สำนักงานการบินพลเรือนแห่งประเทศไทย
The Civil Aviation Authority of Thailand

Guidance Material on Safety Management Systems in Civil Aviation for Non-Complex Civil Aviation Organisations

CAAT-GM-SMO-SMSNC

Revision: 00

Date: 14 March 2024

Approved by

Suttipong Kongpool

Director General of The Civil Aviation Authority of Thailand

Intentionally Left Blank

Foreword

The purpose of this document is to provide guidance on the implementation of Safety Management Systems (SMS). It has been developed to give sufficient understanding of SMS concepts and the development of management policies and processes to implement and maintain an effective SMS. It applies to non-complex Civil Aviation Organisations (CAOs).

This document meets ICAO Annex 19 requirements and is a material for CAOs to refer alongside with Thailand Civil Aviation Regulations (TCARs).

A safety management system is a systematic and proactive approach for managing safety risks where potential safety risks are identified and managed to an acceptable level. SMS adopts a business-like approach to safety, similar to the way that finances are managed, with safety plans, safety performance indicators and targets and continuous monitoring of the safety performance of the organisation. It enables effective risk-based decision-making processes across the business.

It is important to recognise that SMS is a top down driven system, which means that the Accountable Manager of the organisation is responsible for the implementation and continuing compliance of the SMS. Without the wholehearted support and ownership of the Accountable Manager the SMS will not be effective. However, safety is a shared responsibility across the whole organisation and needs the involvement of all staff.

There is not a ‘one size fits all’ model for SMS that will cater for all types of organisations. Organisations should tailor their SMS to suit the size, nature and complexity of the operation, and the hazards and associated risks inherent with its activities.

Table of Contents

Abbreviations

Abbreviations	Meaning
ATO	Approved Training Organisation
ATS	Air Traffic Services
CAAT	The Civil Aviation Authority of Thailand
CAO	Civil Aviation Organisation
ERP	Emergency Response Planning
ICAO	International Civil Aviation Organization
MOR	Mandatory Occurrence Report
SMM	Safety Management Manual
SMS	Safety Management System
SPI	Safety Performance Indicator
SPT	Safety Performance Target
SRM	Safety Risk Management
SSP	State Safety Programme
TASAP	Thailand Aviation Safety Action Plan
TCAR	Thailand Civil Aviation Regulation
VOR	Voluntary Occurrence Report

0. Introduction

0.1 Purpose of this Guidance Material

The introduction of SMS across the aviation industry brings some specific challenges for non-complex CAOs. Indeed, some non-complex CAOs may feel that SMS is too complex or too costly to implement. The purpose of this guidance material is to assist non-complex CAOs in implementing SMS simply but effectively. This guidance recognizes the challenges faced by non-complex CAOs in implementing SMS, including limited access to expertise and resources.

Non-complex CAOs are not required to fully implement an SMS but should apply specific safety risk management principles. This guidance should be applied and read in conjunction with the relevant TCAR that details the specific SMS requirements applicable.

0.2 Is my organisation complex or non-complex?

No criteria have been given by any regulation to classify the size of the organisations whether big or small. However, some TCAR have defined non-complex and complex organisations. CAOs should consider themselves to be complex unless they meet the non-complex definition in the relevant TCARs. This is to enable non-complex organisations to implement SMS with simpler processes than a complex organisation.

0.3 The Structure of this Guidance Material

The structure of this Guidance Material consists of 5 chapters and 7 Appendices:

- Chapter 1 - Introduction
- Chapter 2 - Safety Policy and Objective
- Chapter 3 - Safety Risk Management
- Chapter 4 - Safety Assurance
- Chapter 5 - Safety Promotion
- Appendix A - Example of Safety Policy
- Appendix B – Example of SMS Manual Layout
- Appendix C - Example of a Safety Report Form
- Appendix D - Example of Hazard log
- Appendix E - Example of Risk Assessment and Tolerability Matrices
- Appendix F - Example of Safety Objectives and SPIs
- Appendix G - Example of an Organisational Review or Internal Audit Checklists

0.4 Applicability (is subjected to)

All non-complex CAOs states in the relevant TCARs or any CAAT regulations.

0.5 What is a Safety Management System?

SMS is a proactive approach to managing your risks. This includes the policies, processes and procedures to enable this to be done effectively. This guidance material will support non-complex CAOs implementing an SMS in their organizations and to make aviation safer for everyone.

This guidance material describes the key components of an SMS, and also includes essential points that will help in implementing a suitable and effective SMS.

A suitable SMS means that it is designed around the size of the organisation and the nature and complexity of its activities. It also requires people to act in a safe manner so that risks are always reduced to as low as reasonably practical and report when this cannot be achieved. This will result in a positive safety culture for the organisation.

This will also need to be supported by having in place a 'Just culture.' A 'Just Culture' is defined by CAAT as an atmosphere of trust in which people are encouraged (even rewarded) for providing essential safety-related information, but in which they are also clear about where the line must be drawn between acceptable and unacceptable behaviour.

0.6 Implementation Plan and Gap Analysis

CAOs should carry out a gap analysis based on the SMS regulation to define if there are any gaps between what is required and what is already in place. This gap analysis should form the basis of the SMS implementation plan.

When implementing or maintaining the SMS, CAOs should ensure they have considered people, processes and technology, and, most importantly, how they will work together to enable the organisation to meet its safety objectives.

