



**Civil Aviation Advisory
Publication (CAAP)**

January 2009

SAFETY MANAGEMENT SYSTEMS FOR REGULAR PUBLIC TRANSPORT OPERATIONS

This is an advisory publication. It describes some options for complying with the Civil Aviation Regulations 1988 (CAR 1988).

Always read this advice in conjunction with the appropriate regulations and any Civil Aviation Orders (CAOs).

The relevant regulations and other references:

- *Civil Aviation Act 1988*
- Section 82.3 and 82.5 of the Civil Aviation Orders (CAOs)
- Civil Aviation Safety Regulations 1998
- Standards Australia/New Zealand (2004) *Risk Management 4360:2004*
- International Civil Aviation Organization (ICAO), Doc 9859 – *Safety Management Manual*, 2nd Edition dated 2008.
- Civil Aviation Authority of Singapore (CAAS) Advisory Circular 1-3(0) – *Safety Management Systems*
- UK Civil Aviation Authority (CAA) CAP 712 – *Safety Management Systems for Commercial Air Transport Operations*
- Transport Canada (TC) Advisory Circular 107-001 – *Guidance on Safety Management System Development*

Why this publication was written

The purpose of this Civil Aviation Advisory Publication (CAAP) is to provide guidance material for:

Air Operator’s Certificate (AOC) holders operating under CAO 82.3 and CAO 82.5 – Regular Public Transport (RPT) Operations.

Note: Charter operators currently operating under CAO 82.1 should become familiar with this document as the content is proposed to be incorporated into Part 119 of the Civil Aviation Safety Regulations (CASRs), — Passenger Transport Operations (existing RPT and Charter classifications) — as an Acceptable Means of Compliance and possibly Guidance Material.

Status of this CAAP

This is the first CAAP written on this subject.

For further information

Email the Civil Aviation Safety Regulation CASR Part 119 Project Leader on sms@casa.gov.au.

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Abbreviations

AC	Advisory Circular
ALAR	Approach-and-Landing Accident Reduction
ALARP	As Low as Reasonably Practicable
ALoS	Acceptable Level of Safety
AME	Aircraft Maintenance Engineer
AOC	Air Operator's Certificate
AQF	Australian Qualification Framework
AS/NZS	Australian/New Zealand Standard
ATSB	Australian Transport Safety Bureau (Australia)
BITRE	Bureau of Infrastructure, Transport and Regional Economics (formerly BTCE)
BTCE	Bureau of Transport and Communications Economics (now BITRE)
CAAP	Civil Aviation Advisory Publication
CAO	Civil Aviation Order
CAP	Civil Aviation Publication (United Kingdom)
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulation
CDM	Critical Decision Method
CEO	Chief Executive Officer
CRM	Crew Resource Management
CRMI	Crew Resource Management Instructor
CRMIE	Crew Resource Management Instructor Examiner
DEST	Department of Education, Science and Training
ERP	Emergency Response Plan
ESB	Effective Safety Behaviours
FAA	Federal Aviation Administration (United States)
FDA	Flight Data Analysis
FDAP	Flight Data Analysis Program
FMAQ	Flight Management Attitudes Questionnaire
FRMS	Fatigue Risk Management System
FTO	Flight Training Organisation
GAPAN	Guild of Air Pilots and Air Navigators
GIHRE	Group Interaction in High Risk Environments
HF	Human Factors
HMI	Human-Machine Interface
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
IRM	Immediately Reportable Matter
IRS	Internal Reporting System
ISO	International Organization for Standardization

JAR-OPS	Joint Aviation Requirements - Operations (Joint Aviation Authorities)
LAME	Licensed Aircraft Maintenance Engineer
LOE	Line Operational Evaluation
LOFT	Line-Oriented Flight Training
LOS	Line Operational Simulation
LOSA	Line Operations Safety Audit
MOS	Manual of Standards
MOU	Memorandum of Understanding
NTS	Non-Technical Skills
OH&S	Occupational Health & Safety
POH	Pilot's Operating Handbook
QMS	Quality Management System
RPT	Regular Public Transport
RRM	Routinely Reportable Matter
SAG	Safety Action Group
SLA	Service Level Agreement
SM	Safety Manager
SMM	Safety Management Manual
SMS	Safety Management System
SOP	Standard Operating Procedure
SRB	Safety Review Board
TEM	Threat and Error Management
TNA	Training Needs Analysis
UT	University of Texas
VFR	Visual Flight Rules

Definitions

Accident: An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with intention of flight until such time as all such persons have disembarked, in which:

a person is fatally or seriously injured as a result of:

- being in the aircraft, or
- direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
- direct exposure to jet blast,

except when the injuries are from natural causes, self-inflicted, or caused by other persons, or when injuries are to stowaways hiding outside the areas normally available to the passengers and crew, or the aircraft sustains damage or structural failure which,

- adversely affects the structural strength, performance or flight characteristics of the aircraft, and
- would normally require major repair or replacement of the affected component,

except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tyres, brakes, fairings, small dents or puncture holes in the aircraft skin; or the aircraft is missing or is completely inaccessible.

Notes

1. *For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified as a fatal injury by ICAO.*
2. *An aircraft is considered to be missing when the official search has been terminated and wreckage has not been located.*

ALARP: As Low As Reasonably Practical, means a risk is low enough that attempting to make it lower, or the cost of assessing the improvement gained in an attempted risk reduction, would actually be more costly than any cost likely to come from the risk itself.

Assessment: The process of observing, recording, and interpreting individual knowledge and performance against a required standard.

Behavioural marker: A single non-technical skill or competency within a work environment that contributes to effective or ineffective performance.

Behavioural marker system: An organised set of competency descriptors, collectively representing the domain of non-technical skills (NTS) required for successful performance in a specified role.

Change Management: is a systematic approach to controlling changes to any aspect of processes, procedures, products or services, both from the perspective of an organisation and individuals. It's objective is to ensure that safety risks resulting from change are reduced to as low as reasonably practicable.

Competency: A combination of skills, knowledge and attitudes required to perform a task to the prescribed standard.

Competency standards: Defined and expressed in outcome terms.

Competency-based training: Develops the skills, knowledge and behaviour required to meet competency standards.

Competency assessment: The process of collecting evidence and making judgements as to whether competence has been achieved.

Contract: An arrangement or agreement between two or more parties enforceable by law. A contract is a legal document which describes commercial terms and conditions.

Note: The term 'contract' for the purpose of this CAAP is also taken to mean the following:

- *Leasing arrangements; and*
- *Service Level Agreement (SLA).*

Consequence: Outcome or impact of an event.

Notes:

- 1. There can be more than one consequence from one event.*
- 2. Consequences can range from positive to negative.*
- 3. Consequences can be expressed qualitatively or quantitatively.*
- 4. Consequences are considered in relation to the achievement of objectives.*

Crew resource management (CRM): A team training and operational philosophy with the objective of ensuring the effective use of all available resources to achieve safe and efficient flight operations.

Facilitator: A person who enables learning in a student-centred environment by guiding participants through discussions, interactions, structured exercises and experiences.

Error: An action or inaction by an operational person that leads to deviations from organisational or the operational person's intentions or expectations.

Error management: The process of detecting and responding to errors with countermeasures that reduce or eliminate the consequences of errors, and diminish the probability of further errors or undesired states.

Flight Data Analysis: A process for analysing recorded flight data in order to improve the safety of flight operations.

Hazard: A source of potential harm.

Human Factors (HF): The minimisation of human error and its consequences by optimising the relationships within systems between people, activities and equipment.

Incident: An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

Inter-rater reliability: The extent to which two or more individuals (coders or raters) agree. Inter-rater reliability addresses the consistency of the implementation of a rating system.

Just culture: An organisational perspective that discourages blaming the individual for an honest mistake that contributes to an accident or incident. Sanctions are only applied when there is evidence of a conscious violation or intentional reckless or negligent behaviour.

Likelihood: Used as a general description of probability or frequency.

Note: Can be expressed qualitatively or quantitatively.

Line-oriented flight training (LOFT): Refers to aircrew training which involves a full mission simulation of situations which are representative of line operations, with special emphasis on situations which involve communications, management and leadership.

Line operational simulation: Widely used to provide opportunities for crews to practice CRM concepts in realistic and challenging simulated flight situations.

Line Operational Safety Audit (LOSA): A behavioural observation data gathering technique, which aims to capture data on the performance of flight crews during normal operations.

Management: Management comprises planning, organising, resourcing, leading or directing, and controlling an organization (a group of one or more people or entities) or effort for the purpose of accomplishing a goal.

Non-technical skills (NTS): Specific HF competencies such as critical decision-making, team communication, situational awareness and workload management.

NOTECHS: The JAR-FCL framework for structured assessment of non-technical (CRM) skills, based on, behavioural marker system. NOTECHS was originally designed to fulfil a pan-European requirement under the Joint Aviation Authorities.

Operational safety-critical personnel: Persons performing or responsible for safety-related work, including those personnel performing roles that have direct contact with the physical operation of the aircraft or with those that have operational contact with personnel who operate the aircraft.

Operational safety-related work: Safety-related activity in one or more of the following work areas:

- flying an aircraft;
- cabin crew operations;
- dispatch of aircraft or crew;
- development, design, implementation and management of flight operations safety-related processes (including safety investigations); and

any other duties prescribed by an AOC holder as flight operations safety-related work.

Quality Management System (QMS): A set of policies, processes and procedures required for planning and execution (production/development/service) in the core business area of an organisation.

Risk: The chance of something happening that will have an impact on objectives.

Notes:

1. *A risk is often specified in terms of an event or circumstance and the consequence that may flow from it.*
2. *Risk is measured in terms of a combination of the consequences of an event, and its likelihood.*
3. *Risk may have a positive or negative impact.*

Risk Assessment: The overall process of risk identification, risk analysis and risk evaluation.

Risk Identification: The process of determining what, where, when, why and how something could happen.

Risk Management: The culture, processes and structures that are directed toward realising potential opportunities whilst managing adverse effects.

Safety: The state in which the probability of harm to persons or of property damage is reduced to, and maintained at, a level which is ALARP through a continuing process of hazard identification and risk management.

Safety Culture: An enduring set of beliefs, norms, attitudes, and practices within an organisation concerned with minimising exposure of the workforce and the general public to dangerous or hazardous conditions. In a positive safety culture, a shared concern for, commitment to, and accountability for safety is promoted.

