Safety Management Systems
A N A V I A T I O N B U S I N E S S G U I D E

What’s in it for you? • Getting started • Is it working?
What's in it for you? • Getting started • Is it working?

Safety Management Systems suitable for:

- Aerial work operators
- Charter operators
- Air transport operators
- Maintenance organisations

An introduction to aviation business guide

Safety Management Systems

January 2006 Civil Aviation Safety Authority, Australia.

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The Civil Aviation Safety Authority (CASA) is responsible for the safety regulation of Australia’s civil aviation operators, and for the regulation of Australian-registered aircraft outside Australian territory. CASA sets safety standards and ensures that these are met through effective entry, compliance and enforcement strategies. Additionally, CASA provides regulatory services to industry and plays a part in safety education for the aviation community. CASA also administers exams and issues Australian aviation licences.
About this booklet

The aim is to give you a general understanding of Safety Management Systems and how to put one into practice for your business.
The booklet brings together information presented in CASA’s national education program on Systems of Safety Management conducted from 2002 to 2003.

Definitions

The following terms are used throughout this booklet. They are derived from Australian Standards definitions used in AS/NZS 4380, AS/NZS 4804 and ISO 9000.

Audit: A methodical, planned review of routine organisational functions to identify areas in which performance may be enhanced. Audits form part of evaluation and analyse specific processes in detail. They may occur at random or at programmed intervals.

Benefit: Net project outcomes, usually translated into monetary terms. Benefits may include both direct and indirect effects.

Cost: Activities, both direct and indirect, involving any negative impact, including money, time, labour, disruption, goodwill, political and intangible losses.

Evaluation: An examination of the positive and negative aspects of a process, including a review of standards. An evaluation takes a “big picture” view of an operation or organisation. Results are presented in terms of findings, concerns, observations and recommendations.

Hazard: A source of potential harm or a situation with a potential to cause loss.

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

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

Monitoring: Assessing whether a program is consistent with its design or implementation plan, and directed at the appropriate target population.

Probability: The likelihood of a specific outcome.

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

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

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

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

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

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

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

Quantitative data: Data that come from observations that can be measured. These evaluate more precisely the probability of an accident.

Qualitative data: Unstructured data, usually from written notes, views and opinions, which cannot be expressed in numbers. These review all factors affecting the safety of a product, system, organisation or person. They involve examination against a predetermined set of acceptability measures.

Validity: The extent to which a measure reflects the concept it is intended to measure.

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What’s in it for you?

How a Safety Management System can benefit your business
What is it?

What is a Safety Management System?

A Safety Management System is an integrated set of work practices, beliefs and procedures for monitoring and improving the safety and health of all aspects of your operation. It recognises the potential for errors and establishes robust defences to ensure that errors do not result in incidents or accidents.

Decades of research has shown that accidents and incidents can be traced to some form of human error. Errors can occur at the management level – in the development of policy and procedures – in the same way that errors can occur on the flight deck, on the ramp, in the hangar or in the workshop.

A successful Safety Management System provides a systematic, explicit and comprehensive process for managing risks. As with all management systems, it involves goal setting, planning, documentation, and the measuring of performance against goals.

Any successful Safety Management System is woven into the fabric of an organisation. It becomes part of the organisation’s culture and the way people go about their work. [Reason 2001]

Regardless of the size of the operation, all successful Safety Management Systems will include (but are not limited to) four key elements:

- Top-level management is committed to safety.
- Systems are in place to ensure that hazards are reported in a timely manner.
- Action is taken to manage risks.
- The effects of safety actions are evaluated.

These four key elements are described in detail below.

1. Top-level management is committed to safety.

While safety management requires the involvement of staff at all levels of an organisation, without complete and visible commitment from the highest management levels, operational safety margins are eroded.

Through its attitudes and actions, top-level management influences the attitudes and actions of staff.

In effect, management defines the safety culture of an organisation and sets the safety standards of the operation. If management doesn’t care about safety, it’s unlikely that safety will be a priority for staff.

If, on the other hand, management does care about safety, and is seen by staff to take safety matters seriously, the Safety Management System is likely to be successful.

Visible senior management commitment can take a variety of forms, such as:
- The appointment of a safety officer.
- Open communication about safety issues.
- Provision of adequate resources to address safety concerns.