It is to be considered that CAOs do not work in isolation. There are many interactions that occur between CAOs in across different domains during the delivery of aviation related products and services. In addition, there are safety benefits of collaboration across CAOs in different domain as well as within the same domain within Thailand, regional and international level. Hence, SMS of the CAOs will also have to interact with the SSP.

0.7 Additional documents and guidance

- ICAO Annex 19: Safety Management, 2nd edition.
- ICAO Doc 9859: Safety Management Manual 4th edition.
- ICAO Safety Management Implementation website www.icao.int/SMI
- CAP 795 Safety Management Systems (SMS) guidance for organisations, CAA UK, 2014
- SMS for Small Organisations, Safety Management International Collaboration Group, March 2015.
- CASA CAAP SMS-01 v1.1: Safety Management Systems for Regular Public Transport Operations, 2018

0.8 Definitions

Term	Definition
Accountable Manager	A single, identifiable person having responsibility for the effective and sufficient performance of the CAO
Change management	A formal process to manage changes in the organisation in a systematic manner, so that changes which may impact identified hazards and risk mitigation strategies are accounted for, before the implementation of such changes
Errors	An action or inaction by an operational person that leads to deviations from organisational or the operational person's intentions or expectations
Hazard	A condition or an object with the potential to cause or contribute to an aircraft incident or accident.
Just Culture	A culture in which front-line operators and others are not punished for actions, omissions or decisions taken by them which are commensurate with their experience and training, but where gross negligence, willful violations and destructive acts are not tolerated.
Risk mitigation	The process of incorporating defences, preventive controls or recovery measures to lower the severity and/or likelihood or a hazard's projected consequence.
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 Culture	The way safety is perceived, valued and prioritised in an organisation. It reflects the real commitment to safety at all levels in the organisation. It has also been described as "how an organisation behaves when no one is watching".
Safety data	A defined set of facts or set of safety values collected from various aviation-related sources, which is used to maintain or improve safety.
Safety information	Safety data processed, organized or analysed in a given context so as to make it useful for safetymanagement purposes.
Safety management system (SMS)	A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.
Safety objective	A brief, high-level statement of safety achievement or desired outcome to be accomplished by the State safety programme or CAOs' safety management system.
Safety performance indicator (SPI)	A data-based parameter used for monitoring and assessing safety performance.
Safety performance target (SPT)	The State or CAOs' planned or intended target for a safety performance indicator over a given period that aligns with the safety objectives.
Safety risk	The predicted probability and severity of the consequences or outcomes of a hazard.
System	An organised, purposeful structure that consists of interrelated and interdependent elements and components, and related policies, procedures and practices created to carry out a specific activity or solve a problem.

1. Safety Policy and Objective

1.1 Introduction to Safety Policy and Objectives

An effective SMS is the result of visible safety leadership by the Accountable Manager and how this is communicated to everyone in the organisation. This is demonstrated and communicated through the safety policy and objectives.

The safety policy and objectives are an important first step in implementing the SMS. The safety policy and objectives set out the senior management commitment towards safety. The content of this chapter is divided into five section

a) Management Commitment;

b) Safety Accountability and Responsibilities;

c) Appointment of Key Safety Personnel;

d) Coordinating of Emergency Response Planning; and

e) SMS Documentations.

1.2 Management Commitment

Management commitment from the Accountable Manager and senior management is expressed in the safety policy. This should include key safety objectives that set out the safety priorities for the CAO.

The management commitment goes beyond the safety policy to senior managers upholding the safety policy in their decisions and actions.

1.2.1 Safety Policy

The safety policy should be kept short and succinct and be kept to a single page. It must be signed by the Accountable Manager.

The Safety Policy should set out what the Accountable Manager wants to achieve. It should also include your key safety objectives.

It is important that everyone sees the Safety Policy. In a non-complex CAOs it can be easily circulated as well as posting it on the notice board.

The safety policy should be customised to the organisation and include the following commitments (although they can be reworded to suit the organisation:

a) Continuously improve the level of the safety performance of the organization;

b) Promote and maintain a just and positive safety culture within the organization;

c) Comply with all CAAT requirements;

d) Provide the necessary resources to manage safety effectively and reduce risks to an acceptable level;

e) Ensure that the safety policy is understood, implemented and maintained at all levels;

f) Encourage staff to participate in the SMS by reporting safety issues and concerns; and

g) Ensure human factors principles are applied.

Note: An example of a Safety Policy can be found in Appendix A but it should be customised to the organization

1.2.2 Safety Objective

Safety objectives are short, high-level statements of what the organisation wants to achieve in respect of safety. Safety objectives provide direction to the organization's activities and should be consistent with the safety policy that sets out the organization's safety commitment.

Safety Objective may be:

a) Process-oriented: stated in terms of process improvements.

For example:

i. Increase safety reporting level

ii. implementing an effective SMS

b) Outcome-oriented: focusing on reducing the risk of accidents or operational losses.

For example:

i. A Reduction in the number of Runway incursions

ii. A reduction in the number of unstabilised approaches that continue to land.

A non-complex CAO may only have 2 or 3 safety objectives. The safety objectives should be periodically reviewed to ensure that they remain relevant and suitable to the organisation and its activities.