Safety Management: May be described as managing the identification and reduction of hazards until they reach the ALARP criteria.

Safety Manager (SM): A person responsible for managing all aspects of the operation of the organisation's safety management system.

Safety Management System (SMS): A systematic approach to managing safety, including the necessary organisational structures, accountabilities, policies and procedures.

Stakeholders: Those people and organisations who may affect, be affected by, or perceive themselves to be affected by a decision, activity or risk.

Systemic: Relating to or affecting an entire system.

System Safety: The application of engineering and management principles, criteria and techniques to optimise safety by the identification of safety related risks and eliminating or controlling them by design and/or procedures, based on acceptable system safety precedence

Threat: Events or errors that occur beyond the influence of an operational person, increase operational complexity and should be managed to maintain the margin of safety.

Threat and Error Management (TEM): The process of detecting and responding to threats with countermeasures that reduce or eliminate the consequences of threats, and mitigate the probability of errors or undesired states.

Training: The process of bringing a person to an agreed standard of proficiency by practice and instruction.

Training Needs Analysis (TNA): The identification of training needs at employee, departmental, or organisational level, in order for the organisation to perform effectively.

Unit of competency: Under Australian National Standards, a defined group of competencies required for effective performance in the workplace. A competency comprises the specification of knowledge and skill and the application of that knowledge and skill at an industry level, to the standard of performance required in employment.

Usability: The effectiveness, efficiency and satisfaction with which users can achieve tasks in a particular environment of a product, equipment or system.

Violation: Intended or deliberate deviations from rules, regulations or operating procedures. A person committing a violation fully intends their actions. Violations can be one of four different types:

- routine – common violations promoted by an indifferent environment, 'we do it this way all the time';
- optimising – corner-cutting based on the path of least resistance, 'I know a better way of doing this';
- exceptional or situational – one-off breaches of standards/regulations dictated by unusual circumstances that are not covered in procedures, 'we can't do this any other way'; or
- acts of sabotage – acts of harmful intent to life, property of equipment.

1. Introduction

1.1 This CAAP describes the safety outcomes and the key elements of a SMS. It is based around the SMS Framework recommended by ICAO. The content of this CAAP specifies the components and elements that need to be in place for RPT operations to meet the requirements of CAO 82.3 and CAO 82.5 for an SMS program.

1.2 This CAAP supersedes previous Civil Aviation Safety Authority (CASA) guidance and safety promotion material in regards to SMS.

1.3 Certain terms, definitions and concepts are subject to change, as these evolve in the context of ICAO's ongoing revision and review processes. Australia is actively involved in, and a contributor to, those processes.

1.4 A successful SMS provides – amongst other things a systematic, explicit and comprehensive process for identifying hazards and the risks they bring, and for minimising those hazards. As with all management systems, it involves goal setting, planning, documentation and the measuring of performance goals.

1.5 When developing an organisation's SMS, a vital ingredient is the incorporation of HF. The integration of HF into the SMS should be a key objective of any SMS program.

Note: The integration of HF into an SMS is detailed in CAAP SMS-2(0).

1.6 The organisational culture and the way people go about their work will have a significant impact upon the success of the SMS. Indeed, it is unlikely that the SMS will achieve its full potential for mishap prevention without full understanding and application of HF principles by the entire organisation's staff in support of a positive safety culture.

2. Integrating an SMS into Existing Systems

2.1 Introduction

2.1.1 SMS goes beyond a traditional QMS by focussing on the safety, human and organisational aspects of an operation. Within an SMS, there is a distinct focus on operational safety, and the human element in the system. This underlines the importance of integrating HF through all parts of the SMS.

2.1.2 In civil aviation today, there are various control systems existing within an organisation. Examples include:

- International Organisation for Standardisation (ISO) 9000 system;
- QMS;
- HF and Error Management System;
- Fatigue Risk Management System (FRMS);
- Environment Management System;

- Occupational Health and Safety Management System; and
- Security Management System.

2.1.3 There may be organisational benefits in coordinating some/all of these systems. These include:

- reducing resource duplication, and therefore, cost;
- integration and processing of cross-functional safety related data; and
- reducing potentially conflicting objectives and relationships.

2.1.4 Although the co-ordination and integration process may be a challenging task for many organisations, and could impact on the ability to successfully implement an SMS program in the short to medium term, an alternative would be to plan for integration once the SMS is established within the organisation (a phased approach).

2.1.5 If there is a strategy to integrate some or all of these programs, then the SMS should provide the organisational overview of all the various organisational systems from the operational safety perspective.

2.2 Delivering an effective SMS organisational program

2.2.1 Key components and elements for delivering an effective SMS are outlined in the CASA SMS Framework. (See Figure 1 below.)

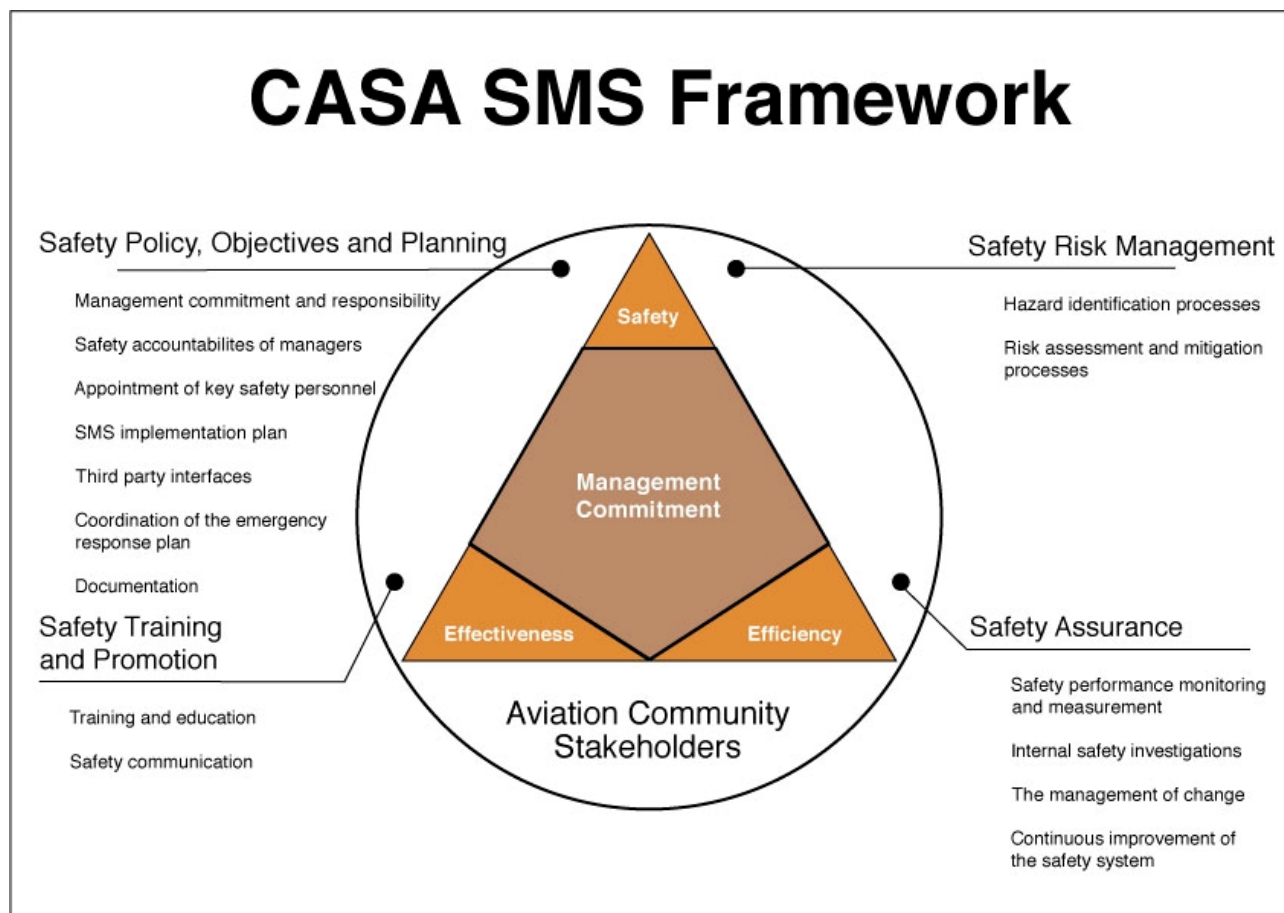


Figure 1: CASA SMS Framework

2.3 The CASA SMS framework - Introduction

2.3.1 The SMS framework in this CAAP is largely based on the ICAO SMS guidance which consists of four major components. These are:

- Safety Policy, Objectives and Planning;
- Safety Risk Management;
- Safety Assurance; and
- Safety Training and Promotion.

2.3.2 Each of these components is detailed below, and forms the basis of the remainder of this CAAP.

3. Safety Policy, Objectives and Planning

3.1 Introduction

3.1.1 This section covers these elements:

- management commitment and responsibility;
- safety accountabilities of managers;
- appointment of key safety personnel;
- SMS implementation plan;
- third-party interface – contracted activities;
- coordination of the emergency response plan; and
- documentation.

3.2 Management Commitment and Responsibility

3.2.1 Chief Executive Officers (CEO) demonstrate a commitment to safety by:

- recruiting a management team appropriate to the size and complexity of the organisation;
- developing and disseminating a safety policy and safety objectives;
- creating and adequately resourcing the SMS program; and
- specifying roles, responsibilities and accountabilities of the management team in relation to aviation safety.

3.2.2 Senior management should develop an organisational structure that has the responsibility, authority and accountability assigned to it to assure the SMS will function as planned. This would include an organisation chart that depicts the organisation structure inclusive of the SMS that establishes a clear line of communication from the Safety Manager (SM) directly to the CEO.

Safety Policy

3.2.3 Management commitment to safety needs to be clearly expressed in a statement of the organisation's safety policies.

3.2.4 A Safety Policy outlines what the organisation will do to achieve the desired safety outcomes. They serve as a reminder as to '*how we do business around here*'.

3.2.5 Safety policy statements may take different forms but will typically include:

- the overall safety objective of the organisation;
- the commitment of senior management to the goal of ensuring that all aspects of the operation meet safety performance targets;

- determination by the organisation to provide the resources necessary for the effective safety management;
- the organisation's policies concerning responsibility and accountability for safety at all levels of the organisation; and
- management's explicit support of a 'just culture', as part of the overall safety culture of the organisation.