2. Systems are in place to ensure that hazards are reported in a timely manner.

It’s been estimated that for each major accident, there are as many as 360 incidents that, properly reported and investigated, might have identified an underlying problem in time to prevent the accident. Identifying the hazard is the first step to analysing the risk. [Reason 2001]

Systems to encourage open reporting and communication include:
- Non-punitive, confidential hazard reporting systems.
- Formal and informal meetings to discuss safety concerns.
- Feedback from management about action taken as a result of hazard reports or safety meetings.

3. Action is taken to manage risks.

Once hazards are identified, a system must be in place to determine logical approaches to counteract the risks to safe operation.

An operator may:
- Eliminate the hazard completely: This is the most effective defence, but is sometimes not practical.
- Change operational procedures to work around the risk: This may require rewriting some of your operating procedures.
- Communicate to people about risks associated with the hazard: This relies on an effective communication and reporting system within your organisation.

The objective is to reduce or eliminate the probability that a particular risk will occur, or reduce the severity of its effects if it does.
What is it?

4. The effects of safety actions are evaluated.
The safety actions taken to manage risks impact on your operations. Evaluating the impact allows you to see and communicate the benefits, or to take further remedial action.

Standard evaluation methods include:

- Monitor and review: You should look at the short- and long-term impact of safety actions on operations, such as on-time tasks, performance of contracts and everyday activities.
- Audits and checklists: Formal audits can be done internally or by an external provider. Use developed checklists derived from your safety objectives to determine the impact on operations.
- Feedback: You should seek informal feedback about work standards and operational safety from staff and customers.

Can Safety Management Systems be used by small operators?
Safety Management Systems can be implemented in any operation, regardless of size. In fact, there are significant advantages for smaller operators wanting to implement a Safety Management System.

The cost and effort required to set up a Safety Management System is lower in smaller operations. Because they employ fewer people, it’s much easier to create open lines of communication, a key component in any Safety Management System.

The greatest single barrier to success for smaller organisations is the belief that it is too difficult. However, in the long term it can be more difficult and dangerous not to set up a Safety Management System. [Hudson 2001]

How do you set up a Safety Management System?
A step-by-step guide to setting up a Safety Management System is provided in Chapter 2, Getting started see page 21.

Is safety management the same as quality management?
Most operators are familiar with quality assurance or quality management systems. It’s reasonable to say that quality and Safety Management Systems have about 70 per cent in common.

They both have to be planned and managed, because neither quality nor safety happens by chance. Both depend upon measurement and monitoring, and both involve every function, process and person. Both strive for continuous improvement.

However, there are important differences. Quality management was introduced in the 1960s, when understanding of human and organisational psychology was less developed than today.

Safety management differs from quality management by focusing more on human and organisational factors because they dominate risks in all kinds of ways. [Reason 2001]

Safety management recognises that human and organisational errors cannot be eliminated. Safety Management Systems set up processes to improve communication about hazards and errors and take action to minimise risks.

How much does it cost to set up a Safety Management System?
A Safety Management System need not be expensive, though it does require the allocation of some resources and time.

If you are a small operator, it may be possible to allocate the task of setting up and maintaining the Safety Management System to an existing employee. Larger organisations may need to hire a full-time safety manager.

There are likely to be small costs in record keeping and safety-related literature. Given that the costs of even a minor aircraft incident are high, the cost of maintaining an effective Safety Management System are small.

Safety Management Systems can be implemented in any operation, regardless of size. In fact, there are significant advantages for smaller operators.
Apart from the obvious safety benefits, a Safety Management System will help you:

- Market the safety standards of your operation.
- Guard against the direct and indirect costs of incidents and accidents.
- Improve communication, morale and productivity.
- Meet your legal responsibilities to manage safety.

**Safety Management Systems make economic sense**

Few organisations can survive the economic consequences of a major accident. Hence, there is a strong economic case for pursuing an integrated Safety Management System. There are three types of costs associated with an accident or incident: direct, indirect and industry/social costs.

**Direct costs:**
These are the 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, and 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 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 Safety Management System in place.

- **Legal and damages claims:** While you can take out insurance for public liability, it is hard to cover the costs of lost time handling legal actions and damages claims. You must take action to protect your interests, and to do so will cost you time as well as money.