1.3 Safety Accountability and Responsibilities

There should be an Accountable Manager that has the ultimate accountability for safety in the organisation. The structure for non-complex CAOs may just consist of the person in charge (Accountable Manager) and a person responsible for the SMS (Safety Manager) supported by a safety committee that conduct periodically meeting to review the effectiveness of the SMS. non-complex CAOs should describe the duties, accountabilities and responsibilities in the SMS documentation

Differences between Accountability and responsibilities

a) Accountability refers to obligations which cannot be delegated.

b) Responsibilities refer to functions and activities which may be delegated.

1.4 Appointment of Key Safety Personnel

The organisation should identify an individual who is a competent person to fulfil the role of Safety Manager as the focal point for the SMS. Where appropriate, non-complex CAOs should also identify a group of suitable people to participate in a safety committee. Having a Safety committee is recommended but not mandatory for a non-complex CAO as it provides an opportunity to discuss safety issues and risks.

The Safety Manager's role is to implement and manage the SMS and report directly to the accountable manager on safety issues and concerns.

The Safety Manager may have more than one role within an organization, but where possible avoid any conflicts of interest.

The Safety Manager may be supported by a suitable Safety Committee with representatives from the operational parts of the business.

The Safety Manager should regularly meet and discuss safety-related issues with everyone in the organisation and also in sub-contract organisations.

1.4.1 Safety Manager minimum requirements

The person responsible for the SMS should ideally have some operational experience and understand the systems that support your operation. They should understand safety management principles, ideally acquired through formal training and practical experience. Specific Safety Manager minimum requirements can be found in the relevant TCARs.

1.4.2 Safety Manager responsibilities

a) Ensuring that the SMS policies, processes and procedures are established, implemented, and maintained;

b) Promote safety awareness and a positive safety culture;

c) Liaise with the authorities on safety-related issues;

d) Exchange valuable lessons learned with other organizations;

e) Manage internal safety investigations;

f) Ensure identified hazards and issues are being managed;

g) Maintain safety documentation;

h) Organise safety training; and

i) Report safety issues and concerns directly to the Accountable Manager

1.5 Coordination of Emergency Response Planning: ERP

Emergency response planning (ERP) is not mandatory for all CAOs (refer to the relevant TCARs). For some organisations it will still need a process for how it coordinates with the ERP of other organisations. The ERP is a plan that describes the actions that have to be taken during emergency events. The objective is to manage the business while dealing with the emergency and then return to normal operations. The ERP should be available and understood to all key staff members of an organization. The ERP should periodically review at least once a year and practiced through a simulated emergency every few years or as stated in the TCARs. A simple ERP would include a checklist with step-by-step actions and the appropriate emergency contact numbers. Coordinate the ERP with external organizations, including the emergency services.

The ERP should describe as a minimum:

a) The procedures for dealing with emergencies;

b) The recovery procedures for returning to normal operations and; and

c) The coordination procedures with external organizations that support the ERP.

Note: Specific minimum requirements can be found in the relevant TCARs.

1.6 SMS Documentation

The policies, processes and procedures of the SMS should be included in a Safety Management System Manual or integrated into existing approved manuals.

All staff members should understand the specific aspects of the SMS Manual that apply to their roles and responsibilities.

CAOs also need to keep a record of actions, decisions and other SMS activities.

Typically, the records that CAOs should keep are:

a) hazards register and hazard/safety reports.

b) Safety Performance Indicators and Targets.

c) Safety risk assessment records.

d) SMS/safety training records.

e) SMS/safety committee meeting minutes.

f) Safety investigation reports.

g) Management of change records.

Note: An example of an SMS Manual Outline can be found in Appendix B of this guidance material.

2. Safety Risk Management

2.1 Introduction to Safety Risk Management

Safety Risk Management is the primary purpose for having an SMS. The goal of Safety Risk Management is to manage and control risks to an acceptable level to ensure the business can operate safely. This chapter will guide the non-complex CAOs on how to implement safety risk management effectively. The content of this chapter is divided into three sections

a) Hazard Identification

b) Risk Assessment and Mitigation

c) Risk Assessment Documentation

The key steps in Safety Risk Management are:

a) Identifying the hazards and potential consequences affecting the safety of an organization and its activities

b) The Assessment of risks associated with the hazards based on severity and likelihood

c) Taking action to accept, mitigate or eliminate the risks

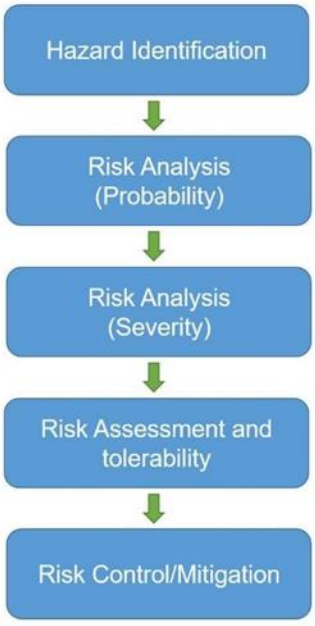

Figure 1: Simple Risk Management Process

Hazards should be defined with the potential consequences (the outcome of the hazard). A Hazard may have more than one potential consequence and priority should be given to assessing the most credible outcome.

For example:

Bird activity at an airport is a hazard to an airline operator, and the potential consequences include hitting an aircraft causing structural damage or being ingested into an engine causing an 'In Flight Shutdown'.