3.2.6 An SMS safety policy may refer to other programs, for instance: Occupational Health and Safety, QMS, environmental management systems, security management systems.

Just Culture

3.2.7 A 'just culture' provides clear boundaries about confidentiality, reporting requirements, and individual responsibilities in relation to the SMS as far as management and staff are concerned. However, in a 'just culture' policy, a clear distinction is required between what is acceptable behaviour and what is unacceptable, and that people are treated accordingly. 'Just culture' is a necessary evolution from the 'blame free' culture of the past.

Safety Objectives

3.2.8 The safety objectives should state an intended safety outcome. These objectives may be expressed in terms of short, medium and long term safety objectives.

3.2.9 To be able to measure the effectiveness of operational safety objectives, they should be *Specific, Measurable, Achievable* and *Realistic*; and have a specified *Timeframe* (SMART) within which they are to be achieved.

3.2.10 The operator should have documented plans of action to achieve each specified safety objective, and these should ideally be included within the implementation plan.

3.3 Safety Accountabilities of Managers

3.3.1 The CEO is ultimately accountable for the SMS and should provide resources necessary to implement and maintain the program.

3.3.2 The roles, responsibilities and accountabilities of the positions outlined on the organisational chart should be explicit with respect to the SMS.

3.3.3 All management and supervisory positions in addition to the SM would be expected to show leadership and have included in their responsibilities/accountabilities a requirement to:

- actively support and promote the SMS;

- ensure that they and their staff comply with the SMS processes and procedures;
- ensure resources are made available to achieve the outcomes of the SMS; and
- continually monitor their area of responsibility, as outlined in the SMS Manual.

3.3.4 Managers should ensure that sufficient resources are made available to achieve the outcomes of the SMS.

3.3.5 Section 28(3) of the *Civil Aviation Act 1988* specifies the following 'key personnel under an AOC:

- the CEO;
- the Head of Flying Operations;
- the Head of Aircraft Airworthiness and Maintenance Control;
- the Head of Training and Checking; and
- others (for example, the Safety Manager).

3.3.6 Depending on the size and complexity of operations, additional safety accountabilities may be explicitly defined for other senior managers. For example:

- General Manager/Chief Operating Officer;
- Head of Ground Services;
- Head of Cabin Safety;
- Head of Operations; and/or
- Head of Customer Services.

3.3.7 As the manager responsible for the SMS, the SM will need to work with the management team to meet the objectives of the SMS. The structure of the organisation needs to be documented so that everyone understands their role and responsibilities. The SM is responsible to the CEO, who is ultimately accountable for the operation of the SMS. When formalising the organisation structure, it is important to remember that the SM needs direct access to the CEO.

3.3.8 To demonstrate their ongoing support for the SMS, program managers should:

- ensure due processes and procedures needed for safe operations are in place;
- ensure sufficient resources are in place to support the SMS; and
- continually monitor their areas of responsibility, as outlined in the SMS Manual.

3.4 Appointment of key safety personnel

Large Organisations — A large organisation may have a dedicated Safety Department, led by a Head of Safety Management. There would be scope within the department to appoint a deputy SM, and additional personnel as required.

Medium Organisations — A medium sized organisation may have a separate SM, possibly with a small number of staff. There would be scope for one of the ‘Safety Representatives’ to be appointed as deputy when required. The Safety Representative could be a front line staff member.

3.4.1 SM — Roles, Responsibilities and Qualifications: Depending on the size of the organisation, the SM should possess operational management experience and an adequate technical background to understand the systems that support operations. Operational skills alone will not be sufficient. The SM should have a sound understanding of safety management principles, typically acquired through formal training and practical experience.

3.4.1.1 Depending on the size of the organisation, senior management should appoint a SM who, irrespective of other duties, will have responsibilities and authority that includes:

- ensuring that processes needed for the SMS are established, implemented and maintained;
- reporting to the CEO on the performance of the SMS and the areas where improvement is required; and
- ensuring the promotion of awareness of safety requirements throughout the organisation.

3.4.1.2 The SM should be the catalyst to develop and mature the SMS over time, through engagement with the organisation’s executive; management at all levels; and operational staff.

3.4.1.3 The SM is responsible for accomplishing tasks and functions of the SMS. The role and responsibilities of the SM are specified in the SMS Manual.

3.4.1.4 The SM reports directly to senior management. The SM may have staff to assist in the role.

3.4.1.5 The SM needs to be ‘independent’ from operational areas, and have the ability to report directly to the CEO. A formal reporting line direct to the CEO gives the SM the ‘authority’ to look across the organisation from the safety perspective.

3.4.1.6 Where possible, the SM should be assisted by safety representatives from each department or functional area.

Safety Responsibilities

3.4.1.7 The SM is **not** the sole person responsible for safety. Specific safety activities and functional or operational safety performance outcomes are the responsibility of the relevant operational or functional managers, and senior management should not hold the SM accountable for line managers' responsibilities. The SM should monitor all cross functional or departmental SMS activities to ensure their relevant integration. While the SM may be held accountable for the satisfactory administration and facilitation of the SMS itself, they should not be held accountable for the safety performance of the organisation — the CEO alone is accountable.

3.4.1.8 The SM is responsible for, but not limited to:

- drafting the SMS Manual;
- implementing, maintaining, reviewing and revision of the SMS;
- regular evaluation, reviews and fine tuning of the safety programme;
- providing safety advice to management and staff;
- providing timely advice and assistance on safety matters to managers, staff and contractors at all levels;
- communicating with Heads of Departments on safety related issues;
- promoting safety awareness and a positive safety culture;
- liaison with CASA and the Australian Transport Safety Bureau (ATSB) on safety-related issues;
- exchange of valuable lessons learned with other operators;
- researching and sharing safety related information with other key safety personnel in the organisation;
- if delegated by the CEO, chairing the safety committee/Safety Review Board;
- incident and accident investigations;
- managing immunity-based reporting systems (confidential reports);
- monitoring the progress of safety reports and ensuring that hazards are addressed in a timely manner;
- maintaining an appropriate reporting system to identify hazards, which includes the ongoing identification and management of hazards;

- overseeing the reduction of hazards to ensure that they are ALARP;
- maintaining safety documentation;
- ensuring SMS induction and recurrent training are conducted in accordance with the SMS Manual;
- identifying ongoing safety training requirements to support the SMS programme objectives;
- overseeing the internal and external SMS audit programmes;
- emergency response planning; and
- maintaining the Emergency Response Plan (ERP).

Qualifications

3.4.1.9 The SM's qualifications and attributes may include the following:

- broad operational knowledge and experience in the functions of an aviation organisation (including engineering, cabin services, ground and flight operations);
- sound knowledge of safety management principles and practices;
- sound knowledge and understanding of HF;
- good written and verbal communication skills;
- well-developed interpersonal skills;
- sound computer literacy;
- the ability to relate to all levels, both inside and outside the organisation;
- organisational ability;
- capable of working unsupervised;
- good analytical skills;
- leadership skills and an authoritative approach;
- worthy of respect among peers and management;
- instructional qualifications and experience eg. Certificate IV in Workplace Training and Assessment;
- knowledge of documentation systems; and
- good understanding of aviation operations.

Personal Traits

3.4.1.10 Ideally, the SM should possess qualities such as:

- fairness;
- assertiveness;
- impartiality;
- trustfulness;
- integrity;
- excellent communication skills; and
- objective thinking.

3.4.1.11 The SM should be a person who is approachable, convincing, who remains composed in adverse situations and above all is tenacious. Successful safety culture change related to SMS implementation takes time and ongoing commitment by the program manager.

3.4.1.12 If the SM lacks credibility, so will the SMS and the behaviour and attitude of staff will tend to be negative.

Training

3.4.1.13 The person selected as the SM will need to be familiar with most aspects of the organisation, its activities and personnel. These requirements may be met in-house or from external courses, however, much of the SM's knowledge will be acquired by self-education.

3.4.1.14 Areas where SMs may require formal training include:

- HF principles;
- integration of HF into an SMS;
- understanding the role of human performance in accident prevention and causation;
- familiarisation with different fleets, types of operations, routes, etc.;
- development, implementation, operation and maintenance of an SMS;
- accident and incident investigation;
- crisis management and emergency response planning;
- safety promotion;
- communication skills;
- computer skills such as word-processing, spreadsheets and database management; and

- specialised training or familiarisation in, for example, Crew Resource Management (CRM), Threat and Error Management (TEM), Fatigue Risk Management Systems (FRMS), Line Operations Safety Audit (LOSA) and accident and incident investigation.

3.4.2 Deputy SM

3.4.2.1 Importantly, operators need to give due consideration to deputising the SM's role during periods of absence or depending on the size and complexity of the organisation.

3.4.3 Safety Committee and Action Groups

3.4.3.1 If the organisation is large and complex then it is expected that there would be more than one group set up to support the SMS program objectives. Typically, this would be a high level Safety Committee (Safety Review Board (SRB)) to oversee the SMS program, and one or more Safety Action Groups (SAGs) who take strategic direction from the Safety Committee. Smaller and less complex organisations may only need to establish a Safety Committee.

3.4.3.2 For the operational aspects of these groups, see the section of this CAAP titled 'Safety Assurance' in Section 7.

3.4.4 Safety Committee (Safety Review Board (SRB))

3.4.4.1 A high level Safety Committee or SRB would normally be necessary for functional or senior management involvement on safety policy, overall system implementation and safety performance review purposes. Membership and level of participation in the safety committee would depend on the size and structure of the organisation. The CEO, as the Accountable Manager, should chair (see note* following) this committee with representation from all relevant functional areas of the organisation.

3.4.4.2 A Safety Committee would typically consist of the Accountable Manager, the SM and other members of the senior management team. The objective of the Safety Committee is to provide a forum to discuss safety issues and the overall health and direction of the SMS. Terms of reference for the safety committee should be documented in the SMS manual. Roles of the Safety Committee may include:

- making recommendations or decisions concerning safety policy and objectives;
- defining safety performance indicators and setting safety performance targets for the organisation;

- reviewing safety performance and outcomes;
- providing strategic directions to departmental SAGs – if established;
- directing and monitoring the initial SMS implementation process; and/or

Note: Should the Accountable Manager choose to assign this task to an appropriate senior person, it should be clearly stated and substantiated in the SMS manual that they are performing the task on behalf of the Accountable Manager whose accountability for safety is not compromised and that the CEO remains accountable for all decisions of the Safety Committee/SRB.*

3.4.4.3 The membership of the Safety Committee/SRB may, for example, comprise:

- CEO (chair);
- Head of Safety Department/Safety Manager (secretary).
- key personnel required under the AOC; and/or
- other specified senior managers as required.