- **Surplus spares, tools and training:** If you 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 will push you into a higher risk category for insurance purposes, and therefore could result in increased premiums. The implementation of a Safety Management System could help you negotiate a lower premium.

- **Loss of staff productivity:** If people injured in an accident are unable to work, under Australian law they must 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 has to be met by the operator.

- **Cost of internal investigation:** 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 company-owned equipment.

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

### Direct and indirect costs compared:

A comparison of direct and indirect costs of a light twin aircraft (indicative only, April 1998).

<table>
<thead>
<tr>
<th>Event</th>
<th>Direct cost</th>
<th>Indirect cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxiing aircraft wing hits tail of parked aircraft Pilot fired</td>
<td>$4,500 (Repair)</td>
<td>$19,000 (Cross hire; aircraft unfair dismissal claim)</td>
</tr>
<tr>
<td>Aircraft attempts take-off with binding brakes</td>
<td>$5,500 (Parts and labour)</td>
<td>$5,200 (Aircraft cross hire)</td>
</tr>
<tr>
<td>Propeller strikes ground on go-around following near wheels-up landing</td>
<td>$20,500</td>
<td>$16,200 (Aircraft cross hire; rescue and ferry)</td>
</tr>
</tbody>
</table>

The implementation of a Safety Management System could help you negotiate a lower insurance premium.
Why do it?

Industry/social costs:
The Bureau of Transport and Communications Economics found that the industry/social cost of aviation accidents in Australia in 1996 was $112 million. [BTCE 1998]

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.

Who pays?
For an individual operator, the insurance company may pay, but often the insurance excess is greater than the cost of the damage. The operator often bears almost all of the costs. In 1996, insurance administration made up 3 per cent of the total cost of aviation accidents. [BTCE 1998]

The excess on an insurance policy for a $2 million commuter aircraft is usually 1–2 per cent of the hull value ($20,000–$40,000). Add the indirect costs, and an operator could easily get into financial difficulties. That makes investment in maintaining an effective Safety Management System very good value.

Improved communication, morale and productivity:
Successful Safety Management Systems are characterised by good communication between management and the rest of the organisation. This enhances safety and can lift morale and, in some cases, productivity.

As communication failures are commonly identified as a source of problems for organisations, having a focus on improving communication can only result in improved performance at all levels. [Hudson 2001]

Marketing advantages:
There are significant marketing advantages in being seen as an organisation with high safety standards. A good safety reputation can contribute to profitability and repeat business.

Increasingly, aviation organisations are required to submit to an external safety audit when bidding for large charter contracts. Because of improved safety practices, operators with Safety Management Systems are more likely to perform well in an audit and be awarded the job.

Legal responsibilities
Recent inquiries into commercial aviation have stressed the need for management to take responsibility for safety, and the need for the aviation industry and the regulator to do more to identify safety deficiencies and reduce the potential for accidents.

Increasingly, Australian law is placing responsibility for safety at the senior management level of organisations. This includes maintenance organisations, flying operators and aerodromes.

Section 28BE of the Civil Aviation Act 1988 puts the main responsibility for flying safety on the shoulders of the Air Operator’s Certificate holder, and any company directors associated with the AOC.

Clearly, management can no longer remain legally “aloof” from the actions of employees.

One proven way of improving safety – and meeting legal requirements – is for operators to take a leadership role in building a Safety Management System designed to manage safety risks.

The Civil Aviation Act (1988): Section 28BE
(1) The holder of an Air Operator’s Certificate (AOC) must at all times take all reasonable steps to ensure that every activity covered by the AOC, and everything done in connection with such an activity, is done with a reasonable degree of care and diligence.
(2) If the holder is a body having legal personality, each of its directors must also take the steps specified in subsection (1).
(3) It is evidence of a failure by a body and its directors to comply with this section if an act covered by this section is done without a reasonable degree of care and diligence mainly because of:
(a) Inadequate corporate management, control or supervision of the conduct of any of the body’s directors, servants or agents; or
(b) Failure to provide adequate systems for communicating relevant information to relevant people in the body.
A ten-step guide to setting up a Safety Management System
How to set up a Safety Management System

There are many ways to integrate a Safety Management System into your operation. You may have some elements of a Safety Management System in place already.