2.2 Hazard Identification Methods

In non-complex CAOs, hazard identification is reliant on an effective safety reporting system and discussions during safety committee meetings. It may also be useful to consider external sources for identifying hazards including:

a) CAAT safety bulletins and the annual safety reports;

b) Information sharing with similar organisations;

c) Safety information from Accident and serious incident reports;

d) Organisation Safety Occurrence Reporting systems; and

e) Safety information from Aircraft Manufacturers and industry associations.

Hazard identification should be gathered from as many sources as possible and consider existing (reactive) and potential hazards (proactive). Reactive is based on events that have happened whereas proactive is events that could happen.

A healthy safety reporting system is an important source of hazards and staff should be encouraged to report hazards. This should include errors, mistakes and near miss events as these are likely to be as a result of an uncontrolled hazard.

2.3 Reporting Systems

A safety reporting system is required to detect and identify hazards and their consequences.

Mandatory occurrence reporting (the CAAT requirement on Reporting of Civil Aviation Occurrences) is a mandatory occurrence report that is a requirement from CAAT. It is used to report significant incidents and events that have been investigated by the CAO.

More information on Mandatory Occurrence Reporting can be found in the CAAT requirement on Reporting of Civil Aviation Occurrences and its guidance or https://caat.or.th/occurrence/

Internal voluntary reporting of less significant incidents should also be actively encouraged. These less significant events could. The key points when developing the reporting systems are:

a) ‘Just Culture’ is essential to encourage people in reporting;

b) Feedback should be given to the person that reports a safety issue on what actions have been taken;

c) Hazard identification is a continuous process;

d) Everyone should be encouraged to participate in the SMS by using the Safety reporting system;

e) Everyone should understand what should be reported and how to complete a safety report. Reporting systems should be confidential;

f) Reporting systems should be simple and easy to use; and

g) Employees should not be punished for unintentional errors or mistakes but should be investigated so that the safety lessons can be learned.

Note: An example of internal safety reporting form can be found in Appendix C - Example of Safety Report Form

For any specific requirements of the reporting systems for each CAOs can be found in the relevant TCARs.

2.4 Internal Safety Investigations

There may be a need to carry out an investigation of an event or a safety report to analyse what happened and why it happened to prevent reoccurrence. This should consider whether there was any human, organisational or technological factors that contributed or caused the event. Risk Assessment and Mitigation

The Risk assessment and mitigation process allows the organization to assess the level of risk associated with the identified hazards and to take actions to accept, control or mitigate the risks to an acceptable level.

The main objective of the risk assessment is to prioritize actions and resources to mitigate the risks.

For risk assessment process all hazards should have the potential consequences identified and the risk assessment is based on the consequence (how much harm and how likely is that harm)

And should clearly defined criteria for the different levels of probability and severity should be established and supported by a risk tolerability matrix.

Note: For any specific requirements of each CAOs can be found in the relevant TCARs.

2.5 Risk Assessment and Mitigation

2.5.1 Safety Risk Probability and Severity

Determining the risk probability and severity is challenging in a non-complex CAOs as there will be limited data available. It will rely on good judgement and the use of subject matter experts. The risk assessment should ideally be verified by the safety committee to ensure that there is agreement on the risk score based on the safety risk matrix that are tailored made and suitable for the size and complexity of the orgainsation.

a) Safety risk probability

Safety risk probability is the likelihood of a potential event or outcome (consequence) occurring. When considering this, these are the questions to help evaluate the likelihood:

i. Is there a history of occurrences similar to the one under consideration, or is this an isolated event?

ii. What other equipment or components of the same type might have similar concerns?

iii. What is the exposure of the hazard under consideration? For example, during what percentage of the operation is the equipment or activity in use? Are a lot of people exposed to the activity is frequently or only occasionally (aircraft loading compared to aircraft de-icing)

b) Safety risk severity

Safety risk severity is the extent of harm that might reasonably be expected to occur. The assessment of severity should consider all possible consequences. related to a hazard, considering the worst foreseeable situation. The severity description should be customized according to the nature of the product or service providers operations. The severity classification should consider:

i. fatalities or serious injuries;

ii. damage.

2.5.2 Safety Risk Tolerability

A Safety risk tolerability matrix is used to combine the probability and severity to determine the tolerability (or acceptability) of the risk. Normally, this will be classified as intolerable, tolerable, or acceptable to enable a decision and actions to be identified.

Intolerable: is an unacceptable risk and requires immediate action to mitigate the risk to as low as reasonably practicable or stop the activity.

Tolerable: is a risk that can only be tolerated if the risk has been reduced to as low as reasonably practicable. This may require a management decision to accept the risk.

Acceptable: is acceptable with no further safety risk mitigation required. However, consideration should still be given to further reducing the risk.

Note: An example of a safety risk matrix, and safety risk tolerability can be found in Appendix E - Example for Safety Risk Management

2.5.3 Assessing Human Factors Related Risks

Risks associated with human performance are more complex to assess than most other risks. People's performance is variable and hard to predict but will need to be considered as part of the SMS.

It is important to recognise that people can be both a source and solution of safety risks by:

a) contributing to an accident or incident through intentional or unintentional actions or decisions.

b) anticipating and taking appropriate actions to prevent a hazardous or catastrophic situation: and

c) solving problems, making decisions and taking actions to mitigate risks.

It is essential to involve people in the identification, assessment, and mitigation of risks.