3.4.5 Safety Action Group

3.4.5.1 Safety Action Groups are accountable to, and take strategic directions from, the Safety Committee. Managers and supervisors from a given functional area would be members of the SAG for that area. The functional head of that area should chair the SAG. The role of the SAGs would include:

- overseeing operational safety within the functional area;
- managing the area's hazard identification activities;
- implementing mitigation or corrective actions relevant to the area;
- assessing the impact of safety on operational changes and activating hazard analysis process as appropriate;
- maintenance and review of relevant performance indicators; and
- managing safety training and promotion activities within the area.

3.4.5.2 Departmental SAGs may wish to appoint 'SMS Coordinators' to facilitate the department's SMS activities.

3.5 SMS Implementation Plan

3.5.1 The SMS implementation plan should detail all aspects of the development and implementation of the SMS. It is expected that the SMS program will mature over time through a process of continuous improvement.

3.5.2 The implementation plan should address all the areas covered in the SMS Manual with particular attention being given to safety strategy, safety objectives, safety management processes and activities, resource implications, training, safety promotion and time lines.

3.5.3 The planning (or establishment) group may be able to build upon existing strengths by reviewing the organisation's current capabilities for safety management (including experience, knowledge, processes, procedures, resources, etc.). Shortcomings in safety management experience should be recognised and resources to assist in development and implementation of the SMS identified. Many operational units may already have internal procedures in place for the investigation of incidents, hazard identification, safety monitoring, etc. These should be reviewed and perhaps modified for integration within the SMS. It is important that the organisation re-use as many existing procedures as practicable, as there is no need to replace known and effective procedures and processes. By building on such an experience base, the development of an SMS will be less disruptive.

During this review process, the planning group should also examine best industry practices for safety management by consulting with other organisations of similar size and mission.

3.5.4 An organisation should consider a phased approach to SMS implementation. A suggested approach is outlined in the table below.

ELEMENTS	PHASE 1	PHASE 2	PHASE 3
Safety Policy, Objectives and Planning			
Management commitment and responsibility	x		
Safety accountabilities of managers	x		
Appointment of key safety personnel	x		
SMS implementation plan	x - (including gap analysis)		
Third party interface		x	
Coordination of the Emergency Response Plan		x	
Documentation	x		
Safety Risk Management			
Hazard identification process		Proactive/predictive hazard identification	
Risk assessment and mitigation process	Reactive	Proactive and predictive	
Safety Assurance			
Safety performance monitoring and measurement	Reactive – incident and accident investigation		
Internal safety investigation	x		
The management of change			x
Continuous improvement of the safety system			x
Safety Promotion			
Training and education	Key personnel	All safety critical personnel	All safety critical personnel
Safety communication		x	x

CAO 82.3 transition (phased approach)

Implementation Plan: 6 months from effective date

Phase 1 complete by 1 February 2010

Phase 2 complete by 1 July 2010

Phase 3 complete by 1 February 2011

Note: or as per an agreed timetable with CASA

CAO 82.5 transition (phased approach)

Phase 1 complete by 1 July 2009

Phase 2 complete by 1 February 2010

Phase 3 complete by 1 July 2010

Note: or as per an agreed timetable with CASA

Gap Analysis and Project Plan

3.5.5 Organisations would need to conduct a gap analysis of their system(s) to determine which components and elements of a safety management system are currently in place, and which components or elements should be added or modified to meet SMS as well as regulatory requirements. The review involves comparing the SMS components and elements against the existing systems in the organisation.

3.5.6 A checklist may be used to account for each component and their respective sub-elements. The checklist can provide for a 'Yes' and 'No' response, in terms of the compliance of the existing system, to the SMS requirements. Remarks for partial compliance or deviations should be made as well as actions required in order to meet the criteria. There should be a column for annotating existing organisation documentation where the requirement is addressed.

3.5.7 Once the gap analysis is complete and fully documented, the items identified as missing or deficient will form the basis of the SMS implementation plan. Organisations may format their implementation plan to suit their individual needs.

3.6 Third Party Interfaces – Contracted Activities

3.6.1 The provision of services supporting flight operations often involves third party interfaces (service providers, contractors, suppliers) in such areas as refuelling; catering and other aircraft ground services; aircraft, aircraft maintenance and overhaul; runway and taxiway construction and repair; crew training; flight planning, flight dispatch and flight following.

3.6.2 Whether a large corporate contractor or small business, the contracting authority (e.g. an airline) holds overall responsibility for the safety of services provided by the contractor. The contract or SLA should specify the safety standards to be met. The contracting authority then has the responsibility for ensuring that the contractor complies with the safety standards prescribed in the contract.

3.6.3 A SMS should ensure that the level of safety of an organisation is not eroded by the inputs, services and supplies provided by external organisations.

3.6.4 The operator should consider the third party's previous safety record and any regulatory breaches. In addition, the operator should ensure that the third party understands the operator's SMS and their responsibilities relating to it. These factors should be given equal weight with other considerations like price, quality and timely delivery.

3.6.5 As a general guideline, a third party contract should include the following as a minimum standard:

- any agreement for the provision of services should be supported by a written contract prior to services commencing;
- all third party providers should hold the appropriate qualifications/credentials or approvals for the work being outsourced;
- all third parties should understand the operator's SMS, and their own responsibilities within the SMS program. The AOC Holder must have a demonstrable process to assure themselves that the third party is aware of, and meeting these requirements;
- all third party organisations should be able to demonstrate their ability to provide trained and competent staff (training could be provided by the AOC holder). Where practicable, this training should include relevant Human Factors training and assessment as outlined in CAAP SMS-2(0) and CAAP SMS-3(0);
- all written service level agreements should contain a schedule of oversight to monitor the third party's performance on a regular basis;
- all agreements should contain details on how any noted safety hazards and deficiencies will be addressed and the time frame for these actions (risk management process as outlined in this CAAP); and
- where a service being provided is conducted under a licence or certificate approved by CASA, the written agreement should contain a statement requiring the third party to advise the contracting organisation of any regulatory action undertaken by CASA that may impact on the third party's ability to provide the required services.

3.7 Co-ordination of the Emergency Response Plan

3.7.1 An ERP is an integral part of the SMS, and is activated in the event of a major occurrence. The ERP is designed to ensure the following is in place prior to an adverse event occurring:

- orderly and efficient transition from normal to emergency operations;
- delegation of emergency authority;
- assignment of emergency responsibilities;
- authorisation by key personnel for actions contained in the plan;

- co-ordination of efforts to cope with the emergency;
- safe continuation of operations or return to normal operations as soon as possible;
- planned and co-ordinated action to ensure the risks attributable to a major safety event can be managed and minimised.

3.7.2 The ERP could be documented in a separate manual or incorporated into the organisation's SMS Manual.

3.7.3 The minimum elements to be included in an ERP are as follows:

- purpose of the ERP;
- activation of the organisational ERP;
- external agency interface (for example, aerodrome ERP, ATSB, CASA, coroner);
- passenger and crew welfare;
- casualty and next-of-kin co-ordination;
- accident investigation;
- organisation ERP response – accident site;
- preservation of evidence;
- media relations;
- claims and insurance procedures;
- aircraft wreckage removal; and
- emergency response training.

3.8 Documentation – SMS Manual

3.8.1 The component elements of the SMS manual should incorporate the requirements covered throughout this CAAP. It is an important management function to provide direction and guidance to managers and staff in an organisation on how the organisation intends to conduct its business based on safety management principles.

3.8.2 The primary function of the safety management documentation is to provide management with the ability to effectively communicate the organisation's approach to safety to the whole organisation. The following components and elements need to be documented:

- Safety policy, objectives and planning:
 - management commitment and responsibility;
 - safety accountabilities of managers;
 - appointment of key safety personnel;
 - SMS implementation plan;
 - third-party interfaces – contracted activities;

- coordination of the emergency response plan; and
- documentation.
- Safety risk management:
 - hazard identification processes; and
 - risk assessment and mitigation processes.
- Safety assurance:
 - safety performance monitoring and measurement;
 - internal safety investigations;
 - the management of change; and
 - continuous improvement of the safety system.
- Safety training and promotion:
 - training and education; and
 - safety promotion.

3.8.3 The documentation should be written so that it reflects the intent and processes of the SMS. Thus, a change to the SMS will require an update of the SMS Manual.

3.8.4 To facilitate easy comprehension and application, the content of the SMS Manual should be concisely written.

3.8.5 Any information that changes regularly should be put into annexes/appendices. This includes, for example, names of personnel assigned specific safety responsibilities.

3.8.6 The amendment and distribution of SMS documentation needs to be controlled.

3.8.7 CASA will provide a web-based Manual Authoring and Assessment Tool to assist organisations in the authoring of their SMS Manual.

4. Safety Risk Management

4.1 Introduction

4.1.1 Australian/New Zealand Standard (AS/NZS) 4360 Risk Management defines Risk Management as:

‘The culture, processes and structures that are directed toward realising potential opportunities whilst managing adverse effects’

4.1.2 The process of risk management involves establishing an appropriate infrastructure and culture and applying a logical and systematic method of establishing the context, identifying, analysing, evaluating, treating, monitoring and communicating risks associated with any activity, function or process in a way that will enable organisations to minimise losses and maximise gains.

4.1.3 Risk management can be applied at many levels in an organisation. It can be applied at the strategic level and operational levels.

4.1.4 In very broad terms, the objective of risk management is to eliminate risk where practical or reduce the risk (probability/consequence) to acceptable levels, and to manage the remaining risk so as to avoid or mitigate any possible undesirable outcome of the particular activity. It is therefore integral to the development and application of an effective SMS.

4.1.5 Organisations pursuing a pro-active strategy for safety risk management believe that the risk of accidents or incidents can be minimised by identifying vulnerabilities and by taking the necessary actions to reduce the risk of adverse consequences arising from them.

4.1.6 Generic guidance provided in this CAAP for managing operational risk and its integration into an SMS is essentially based upon AS/NZS 4360 (2004).

