. Nevertheless, should an aircraft/construction vehicle conflict occur, the severity of such an occurrence wouldstill be catastrophic.
c) Use of the perimeter road as mitigation may delay construction vehicles due to the added driving distance, but in the assessment of the SAG:

    1) While it does not entirely remove the possibility of the consequences of the hazard from occurring (construction vehicles may still cross the primary runway due to a number or combination of circumstances), it nevertheless brings the safety risks of the consequences (construction vehicle deviating from prescribed procedures and crossing the primary runway without an escort; and aircraft in conflict with a crossing vehicle) to a level as low as reasonably practicable (ALARP).

d) Using the safety risk assessment matrix (Table 2-1) and the safety risk tolerability matrix (Table 2-2), the SAG reassesses the safety risk index as 1A (acceptable);
e) The SAG documents this decision process for future follow-up with the Aerodrome safety manager.

6. Safety Risk Management Log

6.1 The safety risk management log Table 1 of Appendix E is used to provide a record of identified safety risks and the actions taken by nominated individuals. The recordshould be retained permanently in the “safety library” in order to provide evidence of safety risk management and to provide a reference for future safety risk assessments.

6.2 Having identified and ranked the safety risks, any existing defenses against them should be identified. These defenses must then be assessed for adequacy. If these are found to be less than adequate, then additional actions will have to be prescribed. All actions must be addressed by a specified individual (usually the line manager responsible), and a target date for completion must be given. The safety risk management log is not to be cleared until this action is completed.

Table of Safety Risk Management Log

Type of operation or activity	Hazard No.	Generic hazard	Specific components of the hazard	Hazard-related consequences	Existing defenses to control safety risks, and safety risk index	Further actions to reduce safety risk(s)and resulting risk index
Airport operations	**W-1**	Airport construction	Construction vehicles crossing primary runway	a) Construction vehicles may deviate from prescribed procedures and cross the primary runway without an escort. b) Aircraft could conflict with a crossing vehicle	a) The SAG assessment leads to the conclusion that there is a remote probability that a construction vehicle will deviate from prescribed procedures and cross the primary runway without an escort. b) There are night air carrier operations atthe airport, so there is a remote probability that an aircraft could conflict with a crossing vehicle. c) While the probability of an aircraft/construction vehicle conflict is remote, the SAG assesses that, should such conflict occur, the severityof the occurrence could be catastrophic. d) The SAG assesses existing defences (driver training programme, use of escorts for construction vehicles, signs, markings and lighting). e) Using the safety risk assessment matrix (Table 2-1) and the safety risk tolerability matrix (Table 2-2), the SAGassesses: ***Safety risk index: 3A*** ***Safety risk tolerability:*** ***Unacceptable under the existing circumstances.***	a) The SAG decides to control the safetyrisk by using an existing aerodrome perimeter road to gain access to the construction site. All construction vehicles will be escorted on the perimeter road. b) With this mitigation, the SAG reassesses the probability of construction vehicles crossing the primary runway without an escort, or that aircraft could conflict with a crossing vehicle, as being extremely improbable. Nevertheless, should an aircraft/construction vehicle conflict occur, the severity of such an occurrence could still be catastrophic. c) Use of the perimeter road as mitigation may delay construction vehicles due to the added driving distance, but in the assessment of the SAG: 1) while it does not entirely remove the possibility of the consequences of the hazard from occurring (construction vehicles may still cross the primary runway due to a numberor combination of circumstances), it nevertheless brings the safety risks of the consequences (construction vehicle deviating from prescribed procedures and crossing the primary runway without an escort; and aircraft inconflict with a crossing vehicle) to an acceptable level.

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						d) Using the safety risk assessment matrix (Table 2-1) and the safety risk tolerability matrix (Table 2-2), the SAG reassesses: ***Safety risk index: 1A*** ***Safety risk tolerability: Acceptable.*** e) The SAG documents this decision process for future follow-up with the Aerodrome safetymanager.