2.5.4 Risk Mitigation

Risk mitigation should always be considered no matter what the risk score is, but if the level of risk is Intolerable or Tolerable then further mitigation actions should be considered to reduce the risks to as low as reasonably practicable.

In deciding on a risk mitigation, it is important to consider the effectiveness of any risk mitigation action and how practical it is to implement. More than one risk mitigation can be applied to further reduce the risk if appropriate. Most mitigation actions only reduce the probability and some can reduce severity. One risk may have multiple mitigation action to reduce the risk to acceptable level.

a) Risk mitigation strategies

All possible risk mitigations should be identified and considered but this may be balanced against the time, cost and difficulty of implementing. CAOs must evaluate the effectiveness of each alternative strategy before decide. Each proposed safety risk mitigation alternative should be examined from the following perspective:

i. **Effectiveness** – how mitigations can reduce or eliminate the safety risks.

ii. **Cost/ Benefit** – the perceived benefits of the mitigation outweigh the costs.

iii. **Practicality** – is the mitigation can be implemented? and how appropriate it is in terms of available technology, financial and administrative resources, legislation and regulations, political will, etc.

iv. **Acceptability** – the acceptability of the strategy in terms of the stake holder's own standards.

v. **Enforceability** –compliance with new rules, regulations or operating procedures can be monitored.

vi. **Durability** – sustainable and effective?

vii. **Residual Safety Risk** – do mitigations cause additional safety risks?

viii. **Unintended Consequences** – The introduction of new hazards and related safety risks associated with the implementation of any mitigation alternative.

ix. **Time** – Time required for implementation

2.6 Safety Risk Management Documentation

For non-complex CAOs Safety risk management activities should be clearly documented and include:

a) Hazard log / risk register

b) Risk Assessment Records

c) Any decision made on mitigation actions and / or risk acceptance

For non-complex CAOs safety risk management documentation may be done using spreadsheets or tables rather than expensive software.

The Hazard log / risk register should be reviewed regularly as the risks will vary over time and as a result of changes in the business.

Note: An example of hazard log can be found in Appendix D -Example of Hazard log

For any specific requirements can be found in the relevant TCARs.

3. Safety Assurance

3.1 Introduction to Safety Assurance

Safety assurance is applied to monitor the effectiveness of the SMS and the risk mitigations implemented. This can also be used to monitor the safety performance of the organization. The content of this chapter is divided into four sections

a) Internal Safety Audit

b) Safety Performance Monitoring and Measurement

c) The Management of Change

d) Continuous Improvement of the SMS

Safety Assurance evaluates the continued effectiveness of risk mitigation actions; safety assurance gives the Accountable Manager confidence that the risk management processes are working and achieving their intended objectives.

3.2 Internal Safety Audit

Internal safety audits can be achieved through an organisational review. This is a self-assessment of the processes and procedures to assess the effectiveness of the SMS and identify the potential of safety improvement within an organization.

The auditor should provide feedback to Accountable Manager on any audit findings and the outcome of the organisational review. The organisational review should consider:

a) Audit/review results;

b) Safety objective achievement results;

c) Safety Report and occurrence investigation status and results;

d) Risk mitigation action(s) status and results;

e) Training program effectiveness;

f) SMS effectiveness;

Note: An example Organisational Review or Internal Audit Checklists can be found in Appendix G - Example of an Organisational Review or Internal Audit Checklists

3.3 Safety Performance Monitoring and Measurement

Safety performance monitoring is conducted through the collection of safety data and safety information from a variety of sources. However, this can be very challenging for a non-complex CAOs as there is likely to be only limited amounts of data available internally. Safety performance monitoring and measurement consists of:

a) Safety performance indicators (SPIs)

b) Safety performance targets (SPTs)

c) Internal audits and the organisational review

3.3.1 Safety Performance Indicators (SPIs)

SPIs are parameters providing the organisation with a view of its safety performance, the effectiveness of its risk mitigations and whether it will achieve its safety objectives.

a) Qualitative and Quantitative SPIs

SPIs that are based on qualitative and quantitative data. Quantitative data is not always available and this is when qualitative data can be used.

b) lagging or leading indicators

Lagging indicators: Lagging SPIs refer to anything that has already happened (an "**outcome – based**" indicator). Lagging indicators tend to be undesirable events such as a runway excursion.

Other less severe events can also be considered a lagging indicator which are often called precursor events. These are events that are close to the undesirable event such as an unstabilised approach that could have resulted in a runway excursion.

Lagging SPIs help the organisation understand what has happened in the past and it is highly useful for long term trending. Trends in lagging indicators are useful in monitoring the effectiveness of risk mitigations.

Leading indicators: Leading SPIs refer to "**activity or process SPIs**" measuring the input and processes being implemented to improve or maintain safety. Leading indicators can be a "percentage" or "frequency" of the activities such as percentage of the staff members who have completed the training; or frequency of bird scaring activities.