4.1.7 The specific design, integration and implementation of the safety risk management system will be influenced by, and dependent on, the requirements of the individual operator, its processes, policies, practices and SMS.

Risk criteria and the concept of 'ALARP'

4.1.8 Where risk is concerned, there is no such thing as absolute safety. Risk management systems are often premised on the concept of ALARP. In doing so, there is an acceptance that not all risk can or should be eliminated. There are practicable limits to which the aviation industry is able to go and the extent to which the industry and the community will pay to reduce adverse risks.

4.1.9 The principle of managing risk to a level that is ALARP is as follows:

- There is an upper level of risk that is deemed to be intolerable. If a risk is found to be intolerable, risk reduction measures are essential, regardless of cost;
- There is a lower level of risk that is deemed to be broadly acceptable. At this risk level (and below), maintain current systems and monitor and review the risk. Further risk reduction may be made, but only if the cost is insignificant; and
- The ALARP region lies between the upper and lower levels of risk. If risk falls into this region, it should be reduced as much as is reasonably practicable.

4.1.10 In the ALARP region, risk reduction measures should be identified and evaluated in terms of cost and possible risk benefit. Any risk falling within the ALARP range should be assessed and reduced unless the cost of reducing the risk is grossly disproportionate to the benefit gained. This comparison may be a quantitative one, or based on qualitative arguments.

4.1.11 The ALARP principle is illustrated below.

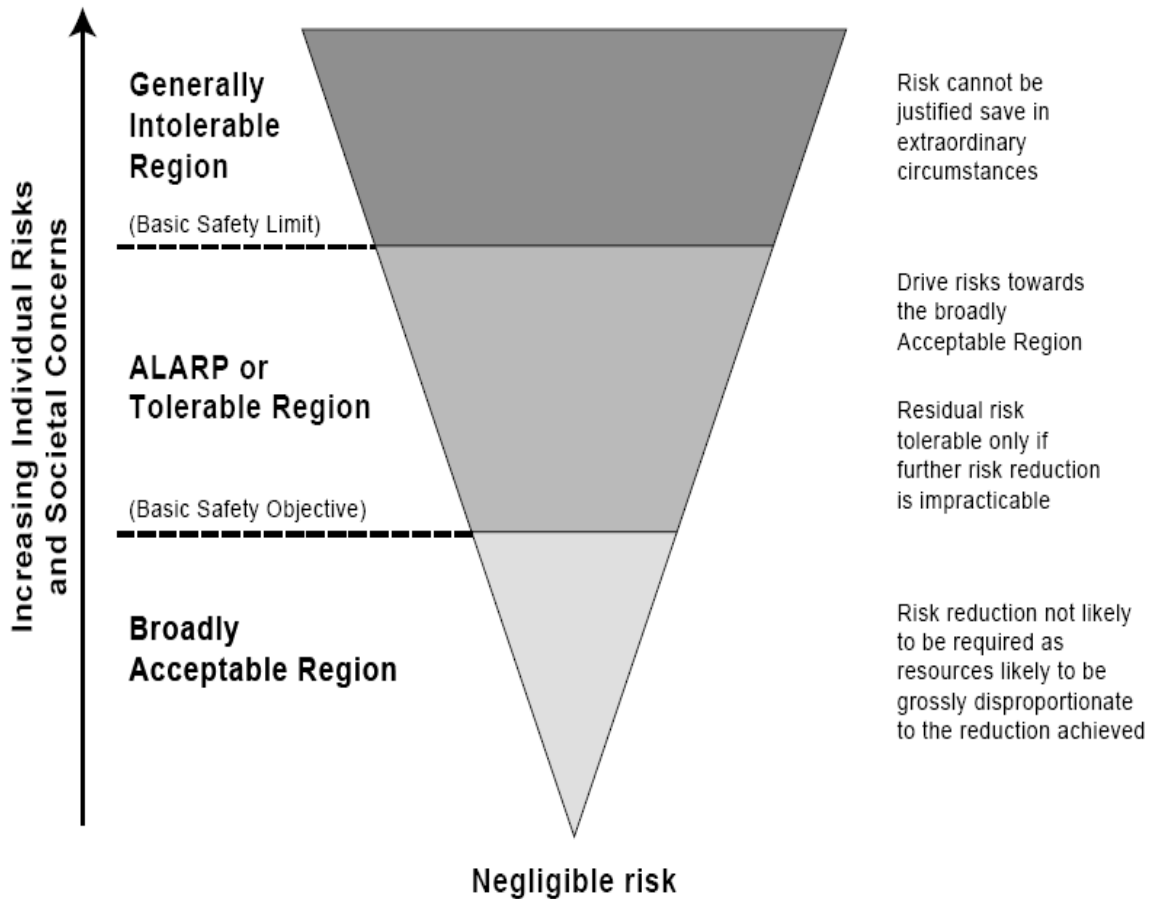


Figure 2: ALARP

4.1.12 The risk can only be said to be ALARP when it can be demonstrated that all justifiable risk reduction measures have been considered and the remaining mitigation strategies cannot be justified.

4.1.13 The ALARP principle operates in an environment of continuous improvement. Both the risks and the methods of control change and evolve over time and consequently require a continual reassessment as to which risk, and their respective treatments, are reasonable to sustain and which are not.

4.2 Hazard Identification Processes

4.2.1 Hazards can combine in unforeseeable ways, so that even apparently trivial hazards can result in undesirable outcomes which may have catastrophic results.

4.2.2 Consequently the starting point for the whole safety risk management process should be establishment of the context and hazard identification. A systematic and comprehensive hazard identification process is critical, because hazards not identified at this stage may be excluded from further risk analysis and treatment.

4.2.3 Hazards can be identified from a range of sources including, but not limited to:

- brain-storming using experienced operational personnel;
- development of risk scenarios;
- trend analysis;
- feedback from training;
- flight data analysis programs;
- safety surveys and operational oversight safety audits;
- monitoring of normal operations;
- state investigation of accidents and serious incidents; and
- information exchange systems (similar operators, regulators, etc.).

4.2.4 Over time, the ‘database’ of reported hazards enables the organisation to:

- identify ‘hot spots’ that need particular attention; and
- conduct trend analysis which can provide the basis for improvement of hazard identification.

Hazard and Occurrence Reporting

4.2.5 Every event is an opportunity to learn valuable safety lessons. The lessons will only be understood, however, if the event is analysed so that all employees, including management, understand not only what happened, but also why it happened. This involves looking beyond the event and investigating the contributing factors, the organisation and HF within the organisation that played a role in the event.

4.2.6 To enable analysis and organisational learning, the organisation should maintain procedures for the internal and external reporting and recording of incidents, hazards and other safety-related issues. The collection of timely, appropriate and accurate data will allow the organisation to react to information received and apply the necessary corrective action to prevent a recurrence of the event.

Statutory Reporting Requirements

4.2.7 Organisations are required to meet statutory reporting requirements under the *Transport Safety Investigation Act 2003*. Reportable matters are categorised as Immediately Reportable Matters (IRM) and Routine Reportable Matters (RRM).

4.2.8 IRM and RRM are required to be reported to the ATSB. IRM and RRM are events relating to an organisation's operations, and therefore need to be included in the organisation's internal reporting system.

4.2.9 Reportable Matters can be entered into the organisation's Internal Reporting System (IRS) database along with any other matters reported through the company's IRS (for example, hazards).

Key Elements – Internal Reporting System

4.2.10 An IRS is a method of gathering valuable safety information from the people who are probably aware of a range of hazards in an organisation – the staff.

4.2.11 An organisation's IRS should encompass the following fundamental elements:

- procedures for reporting occurrences (including IRM and RRM), hazards, or safety concerns;
- methods for the collection, storage and distribution of data (hazard register or log);
- procedures for analysing data, safety reports and any other safety related information;
- documentation of corrective action and risk reduction strategies;
- determination of the effectiveness of corrective action; and
- ongoing monitoring and review.

4.2.12 The IRS should be accessible by all operational safety-critical personnel and be user-friendly.

Safety Surveys

4.2.13 Safety surveys provides managers and staff the opportunity to respond to questions about various safety related matters. The results of such surveys can be analysed to provide cost effective identification of hazards and safety concerns. Surveys may be conducted using electronic or paper-based checklists, questionnaires or interviews.

4.2.14 A Safety survey can be used to establish an organisational benchmark and then be re-used as a way of measuring improvement over a period of time.

4.2.15 When conducting safety surveys, the following points should be considered:

- affected managers and staff should be told before the survey starts;
- affected managers and staff should receive an assurance of confidentiality regarding the information volunteered through the survey;
- any perception of bias should be avoided;
- surveys should not be used too often or they may start to be ignored;
- when conducting a survey interview, avoid criticism of the person being interviewed; and
- hearsay and rumour need to be substantiated before being accepted.

4.3 Risk Management and Mitigation Process

4.3.1 Safety Risk Management is a formal process that is used to:

- identify hazards associated with an organisation's operations;
- analyse and assess the risks associated with those hazards;
- implement controls, to prevent future accidents, incidents or occurrences.

Note: AS/NZS 4360: (2004) outlines the following as the main elements of the risk management process. Other guidance materials and standards may differ with regard to terminology; however, the elements described are generally accepted as essential to a comprehensive and defensible risk management system.

The main elements of the risk management process, as illustrated in Figure 3, are as follows:

(a) Communicate and consult

Communicate and consult with internal and external stakeholders as appropriate at each stage of the risk management process and concerning the process as a whole.

(b) Establish the context

Establish the external, internal and risk management context in which the rest of the process will take place. Criteria against which risk will be evaluated should be established and the structure of the analysis defined.

(c) Identify risks

Identify where, when, why and how events could prevent, degrade, and/or delay the achievement of safety objectives. Sometimes referred to as a Hazard Identification process, this encompasses a number of methodologies in identifying potential threats and past failures in order to determine the extent of the risks associated. Part of this process may include the establishment of a hazard log/register to ensure that hazards are tracked and treated as part of a formal process of prioritisation, documentation and assessment.

(d) Analyse risks

Determine consequences and likelihood of the event and therefore the level of risk. Identify and evaluate existing controls (measures in place that control the hazard or reduce the likelihood of occurrence or consequence). This analysis should consider the range of potential consequences (both commercial and operational) and how these could occur. The determination may be the result of employing either qualitative, quantitative analysis techniques, or a combination of the two (semi-quantitative).