You should plan to integrate a Safety Management System into your operation in a way that suits your particular operation.

Regardless of how you incorporate a system for managing safety, you should consider each of the 10 key steps that research has found to be essential to the success of Safety Management Systems.

The 10 basic steps to establishing a Safety Management System are:

1. Gain senior management commitment.
2. Set safety management policies and objectives.
3. Appoint a safety officer.
4. Set up a safety committee (usually only for large or complex organisations).
5. Establish a process to manage risks.
6. Set up a reporting system to record hazards, risks and actions taken.
7. Train and educate staff.
8. Audit your operation and investigate incidents and accidents.
9. Set up a system to control documentation and data.
10. Evaluate how the system is working.

Each step is briefly described in the following sections.

Putting these elements in place is the first stage in building a Safety Management System. However, they will only be effective if they are integrated seamlessly into your operation and organisational culture.
1. Gain senior management commitment

While safety management requires the involvement of all staff, without commitment from senior management your Safety Management System will not be effective.

Regardless of size, complexity and type of operation, senior management must:

- Demonstrate commitment to safety and the Safety Management System.
- Set the safety standards and policies for the operation.
- Encourage participation in safety management.
- Allocate sufficient resources to the Safety Management System.
- Facilitate the flow of safety information.

What resources are required?

Good safety management is a state of mind, not an expensive add-on. It's about the mindset of everyone involved, rather than money.

When planning the implementation of your Safety Management System, you need to look at the resources available and those that you need to provide.

Resources required may include (but are not limited to):

- Time – for meetings, information gathering, planning and communication.
- Safety information.
- Expertise.
- Customised training.
- Contingency plans for hazardous situations and events.

Often time is the largest resource required, particularly at the start of the process of implementing a Safety Management System.

Meetings will be required to establish roles and responsibilities. Time must also be taken to communicate the intention of the Safety Management System to all employees. The time spent communicating policy and goals to staff will pay dividends by gaining their commitment.

You can demonstrate management commitment to safety by providing available resources like safety-related literature, courses, seminars and crew resource management training.

One of the most important resources you need to devote to the operation of your Safety Management System is expertise. You will need to involve people from across your operation with the expertise to address safety-related issues. Technical training may be required.

All staff should be trained to understand the purpose of your Safety Management System and their role in applying it to the way you do business.

Significant resources – in time and expertise – will be needed to plan contingencies for hazardous situations and events.

Once hazards start to be identified, senior management must be prepared to commit resources to address those hazards. If hazards are not properly addressed, enthusiasm for the Safety Management System will quickly wane.

Checklist

- Senior management is involved in – and committed to – the Safety Management System.
- Senior management has approved the organisation’s safety policy and operating safety standards.
- The safety policy and standards are communicated to all staff, with visible endorsement by senior management.
- Appropriate resources are allocated to support the Safety Management System.
- Senior management has established an appropriate reporting chain for safety issues.
- Senior management actively encourages participation in the Safety Management System.
2. Set safety management policies and objectives

What are safety policies and objectives?
The purpose of developing safety management policies and objectives is to set out what your organisation is striving to achieve, and how it is going to get there. This is communicated in a written document.

Safety policies set out what you are trying to achieve through your Safety Management System.

Safety policies outline the methods and processes the organisation will use to achieve desired safety outcomes. They serve as clear indications of “the way we do business around here”. They are a tangible indication that senior management is committed to safety, and expects high safety performance from staff and managers.

Objectives set operational safety standards. They need to be specific, measurable, realistic and agreed with those who have to deliver them. Both short- and long-term objectives should be set and prioritised against business needs.

How to write a safety policy

The safety policy can be a stand-alone document or it can be incorporated in your operations manual. A copy of the policy should be located where it will be seen by staff.

Senior management should consult widely with staff when preparing the safety policy. Consultation ensures that the document is relevant to your staff and your operation. It will help staff to feel that they have ownership of the safety policy.

Effective policies are a commitment to action. They must:

• Contain the general intentions of management, the approach and objectives of your organisation.
• Cover the arrangements for implementing the policy.
• Become the criteria upon which the organisation bases its actions.
• Align with other operational policies, and be designed to secure commitment and involvement from all staff.