In conclusion, ideally SPIs should be selected that use a combination of both lagging and leading SPIs

c) How to set up SPIs

The starting point should be the safety objectives and identify SPIs that would be helpful to monitor the achievement of those safety objectives. Although the CAO should consider the State Safety Objectives detailed in the TASAP. It should develop its own safety objectives that are specific to its own operation and activities. For a non-complex CAOs 4 or 5 SPIs should be all that is needed. SPIs do not always need to be based on eventsFor each SPI there should be:

i. a description of what the SPI measures;

ii. the purpose of the SPI (linked to the safety objective or significant risk);

iii. the units of measurement (e.g. rate of occurrence per 1000 flight hours or 1000 aircraft movements);

iv. who is responsible for collecting, validating, reporting and acting on the SPI (these people can be from different parts of the organisation);

v. the sources of data being collected and used for the SPI; and

vi. the frequency of reporting, collecting, monitoring and analysis of the SPI data.

Examples SPIs:

a) Number of Mandatory Occurrence Reports (MOR) per 1000 flights

b) Number of Voluntary Occurrence Reports (VOR) per year

   i. Operator/ATO: Number of flights flown with operational Minimum Equipment List (MEL) restrictions

   ii. Aerodrome: Number of runway incursions, number of bird incidents

   iii. Maintenance: Number of maintenance errors

c) Number of safety committee meetings per year

d) Percentage of attendance at safety committee meetings

e) Number of safety audits per year

f) Average time to close safety reports

Note: Safety objectives should have been established before setting SPIs.

An example of Safety Objectives and SPIs can be found in Appendix F – Example of Safety Objectives and SPIs

3.3.2 Safety Performance Targets (SPTs)

Safety performance targets (SPTs) define short term goals for the organisation. They act like “milestones” to track progress towards achievement of the organisation’s safety objectives.

Not all SPIs need to have SPTs. Rather than defining absolute targets, a direction of travel to targets (i.e. to increase/decrease 5%) may be more appropriate. Where there are adequate data for SPIs, the SPIs alert levels may be more suitable than a numerical target

3.3.3 Monitoring safety performance

Non-complex CAOs should consider monitoring and measuring the organisation’s safety performance to support achievement of the SPTs and to identify if some actions or changes are required when the progress is unable to serve the CAOs’ expected commitment or safety objective. The mechanism can be varied depends on what CAOs would like to monitor.

3.4 The Management of Change

Organisations are frequently changing. This can include organisational changes, operational changes or changes in technology. All of these changes can have an impact on safety and the business. New hazards and risks may be introduced when there is a change in an organisation**.** The management of change process will help to organise the change so it can be implemented efficiently and effectively without having a negative impact on safety. It can identify any risks associated with the change so that they can be mitigated to enable a smooth change. Typical changes such as:

a) the expansion or contraction of the operation;

b) changes in aircraft or equipment;

c) economic changes;

d) changes in contracted services;

e) organisational restructuring;

f) external regulatory changes; and

g) the introduction of new technology or procedures.

To manage change effectively there should be early communication and engagement with all staff to improve the way the change is perceived and implemented. The change management process should include these activities:

a) a description of the change and why it is being implemented;

b) determining who the change will affect and how (people, departments, organisations);

c) identify new hazards as a result of the change and whether existing hazards or risk controls are affected;

d) conduct a safety risk assessment and mitigate any unacceptable risks;

e) sign off the change to confirm it is safe to implemented; and

f) agree an assurance plan to monitor the implementation of the change and to ensure that it was implemented without a negative impact on safety.

g) consider the impact of the change on its staff. This could affect the way the change is acceptable by those people affected. Communicating and engaging with staff at earliest opportunity will improve the way that change is accepted and implemented

3.5 Continuous Improvement of the SMS

SMS is a dynamic risk management system and needs to be continuously monitored to ensure it is keeping the organisation and its people safe. The organisational review can support the continuous improvement of the SMS.

This can be achieved by an annual review that reviews:

a) The effectiveness of the SMS

b) Any occurrences that have happened in the last year and what actions have been taken

c) Review of any changes that have occurred or are planned

d) Top safety risks and progress on actions to mitigate them

4. Safety Promotion

4.1 Introduction to Safety Promotion

Safety promotion is an important part of SMS. The primary objective is to ensure personnel are trained and competent to perform their tasks. It is where safety is promoted to people to encourage the right behaviours and promote a good safety culture within the organisation. It also requires good communication within the organisation and with external contracted organisations. This includes the sharing of safety information and safety critical information. This chapter will guide non-complex CAOs on how to promote safety effectively. The content of this chapter is divided into two sections

a) Safety Training and Education

b) Safety Communication

4.2 Safety Training and Education

CAOs should conduct SMS training for every employee based on their safety roles and responsibilities. It is important to ensure that your staff are trained and competent to carry out their safety-related functions. Training could be computer or classroom based, supplemented by reading specific training material. The delivery method is not important; what is important is that your staff are trained and understand how your SMS works and their role within it.

CAOs should conduct initial and recurrent training for an organization's safety management system with a minimum requirement for the initial training to include:

a) Importance of the SMS;

b) Employee's responsibilities for safety;

c) SMS policy and processes in your organization;

d) Safety reporting (why, what and how); and

e) Human Factors.

Recurrent training should be carried out at least every 2 years or as required in the relevant TCARs and should include:

a) updates to the SMS;

b) significant organisational risks;

c) lessons learnt from events and audit findings; and

d) Organisational and operational changes.

Recurrent training can be delivered as a facilitated workshop to discuss known hazards, safety issues and risk mitigations.

The training program should be reviewed for effectiveness during the annual Management Review process.

For any specific training requirements can be found in the relevant TCARs.