(e) Evaluate risks

Compare estimated levels of risk against the pre-established criteria of acceptability and consider the balance between potential benefits and adverse outcomes. This enables decisions to be made about the extent and nature of treatments required and about priorities.

(f) Treat/Mitigate risks

Develop and implement specific cost-effective strategies and action plans for increasing potential benefits and reducing potential costs and losses.

(g) Monitor and review

It is necessary to monitor the effectiveness of all steps of the risk management process. This is important for continuous improvement. Risks and the effectiveness of treatment measures need to be monitored to ensure changing circumstances do not alter priorities.

Figure 3: Risk Management Process—Overview

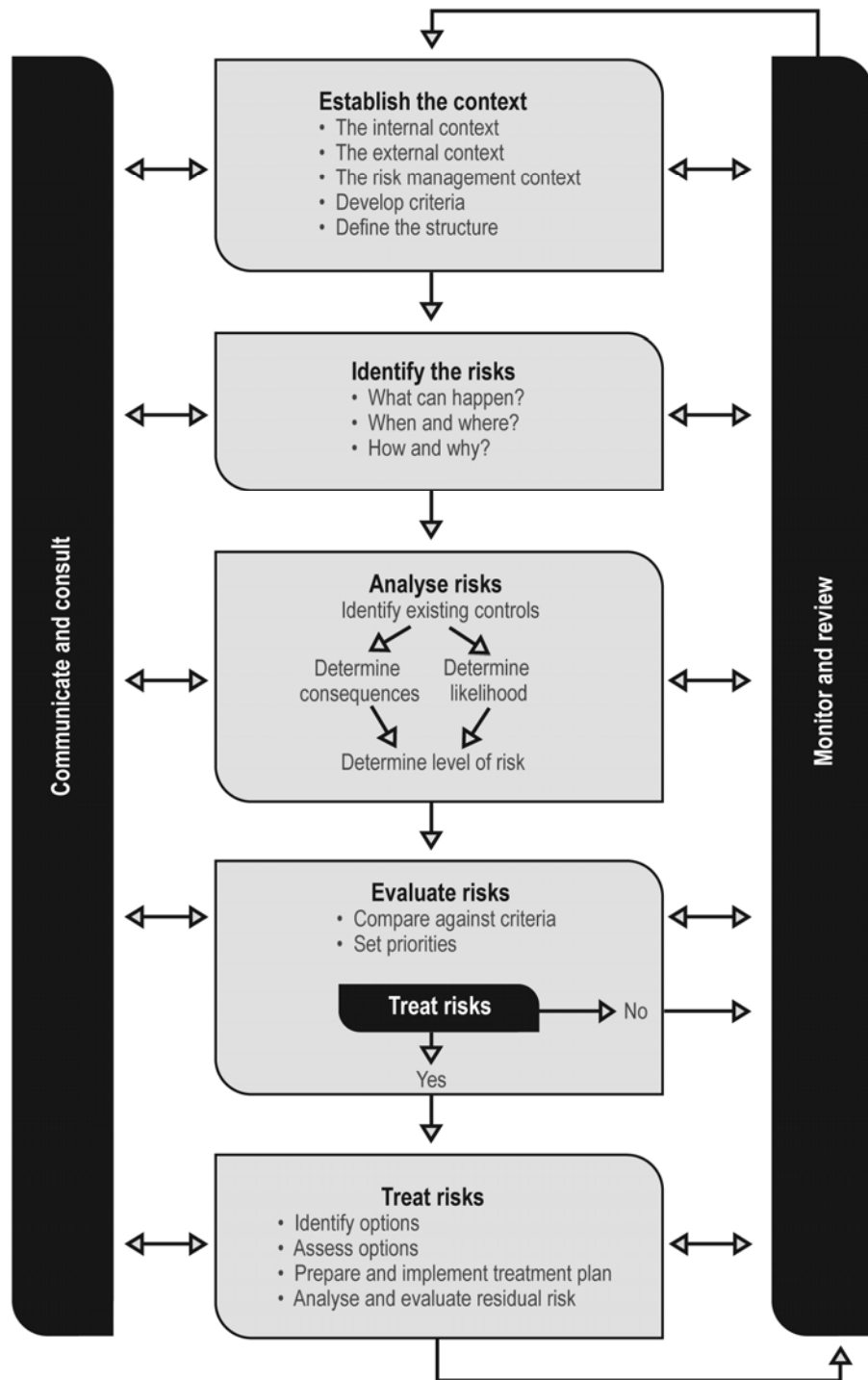


Figure 3: Risk Management Process – Overview

Source: AS/NZS 4360(2004)

4.3.2 A formal record of each stage of the risk management process should be initiated and kept. Assumptions, methods, data sources, analyses, results and reasons for decisions should all be documented.

5. Safety Assurance

5.1 Introduction

5.1.1 Safety assurance within the organisation should be monitored and reviewed by a range of formal safety review processes, initiated through senior management and the Safety Department/Safety Manager. This oversight can be used to confirm the effective functioning of the SMS as documented.

Systems to Achieve Safety Oversight

5.1.2 The following elements are desirable:

- a system for analysing flight recorder data for the purpose of monitoring flight operations and for detecting unreported safety events¹;
- an organisation-wide system for the capture of written safety event/issue reports;
- a planned and comprehensive safety audit review system which has the flexibility to focus on specific safety concerns as they arise;
- a published system for the conduct of internal safety investigations, the implementation of remedial actions, and the communication of such information;
- systems for effective use of safety data for performance analysis and for monitoring organisational change as part of the risk management process;
- arrangements for ongoing safety promotion based on the measured internal safety performance and assimilation of experience of other operations;
- periodic review of the continued effectiveness of the safety management system by an internal, independent body; and

¹ Note: With the introduction of CASR Part 119, for all aeroplane operations above 27,000 kg Maximum Certified Take-Off Mass it is proposed that an additional requirement for operators to establish and maintain a Flight Data Analysis Program (FDAP) will be implemented. The flight data analysis program should contain adequate safeguards to protect the source(s) of data, and ensure no punitive action is taken against a person who reports data.

- line managers monitoring work in progress in all safety critical activities to confirm compliance with all regulatory requirements, organisational standards and local procedures.

5.2 Safety Performance Monitoring and Measurement

5.2.1 Safety management requires feedback on safety performance to complete the safety management cycle. Through feedback, system performance can be evaluated and any necessary changes effected. In addition, all stakeholders require an indication of the level of safety within an organisation for various reasons, for example:

- staff may need confidence in their organisation's ability to provide a safe working environment;
- line management requires feedback on safety performance to assist in the allocation of resources between the often-conflicting goals of production and safety;
- passengers are concerned with their own personal safety;
- senior management seeks to protect the corporate image (and market share); and
- shareholders wish to protect their investment.

5.2.2 The size and complexity of the organisation will determine the best methods for establishing and maintaining an effective safety performance monitoring program. Organisations providing adequate safety oversight employ some or all of the following methods:

- by establishing an effective hazard and occurrence reporting system
- their front-line supervisors maintain vigilance (from a safety perspective) by monitoring day-to-day activities;
- they regularly conduct inspections (formal or informal) of day-to-day activities in all safety-critical areas;
- they sample employees' views on safety (from both a general and a specific point of view) through safety surveys;
- they systematically review and follow up on all reports of identified safety issues;
- they systematically capture data which reflect actual day-to-day performance (using programs such as Flight Data Analysis (FDA), LOSA and Normal Operations Safety Survey (NOSS));

- they conduct macro-analyses of safety performance (safety studies);
- they follow a regular operational audit program (including both internally and externally conducted safety audits); and
- they communicate safety results to all affected personnel.

5.3 Internal Safety Investigation

5.3.3 For every accident or serious incident, there will likely be hundreds of minor events or near-misses, many of which have the potential to become an accident. It is important that all reported events/hazards be reviewed and a decision taken on which ones should be investigated, and how thoroughly.

5.3.4 The Organisational Safety Policy/SMS Protocols would need to state that the purpose of internal investigations is to find systemic causes and implement corrective actions, **NOT** to apportion blame to individuals. Where a 'Just Culture' policy is in place, the Policy and Protocols for internal investigations should clearly reference such policy.

Investigation Management

5.3.5 Where the ATSB conducts an investigation into an organisation event, the SM, or delegate, would act as the organisation's point of contact/coordinator for the investigation. This way the SM will be kept informed as the investigation progresses.

5.3.6 Resources are normally limited, thus the effort expended should be proportional to the perceived benefit in terms of potential for identifying systemic hazards and risks to the organisation.

5.3.7 The accountability for the management of internal safety investigations should be documented in the organisation's SMS specifically to determine:

- the scope of the investigation;
- the composition of the investigation team including specialist assistance if required;
- that the investigation outcomes are recorded for follow-up trend analysis; and
- that there is a timeframe for completion.

5.3.8 The accountable person in charge of the investigation should have the authority to:

- interview any manager or staff member; and
- access any company information source.

Scope of Safety Investigations

5.3.9 The extent of the investigation will depend on the actual and potential consequences of the event or hazard. This can be determined through an initial risk assessment. Reports that demonstrate a high potential should be investigated in greater depth than those with low potential.

5.3.10 The investigative process should be comprehensive and should attempt to address the factors that contributed to the event, rather than simply focusing on the event itself – the active failure. Active failures are the actions that took place immediately prior to the event and have a direct impact on the safety of the system because of the immediacy of their adverse effects. They are not, however, the root causes of the event; applying corrective actions to these issues may not address the real cause of the problem. A more detailed analysis is required to establish the organisational factors that contributed to the event.