Your policy statement should clearly state:

• Senior management’s commitment to the Safety Management System.
• The responsibilities and accountabilities for directors, managers and employees.
• How the organisation will achieve its safety objectives.
• The safety outcomes expected of staff, managers and contractors.

It should be signed by the most senior person in your organisation, usually the owner, chief executive officer (CEO) or by the board of directors.

The key to effective policy implementation is good business planning. You should be able to measure performance against plans.

How to write safety objectives

Safety management objectives are outcome-based to meet the organisation’s safety policies. For example, you may have an objective of reducing incidents in your workshop by 15 per cent over the next 12 months. The purpose of communicating safety objectives is to foster a common understanding of what you want to achieve.

In writing your objectives, consider the following:

• What are your performance standards or targets?
• Who is responsible?
• What are they responsible for?

Your safety policy should be reviewed periodically to ensure that it remains reflective of your safety objectives and relevant to your operation.

Checklist

☐ A safety policy has been developed by management and staff and signed by the CEO.
☐ The policies align with other operational policies.
☐ The safety policy has been communicated to all staff.
☐ The safety policy is reviewed periodically.
3. Appoint a safety officer

The safety officer

The safety officer is the person within the organisation who is responsible for the day-to-day operation of the Safety Management System. Larger organisations may have a director of safety or a safety manager.

Depending upon the size of the organisation, the responsibilities of the safety officer may require a full-time appointment, or may be added to existing duties. In large organisations, the safety officer may require the assistance of other people.

The safety officer should have an open line of communication with the CEO. This ensures that safety reports and recommendations are afforded the proper level of attention, and that appropriate solutions are implemented in a timely manner. The safety officer must have the CEO’s assurance that any safety issue can be raised without fear of retribution.

The safety officer should be technically competent in one or more of the functional areas of the company’s operations. Regardless of technical expertise, the most effective safety officer is the person who is enthusiastic and interested in the task. If the job of safety officer is forced on someone who does not have a keen interest in safety, then it is unlikely that others within the organisation will be encouraged to “buy in” to the Safety Management System.

The safety officer is responsible for:
- The maintenance, review and revision of the safety management program.
- Providing timely advice and assistance on safety matters to managers and staff at all levels.
- Maintaining an appropriate reporting system to identify hazards.
- Monitoring the progress of safety reports and ensuring that hazards are addressed in a timely manner.
- Providing feedback about ongoing safety issues.
- Reporting incidents and accidents as required by legislation.
- Distributing relevant and up-to-date safety information to staff and management.
- Identifying safety training requirements.

Organisational structure

The appointment of a safety officer or safety manager does not relieve the organisation’s key personnel from discharging their legal obligations under The Civil Aviation Act (1988).

The safety officer is not a statutory position, however. Civil Aviation Order (CAO) 82.0 gives the chief pilot responsibilities for matters affecting the safety of the flying operations. The safety officer is appointed to administer the safety program. The responsibilities include the identification and reporting of safety hazards, but may not include operational authority.

The responsibilities and authority of the safety officer and the chief pilot must be clearly understood in order to prevent any conflict.

The safety officer should report directly to the CEO, with an informal communication line to the chief pilot and/or chief engineer. Copies of all safety-related information and reports are made available to key staff as required.

Safety officer reports to CEO
4. Set up a safety committee (if required)

Depending on the size or nature of your operation, the safety officer may be assisted by a safety group or committee.

**The safety committee can:**
- Act as a source of expertise and advice.
- Review the progress of incidents/accidents, and the actions taken.
- Review the status of hazard/risk reports, and review the actions taken.
- Make safety recommendations to address hazards.
- Review internal audit reports.
- Review and approve audit response and actions taken.
- Encourage lateral thinking and creative solutions.
- Help identify hazards and defences.
- Prepare and submit reports to the CEO for review.

**Do you need a safety committee?**

Depending on the size and complexity of your organisation, you may not need a safety committee.

**Small general aviation organisations:** Smaller organisations with fewer than 20 staff may prefer to discuss and resolve safety matters in a more informal way. As long as there is good communication, and staff and management are willing to provide advice and assistance to the safety officer, the Safety Management System should be able to function without a formal safety committee.