Key Points:

a) Initial training should be delivered with a trainer either in a classroom, or remotely to ensure that there is a 2-way discussion;

b) e-learning or online training may be appropriate for recurrent training;

c) SMS training can be delivered by the safety manager or by an external trainer. If an external trainer is used, they will need to customise the training to reflect the organisation's SMS;

d) An organization should keep training records for all staff; and

e) All staff should be aware of the hazards and risks associated with their duties.

NOTE: The training program above is the minimum requirement. An organization can conduct more training if needed.

4.3 Safety Communication

CAOs should communicate the organization's safety policy, safety objectives and SMS processes and procedures to everyone in the organisation. Critical safety information also needs to be communicated. Safety communication can be achieved through:

a) Meetings;

b) safety bulletins;

c) information sheets;

d) newsletters, e-mail;

e) Website; and

f) Social Media messaging.

Safety communication should also encourage people to report safety issues and concerns through the safety reporting system. If there is a potential hazard or safety issue that is not reported the management is not aware of it and it won't get fixed.

CAOs should consider whether the safety information needs to be communicated to external organisations. It is also important to assess the effectiveness of safety communication.

The safety risk management documentation also a very important source of safety knowledge which provides material for safety training and communication. For instance, lessons learnt from the safety reporting system and safety investigation may be a good source of information for organisation's safety communication activities.

5. Appendix A – Example of a Safety Policy

5.1 Example of safety policy

Safety is a prime consideration at all times within (your organisation).

As the Accountable Manager, it is my responsibilities to ensure the safety of all our operations and services. I will ensure that adequate resources and training are provided to manage safety effectively. We encourage all our staff and stakeholders to report safety events or potential hazards, however, insignificant they may consider them at the time.

We have an open reporting culture that encourages free and frank reporting through a Just Culture.

We strive to achieve:

- A fatal accident-free environment;
- An effective safety management system and continuous improvement;
- Full compliance with the Air Navigation Act and all Thai Civil Aviation Requirement that apply to us.

These objectives are for the benefit of the company, its employees and its customers. To this end, we have a shared responsibilities to achieve these aims.

Safety is everyone's responsibility.

(*Signed by Accountable Manager*)

Mr./Ms. xxx

Accountable Manager

Company X

6. Appendix B – Example of SMS Manual Layout

6.1 Example of SMS Manual layout (contents page)

1. Table of contents

2. List of effective pages

3. Distribution list.

4. Safety policy and safety objectives

5. Safety Accountability of the Accountable Executive

6. Safety Responsibilities of the Safety Manager, Management and All Personnel involved in Safety-related Duties

7. Aviation Organization Chart Showing the Lines of Safety Responsibility within the Organization

8. Safety and Occurrence Reporting Procedures

9. Hazard Identification, Risk Assessment and risk mitigation Procedures

10. Procedures for Monitoring Safety Performance

11. Internal Safety Audit (organisational review) Procedures

12. Safety Training and Communication

13. Documentation Control Procedures, including Amendment Procedure and Distribution List

14. Emergency Response Plan: ERP

7. Appendix C - Example of a Safety Report Form

7.1 Example of Safety Report Form

Company X Safety Report Form

Part A to be completed by the person identifying the safety issue or hazard.

Date of event		Local time	
Location:			
Name of Reporter		Section / Organization	

Please fully describe the event or identified hazard:

Include your suggestions on how to prevent similar occurrences.

In your opinion, what is the likelihood of such an event or similar happening or happening again?

Unlikely	Probable	Likely
1	2	3

What do you consider could be the worst possible consequence if this event did happen or happened again?

Negligible	Serious Incident	Fatal Accident
1	3	5

Part B To be completed by the *(insert title of responsible person).*

The report has been dis-identified and logged.

Report Reference		
Signature		Date:
Name		

If further investigation is needed this should be carried out before being submitted to the Safety Committee.

Part C To be completed by the Safety Committee.

Rate the likelihood of the event occurring or recurring:

Unlikely	Probable	Likely
1	2	3

Rate the most credible accident consequences?

Negligible	Serious Incident	Fatal Accident
1	3	5

What action or actions have been or are being taken to prevent the issue or hazard from occurring in the future and/or to mitigate its consequences?

Resources required	
Responsibility for Action	

Agreed and Accepted by

(insert title of responsible person)	
Responsible Manager	Date
Accountable Manager	Date

Appropriate Feedback given to staff by Safety Officer Signed:	Date

Follow up action required:

What	
Who	
When	

8. Appendix D - Example of Hazard log

8.1 Example of Hazard log

Example 1

Hazard Description What is the issue?	Consequence What will happen as a result?	What are the existing risk controls?	Initial Risk Score			Additional Mitigation Required (who, what and when)	Residual Risk			Risk Owner	Monitoring and next review date
			Probability	Severity	Risk		Probability	Severity	Risk		

Example 2

Operation/System	
Hazard no.	
Hazard Description	
Safety Event (Causes or threats)	
Potential Consequences	

Risk Controls (Barriers and Mitigations)		
No.	**Description**	**Responsible Persons**
1		
2		

Risk Assessment			
Hazard Frequency			
Overcome Likelihood			
Consequence Severity			
Risk			
Management Approval	Name:		Signature:

Safety Performance Monitoring Requirements		
No.	**Description**	**Responsible Persons**
1		
2		

9. Appendix E - Example of Risk Assessment and Tolerability Matrices

The definitions of Probability and severity should be tailored to the activities of the organisation