Internal Safety Investigation Process

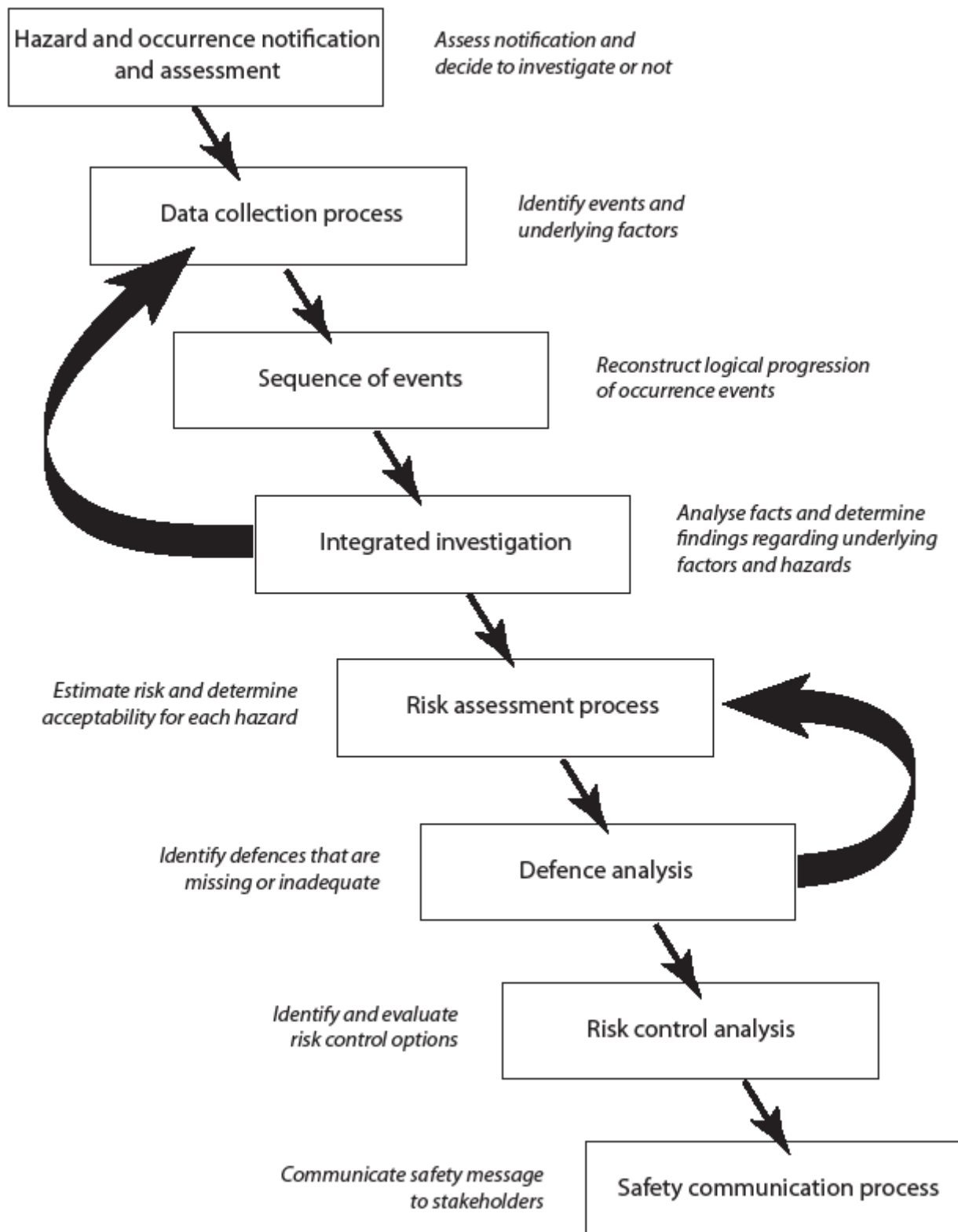


Figure 4: Integrated Safety Investigation Methodology

5.4 Change Management

5.4.1 Changes within an organisation can result in the creation of hazards which can impact on safety. In the main, changes are made to meet business demands, and organisations need the flexibility to meet those requirements. However, whilst the changes need to be made effectively and efficiently, the main focus needs to be on implementing the changes safely.

5.4.2 The organisation should identify the changes likely to occur in the business which would have a noticeable impact on:

- resources – material and human;
- management direction – processes, procedures, training; and
- management control.

5.4.3 Change may create the potential for adverse safety outcomes. Typical areas that would require the application of change management procedures include:

- new schedule(s);
- new port(s);
- new type(s) of operation;
- addition of a new aircraft type;
- addition of extra aircraft of the same or similar type;
- introduction of new equipment and/or operational procedures;
- change in key personnel; and
- restructure of operational department(s).

5.4.4 The operator's SMS documentation should identify those changes that necessitate formal risk management processes, including HF issues. Also refer to the *Integration of Human Factors into SMS* in CAAP SMS-2(0).

5.5 Continuous improvement of the safety system

5.5.1 Continuous improvement of the safety system requires management of two major components:

- maintenance – the objective of which is to maintain current technological, managerial, and operating standards, and
- improvement – which is aimed at improving current standards.

5.5.2 Under the maintenance function, the SM should first establish a SMS that includes policies, rules, directives and standard operating procedures (SOPs) and then work towards ensuring that everybody follows SOPs. To achieve this, a combination of discipline and human resource development measures need to be employed.

Note: With the future introduction of CASR Part 119 it is proposed that these SOPs will be identified in the organisation's Exposition.

5.5.3 Under the improvement function, management will be required to work continuously towards revising the current processes, in response to changing needs, operational environment or standards.

Management Review

5.5.4 Formal management reviews of the SMS should occur on a regular basis. Ideally, there would be a quarterly high level review process via the Safety Committee/SRB to ensure:

- that the SMS continues to meet its core safety objectives;
- safety performance is monitored against objectives; and
- identified hazards are addressed in a timely and appropriate manner.

5.5.5 Following the formal management review, there should be a periodic SAG review process at line management level to include, for example:

- monitoring and reporting on safety management activities by SAG/Safety Committee;
- measuring and reporting on safety management performance;
- reporting on change management issues;
- reporting on resource issues; and
- reporting on safety training performance.

Note: For less complex organisations, this could be combined into a single process.

5.5.6 A safety review validates the SMS, confirming not only that people were doing what they were supposed to be doing, but also that their collective efforts have achieved the organisation's safety objectives. Through regular review and evaluation, management can pursue continuous improvements in safety management and ensure that the SMS remains effective and relevant to the organisation's operation.

5.5.7 Based on the SMS review, recommendations could include:

- changed SMS objectives;
- changed safety goals/targets;
- improved SMS processes/procedures; and/or
- an implementation plan for improvement changes.

6. Safety Training and Promotion

6.1 Training and Education

6.1.1 The key function of safety management training is to create awareness of the objectives of the SMS of the organisation and the importance of developing a positive safety culture.

6.1.2 The SMS training should focus on both the identification and reduction of hazards in the system, and the importance of the human component in achieving this.

Training Requirements

6.1.3 As part of the implementation of training in SMS, a Training Needs Analysis (TNA) should be undertaken for all operational safety critical personnel in the organisation.

6.1.4 Depending on the nature of the task, the complexity of safety management training required will vary from:

- safety management awareness training for all staff;
- training aimed at management's safety responsibilities;
- specific training for operational staff (such as flight crew, operations staff, tarmac staff, Licensed Aircraft Maintenance Engineers (LAMEs)/ Aircraft Maintenance Engineers (AMEs), etc; and
- detailed training for safety specialists (such as the Safety Manager, Safety Representatives, and Flight Data Analysts).

Training Documentation

6.1.5 Documentation should be developed to support the SMS training plan, which includes:

- a listing of the personnel (staff and third party personnel) who require SMS training;
- a means of determining when each staff member is due to undergo a specific safety training course;

- a method of determining the training provided to each member of staff;
- safety induction course/s for staff who have not previously been exposed to an SMS;
- recurrent safety course/s for all operational safety critical personnel; and
- a means of determining the effectiveness of the safety training provided. e.g. feedback questionnaire.

6.1.6 An SMS training register which incorporates individual training records should be established and maintained. This may be incorporated in a centralised training record system.

Initial Safety Training – All Staff

6.1.7 All staff should receive an appropriate induction course covering, for example:

- HF elements supporting SMS (see CAAP SMS-3(0) titled Human Factors Training and NTS Assessment for RPT Operations);
- basic principles of safety management;
- corporate safety philosophy, safety policies and safety standards (including corporate approach to disciplinary action versus safety issues, integrated nature of safety management, risk management decision-making, safety culture, expected behaviours etc.);
- importance of complying with the safety policy and with the procedures that form part of the SMS;
- organisation, roles and responsibilities of staff in relation to safety;
- corporate safety record, including areas of systemic weakness;
- corporate safety goals and objectives;
- corporate safety management programs (e.g. IRS, Internal Audit Program, LOSA, etc);
- requirement for ongoing internal assessment of organisational safety performance (e.g. employee surveys, safety audits and assessments);
- reporting reportable matters, hazardous events and potential hazards;
- lines of communication for safety matters;
- feedback and communication methods for the dissemination of safety information;
- safety awards programs (if applicable); and
- safety promotion and information dissemination.

Safety Training for Management

6.1.8 It is essential that the management team understand the principles on which the SMS is based. Training should ensure that managers and supervisors are familiar with:

- the principles of the SMS;
- risk management process;
- their responsibilities and accountabilities for safety; and
- their legal liabilities.

Specialist Safety Training

6.1.9 A number of safety-related tasks require specially trained personnel. These tasks include:

- investigating safety events;
- monitoring safety performance;
- conducting risk assessments;
- managing safety databases; and
- performing safety audits.

6.1.10 It is important that staff performing these tasks receive adequate training in the special methods and techniques involved. Depending on the depth of training required and the level of existing expertise in safety management within the organisation, it may be necessary to obtain assistance from external specialists in order to provide this training.

Training for the Safety Manager

6.1.11 The person selected as the SM needs to be familiar with most aspects of the organisation, its activities, its management and staff.

6.1.12 Areas where the SM may require formal training include:

- familiarisation with different fleets, types of operations, routes, etc.;
- understanding the role of human performance in accident causation and prevention;
- operation of the SMS;
- investigation of reportable matters and hazardous events;
- crisis management and emergency response planning;
- safety promotion;
- communication skills;

- computer skills such as word-processing, spreadsheets and database management; and
- specialised training or familiarisation (such as TEM/CRM, LOSA and FDA).

Safety Training for Operational Safety Critical Personnel

6.1.13 In addition to the corporate induction training outlined above, staff engaged directly in operations (flight crew, operations staff, LAMEs/AMEs, etc.) require more specific safety training in relation to:

- procedures for reporting reportable matters;
- procedures for hazard reporting;
- specific safety initiatives, such as:
 - TEM/CRM
 - Approach and Landing Accident Reduction; and
 - LOSA.
- seasonal safety hazards and procedures (weather-related operations, etc.); and
- emergency procedures.

Delivery Methods

6.1.14 The SM, in consultation with the training manager should determine the best method of delivery that fits the training requirements considering the size and complexity of the organisation.