Another option for smaller organisations is to pool resources with other operators in their region to form a combined safety committee. The sharing of safety information and expertise can benefit all concerned and need not be commercially sensitive.

**Regular public transport and larger organisations:** In larger organisations (20 or more staff) or organisations with several operational centres, communications are often “filtered”. In these organisations, safety committees are vital to the operation of the Safety Management System.
Who should chair the safety committee?
The safety officer, a senior manager, or any other committee member may chair the meetings. The role of chairperson can be rotated.

Minutes and agenda

Minutes: The minutes of all meetings should be recorded by a committee member; or someone dedicated to this task. The minutes should be provided to each member of the committee as soon as possible after the meeting. Copies of the minutes should be displayed or made available by other means for the information of employees.

Agenda: A member of the committee, usually the safety officer, should be made responsible for drawing up the agenda. Adequate notice of items to be discussed should be given to the safety officer. The agenda should be distributed one week before the meeting.

A typical agenda might include some or all of the following items:
- Review outstanding issues from previous meetings.
- Review safety action plans.
- Review accident investigation reports.
- Review the effectiveness of previous safety recommendations.
- Notify members of committee activities.
- Assess and resolve identified hazards.
- Review safety audits and action plans.
- Monitor and promote safety involvement.
- Carry out risk assessment on any new equipment, routes or procedures.
- Plan and organise staff training.
- Plan for the impact on safety of operational changes.

How often should the safety committee meet?
The frequency of committee meetings will be determined by the size of your organisation and the volume and severity of identified hazards.

Some safety committees will meet on a weekly basis, while others may only need to meet once every two months. Meetings should take place at least every three months.

An extraordinary meeting of the safety committee should be called if a serious safety issue requires urgent resolution. Alternatively, the safety officer may advise management of time-critical problems and solutions.

Who should be on the safety committee?
The size of your operation will determine the make-up and number of members in your safety committee.

The committee must include:
- The safety officer.
- A representative from senior management who has the authority to approve safety recommendations.

It should also include at least one representative from each functional area.

For example:
- Flying operations.
- Maintenance.
- Ramp.
- Cabin crew.
- Check-in.

Checklist

☐ A safety committee has been established (if required).
☐ The roles and responsibilities of the safety committee are clearly defined and documented.
☐ Staff and management understand the roles of the safety committee.
☐ The safety committee includes representation from across the organisation.
☐ Minutes of the safety meetings are made available to all employees.
5. Identify hazards and manage risks to your operation

What is a hazard?
A hazard is an event or situation that could result in damage or injury. The purpose of hazard identification is to allow organisations to assess their risks and determine effective approaches to reduce or eliminate them.

When identifying hazards, management and staff should consider all facets of the operation and identify any areas or situations that may compromise safety.

Hazard identification systems should be non-punitive, confidential, simple and easy to use. You can use paper reporting forms, minutes from meetings, or a computer database to record hazards.

What is risk?
Risk is the chance that a hazard will result in damage or harm. It is measured in terms of consequences and likelihood.

There will always be risks involved in aviation operations. Some risks can be accepted, some can be eliminated, and others can be reduced to the point where they are acceptable.

Risk management is a decision-making tool that allows you to continually improve safety performance.

Risk management
The risk management process follows a logical sequence:
1. Establish the context.
2. Identify the hazards.
3. Analyse the risk.
4. Evaluate the risk.
5. Apply the defences.

1: Establish the context
Establishing the risk management context is about defining the extent and depth of the project or activity you are going to examine.

It requires you to be familiar with all the elements of the project or activity and to decide what criteria you are evaluating the risk against.

Examples are operational needs, customer requirements, or technical, financial or legal issues.

Establishing the context allows you to limit your process to something that is manageable, such as an activity or task.

2: Identify hazards
There are many ways to identify hazards. You could use:
- Checklists.
- Judgement based on previous experience.
- Records and trend analysis.
- Brainstorming meetings with staff or customers.
- Flow charts.
- Systems analysis, which looks at gaps in how your systems are working together.
- Scenario analysis, which imagines possibilities for hazard and error.

Some of the methods of identifying hazards may need lateral thinking by people who are unencumbered by past ideas and experiences.