9.1 Example of safety risk probability table

Probability	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

9.2 Example of safety risk severity table

Severity	Meaning	Value
Catastrophic	- Aircraft / equipment destroyed - Multiple deaths	A
Hazardous	- A large reduction in safety margins, physical distress or a workload such that operational personnel 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 operational personnel 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 - Minor incident	D
Negligible	- No or insignificant safety impact	E

9.3 Example of safety risk matrix

Safety Risk	Severity				
Probability	**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**

9.4 Example of safety risk tolerability

Safety Risk Index Range	Safety Risk Description	Recommended Action
5A, 5B, 5C, 4A, 4B, 3A	INTOLERABLE	Take immediate action to mitigate the risk or stop the activity. Perform priority safety risk mitigation to ensure additional or enhanced preventative controls are in place to bring down the safety risk index to tolerable.
5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C, 1A	TOLERABLE	Can be tolerated based on the safety risk mitigation but should consider whether the risk can be reduced further to as low as reasonably practical. It may require a management decision to accept the risk.
3E, 2D, 2E, 1B, 1C, 1D, 1E	ACCEPTABLE	Acceptable as is. No further safety risk mitigation required.

10. Appendix F - Example of Safety Objectives and SPIs

10.1 Example of Safety Objectives and SPIs

Performance Indicator	Annual Target	Annual Performance			
		Qtr1	Qtr2	Qtr3	Qtr4
Mandatory Reports per 100 flights/movements	No Target				
Voluntary Reports per 100 flights / movements	More than 5				
% of safety reports actioned and closed within 3 months	90%				
Safety meetings per year	4				
Safety briefings per year	More than 2				
Safety audits per year	More than 3				
Organization-specific SPIs					
Operator: Flights flown with operational MEL restrictions per 100 flights	Less than 5%				
Aerodrome: Runway incursions per year	Less than 5				
Maintenance: Maintenance errors per year	Less than 5				
ATS: Airspace infringements per 100 movements	Less than 2				

11. Appendix G - Example of an Organisational Review or Internal Audit Checklists

11.1 SMS Audit Checklist for Non-Complex Organisations

SMS Auditor:		**Date of Audit**	
SMS Manual Revision:			
		Compliance Y/ N	**Non-Compliance, Observations and items sampled**
Management commitment	Is there a written safety policy signed by the Accountable Manager?		
	Does Senior Management continuously promote and demonstrate its commitment to the safety policy?		
	Has the safety policy been communicated effectively throughout the organisation?		
	Does the safety policy encourage safety reporting and include just culture principles?		
Safety accountability and responsibilities	Are the safety accountabilities and responsibilities of the Accountable Manager and other key staff members clearly defined?		
	Does the Accountable Manager have full responsibility for the SMS and authority to make decisions regarding resources?		
	Has the management structure of the organisation been defined?		
	Are all staff members aware of their safety roles and responsibilities?		

Appointment of key safety staff members	Has a focal point/Safety Manager for the SMS been appointed?		
	Is there a direct reporting line between the SMS focal point/ Safety Manager and the Accountable Manager?		
	Does the SMS focal point/ Safety Manager have the appropriate SMS knowledge and understanding?		
	Does the organisation have a Safety Committee or equivalent?		
	Does the Safety Committee or equivalent monitor the safety performance and the effectiveness of the SMS?		
	Does the Safety Committee or equivalent meet at least annually and are the decisions and actions agreed at the meetings documented?		
Emergency response planning	Has an emergency response plan been developed and is it kept up to date?		
	Are the roles, responsibilities and actions of key staff members defined in the ERP?		
	Is there a plan for the ERP to be reviewed and tested?		
Safety documentation	Are all of the SMS policies, processes and procedures documented in a safety management manual or integrated into existing manuals?		
	Are all records related to the SMS stored securely?		

Hazard identification	Is there a confidential safety reporting system that includes feedback to the reporter?		
	Are significant safety reports reviewed by the Safety Committee or equivalent?		
	Have the major hazards associated with the organisation been identified?		
	Are hazards and potential consequences being identified and recorded?		
	Are there procedures for safety investigations to be carried out after incidents or accidents to establish root cause?		
	Is there a risk assessment and risk management process in place and is it applied consistently?		
	Are risk assessments reviewed to ensure that they remain valid?		
	Are unacceptable risks being mitigated to an acceptable level?		
	Are risk mitigations and controls being verified/audited to confirm the effectiveness?		
	Are the hazards and how they are being managed being recorded?		
	Have safety objectives and associated safety performance indicators been defined?		
	Are safety objectives and safety performance indicators being reviewed annually to confirm they are still suitable?		

	Is there a formal process to manage changes to ensure they do not have a negative impact on safety?		
	Is there an annual review of the effectiveness of the SMS to manage the continuous improvement of the SMS?		
	Is there an audit plan to assess compliance with the regulations or an organisational review process?		
	Is there a regular assessment of the effectiveness of the SMS?		
	Have all staff been appropriately trained in respect of the SMS and their safety roles and responsibilities?		
	Does safety related information get communicated to all staff members as appropriate?		
	Is there a means to share safety information and lessons learnt from the safety reporting system and safety investigations?		
	Have the SMS interfaces with external organisations been identified?		
	Are hazards and risks related to interfaces with external organisations being managed?		