6.1.15 Supporting education material could be delivered via:

- an intranet system;
- an internal document circulation system;
- a safety library (centrally located);
- summaries (probably by the SM) notifying staff of the receipt of such information; and/or
- a range of available safety posters strategically situated in workplace areas.

6.2 Safety Promotion and Communication

6.2.1 An ongoing program of safety promotion and communication should ensure that the organisation's staff benefit from safety lessons learned and continue to understand the organisation's SMS. Safety promotion is linked closely with safety training and the dissemination of safety information. It refers to those activities which the organisation carries out in order to ensure that their staff understands:

- why SMS procedures are in place;

- what safety management means; and
- why particular safety actions are taken, etc.

Safety Promotion and Safety Culture

6.2.2 Safety promotion provides a mechanism through which lessons learned from safety event investigations and other safety-related activities are made available to all affected staff. It also provides a means of encouraging the development of a positive safety culture and ensuring that, once established, the safety culture is maintained.

Management Role

6.2.3 While it is important that personnel are kept well informed, they should see evidence of the commitment of management to safety. The attitudes and actions of management will therefore be a significant factor in the promotion of safe work practices and the development of a positive safety culture.

Safety Promotion Focus

6.2.4 Safety promotion activities are the primary means by which safety issues are communicated within the organisation. These issues may be addressed through staff training programs or less formal mechanisms.

6.2.5 In order to propose solutions to actual or potential operational safety issues, staff should be aware of the existing hazards identified and the corrective actions that have already been implemented. The safety promotion activities and training programs should therefore:

- address the rationale behind the introduction of new procedures; and
- ensure the main focus is on ‘what is going on within the organisation’.

Motivation

6.2.6 If a safety message is to be learned and retained, the recipient first has to be positively motivated. Unless this is achieved, much well-intended effort will be wasted. Propaganda which merely tells people to avoid making errors, to take more care, etc. is largely ineffective as it does not provide anything substantial to which individuals can relate. This approach has sometimes been described as the ‘bumper sticker’ approach to safety.

Safety Topics

6.2.7 Safety topics should be selected for promotional campaigns based on their potential to control and reduce losses. Selection should therefore be based on:

- the experience of past events or near misses;
- hazards/potential hazards identified by hazard analysis; and
- observations from routine internal safety audits.

6.2.8 The SM/Department Managers/Safety Representatives should be involved in encouraging staff to submit suggestions for promotional campaigns.

Methods of Dissemination

6.2.9 The target audience, (employees) tend to be a ‘critical audience’, therefore the dissemination of information needs to be done well otherwise it will not be effective. All methods of dissemination – the spoken and written word, posters, videos, slide presentations, etc., require talent, skill and experience to be effective.

6.2.10 Once a decision has been made to disseminate safety information, a number of important factors should be considered, including:

The audience: The message needs to be expressed in terms and vernacular that reflect the knowledge and culture of the audience.

The response: What is expected to be accomplished?

Media: Consider which media is the most effective. For example, print, web, multimedia, etc.

The style of presentation: This may involve the use of humour, graphics, photography and other attention-getting techniques.

6.2.11 The organisational safety promotion program should be based on several different communication methods for reasons of flexibility and cost. Typical methods available are:

Spoken word: Perhaps the most effective method, especially if supplemented with a visual presentation. However, it is also the most expensive method, consuming time and effort to assemble the audience, aids and equipment.

Written word: The most popular method because of speed and economy, the printed safety promotion material also competes for attention with considerable amounts of other printed material.

Videos: Videos while offering advantages of dynamic imagery and sound to reinforce particular safety messages efficiently, also have two main limitations: expense of production and the need for special equipment for viewing..

Electronic media: Use of the Internet offers significant potential for improvement in the promotion of safety, as even small companies can establish and maintain a website to disseminate safety information. This may also include an electronic newsletter (eNewsletter) or podcasting to distribute key safety messages in a timely manner. This medium may be particularly effective in communicating with younger generations.

7. The Essence of Safety Management

7.1 Summary

7.1.1 Safety should be actively managed from the very top of an organisation. Safety management should be seen as an integral strategic aspect of normal business management, recognising the high priority attached by the organisation to safety.

7.1.2 An organisation's commitment to safety management is typically evidenced by the following:

- a demonstrable Board/CEO level of commitment to an effective formal Safety Management System should exist;
- the safety contributions of staff should be encouraged;
- companies establishing an SMS need to take a pragmatic approach, building where possible on existing procedures and practices;
- a fully-fledged SMS is a formalised, organisation-wide system. Established at the corporate level, the SMS then devolves out into the individual departments of the Organisation. Flight Operations, Engineering and Maintenance, Ground Operations and all other departments whose activities contribute to the operator's safety performance will have their own processes and procedures under the umbrella of the corporate SMS;
- where safety sensitive functions of the operator are outsourced (e.g. maintenance, ground handling), contractual agreements should identify the need for an equivalent, auditable SMS in the supplier.

APPENDIX I TO CAAP SMS-1(0)

BENEFITS OF A SAFETY MANAGEMENT SYSTEM

The Benefits of an SMS

To improve on existing levels of aviation safety in the light of the continuing growth of the industry, additional measures are needed. One such measure is to encourage operators to develop and implement their own SMS that fits the size and complexity of their operation.

An SMS is as important to business survival of the organisation as financial management. The implementation of an SMS should lead to achievement of one of civil aviation's key goals; enhanced safety performance through the identification of hazards and reducing these hazards until they are ALARP. An effective SMS may produce the following benefits:

- Reduction in incidents and accidents (occurrences);
- Reduced direct and indirect costs;
- Safety recognition by the travelling public;
- Reduced insurance premiums; and
- Proof of diligence in the event of legal or regulatory safety investigations

SMS make economic sense

Few organisations can survive the economic consequences of a major accident. Hence, there is a strong economic and safety case for developing and implementing an SMS. There are typically three types of costs associated with an accident or incident: direct, indirect and industry/social costs.

Direct Costs

There are obvious on-the-spot costs that are easily measured. They mostly relate to physical damage, and include things like rectifying, replacing or compensating for injuries, aircraft equipment and property damage.

Indirect Costs

Indirect costs are usually higher than direct costs, but are sometimes not as obvious and are often delayed. Even a minor incident will incur a range of indirect costs.

Indirect costs include:

Loss of business and damage to the reputation of the organisation: Many large organisations will not charter an aircraft from an operator with a questionable safety record or one without a documented SMS in place.

Legal and damage claims: While organisations can take out insurance for public liability, it is hard to cover the costs of lost time handling legal actions and damage claims.

An organisation should take action to protect its interests, and to do so will cost both time and money.

Surplus spares, tools and training: If organisations have a spares inventory and people trained for a one-of-a-kind aircraft that is involved in an accident, the spares and training become surplus overnight. In many cases, the sale value of the spares is below the purchase cost.

Increased insurance premiums: An accident may push organisations into a higher risk category for insurance purposes, and therefore could result in increased premiums. The implementation of an SMS could help an operator negotiate a lower premium.

Loss of staff productivity: If people injured in an accident at work are unable to perform their normal duties, under Australian law they should still be paid. They will also need to be replaced in the short term – again a substantial cost in terms of wages (and possibly training) as well as management time.

Aircraft recovery and clean-up: This is often an uninsured cost and is usually met by the operator.

Cost of internal investigations: This is a cost borne by the operator and is uninsurable.

Loss of use of equipment: Loss of an aircraft that is not replaced immediately means that the operator will lose business or jeopardise existing contracts.

Cost of short-term replacement equipment: Short-term hire is usually far above the cost of operating organisation-owned equipment.

Consider the potential savings by reducing these typically uninsured costs. The simplest way is not to have an occurrence in the first place.

Industry/Social Costs

The Bureau of Infrastructure, Transport and Regional Economics (BITRE, formerly BTCE) found that the industry/social cost of aviation accidents in Australia was \$114 million.²

Over one-third of this cost is made up of the loss to society of the productive capacity of the victims of aviation accidents. A quarter is attributable to damage to aircraft, and a fifth to family and community loss.

² BTCE (2003)

Understanding a Safety Management System

A SMS can be compared with a financial management system as a method of systematically managing a vital business function.

The features of a financial management system are well recognised:

- financial targets are set;
- budgets are prepared; and
- levels of authority are established, etc.

The formalities associated with a financial management system include:

- ‘checks and balances’; and
- the whole system includes a monitoring element so that corrections can be made if performance falls short of set targets.

Financial management is central to an organisation’s continued success and viability. The outputs from a financial management system are usually felt across the organisation. Financial risks are still taken but financial control procedures should ensure that there are no ‘business surprises’. If there are, it can be disastrous for a small organisation. For the larger organisation, unwelcome media attention usually follows an unexpected loss.

An aircraft accident is also ‘an unexpected loss’ and not one that any organisation in the aviation industry wishes to suffer. It should be apparent that the management of safety should attract at least the same focus as that of finance. The adoption of an effective SMS will provide this focus.

APPENDIX 2 TO CAAP SMS-1(0)

Sources of Additional Information (CAAPs SMS-1, SMS-2 & SMS-3)

Safety Management Systems

- ICAO (2006) Safety Management Manual (SMM). International Civil Aviation Organization. Doc 9859 AN/460. Second Edition. Downloadable from <http://www.icao.int/anb/safetymanagement/Documents.html>
- ICAO SMS Training Material. International Civil Aviation Organisation. Downloadable from: <http://www.icao.int/anb/safetymanagement/training.html>
- UK CAA CAP 712: Safety management Systems for Commercial Air Transport Operations.
- UK CAA CAP 726: Guidance for Developing and Auditing a Formal Safety Management System.
- Part I Subpart 7 of the Canadian Aviation Regulations (CARs) - Safety Management System Requirements;
- Transport Publication (TP) 8606, 2005-07-01 - *Inspection and Audit Manual*;
- TP 13739, 2001-04-01 - Introduction to Safety Management Systems;
- TP 14135, 2004-09-01 - Safety Management Systems for Small Aviation Operations – A Practical Guide to Implementation;
- National Standard of Canada, CAN/CSA-ISO 9000-00 - Quality Management Systems-Fundamentals and Vocabulary;
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- NOTECHS: Non-technical skill evaluation in JAR-FCL. Downloadable from: <http://www.nlr.nl/id~4646/1~en.pdf>
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