Section 2.6 outlines how to set up a basic hazard reporting system.

3: Analyse the risks
Risk analysis is the process of estimating the probability and consequences of each hazard to ensure that the risk is understood and prioritised. Critically analyse the hazards and rank them, as far as possible, in order of their risk potential.

A priority list will ensure that your resources are focused on the most threatening risks.
In analysing risk, you must determine:
• The probability of the hazard occurring.
• The consequences of the hazard occurring.
It may help to rank probability and consequences on a graduated scale to prioritise overall risk (see the Australian and New Zealand Standards example on page 37). Any risks with severe consequences and medium-to-high likelihood will obviously assume the highest priority.

4: Evaluate the risk
Once a hazard is identified and approximately ranked, evaluate the risk level. Your safety policy determines the responses to the levels of risk. You may decide to fix “low” risks when possible, but those that rank “likely” or above need immediate action.

How will you evaluate the risk?
• Group discussions that include representatives with relevant expertise.
• Research by the safety officer.
• Information from other sources (staff, consultants, aircraft or engine manufacturers, safety publications, etc).

5: Apply the defences
Each hazard and its defences need to be critically examined to determine whether the risk is appropriately managed or controlled. Having identified the risks that may need to be resolved, there needs to be a strategy to:
• Eliminate the risk.
• Reduce the level of risk, or the consequences or likelihood of that risk occurring.
• Avoid the risk.

If the risk can be resolved, the activity or task may continue. If not, then steps should be taken to improve the defences or to remove or avoid the hazard. Assess the suitability of your existing defences associated with each of the identified hazards. How effective are they? Do they prevent the occurrence (that is, do they remove the hazard)? Do they minimise the likelihood or the consequence? And to what extent?

To establish the effectiveness of defences ask:
• Are staff aware of the defences?
• Are they trained to use the defences?
• Are there tools or equipment suitable for the anticipated risks?
• Do staff need authorisation to use the defences in an emergency?

In some instances, a range of solutions to a hazard may be available.

For example:
• Re-designing solutions.
• Changing standard operating procedures.
• Ongoing reviews of the activity or task.
• Recurrent training.
• Improved supervision.
• Targeted safety information or advice.
• Contingency planning.
• Limiting exposure to the risk.

6: Monitor and review defences.
When any change is made, further risk management must be carried out to ensure that the hazard is effectively controlled and the defence has not, in itself, created any new hazards.

Each hazard and its defences need to be critically examined to determine whether the risk is appropriately managed or controlled.

Checklist
☐ Criteria are established for evaluating risk.
☐ A system is in place to identify hazards.
☐ Relevant staff are involved in critically analysing and ranking identified risks.
☐ Defences are set up to reduce, eliminate or avoid risks.
☐ Staff are aware of the defences, and have received training, where appropriate.
☐ Checks are in place to find out whether defences are working.
**Table 1: Qualitative measures of consequence and likelihood**

**Consequence**

<table>
<thead>
<tr>
<th>Level</th>
<th>Descriptor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Insignificant</td>
<td>No injuries, low financial loss.</td>
</tr>
<tr>
<td>2</td>
<td>Minor</td>
<td>First aid treatment required, on-site release immediately contained, medium financial loss.</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
<td>Medical treatment required, on-site release contained with outside assistance, high financial loss.</td>
</tr>
<tr>
<td>4</td>
<td>Major</td>
<td>Extensive injuries, loss of production capability, off-site release with no detrimental effects, major financial loss.</td>
</tr>
<tr>
<td>5</td>
<td>Catastrophic</td>
<td>Death, toxic release off-site with detrimental effect, huge financial loss.</td>
</tr>
</tbody>
</table>

Note: Measures used should reflect the needs and nature of the organisation and activity.

**Likelihood**

<table>
<thead>
<tr>
<th>Level</th>
<th>Descriptor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Certain</td>
<td>Is expected to occur in most circumstances.</td>
</tr>
<tr>
<td>B</td>
<td>Likely</td>
<td>Will probably occur at some time.</td>
</tr>
<tr>
<td>C</td>
<td>Possible</td>
<td>Might occur at some time.</td>
</tr>
<tr>
<td>D</td>
<td>Unlikely</td>
<td>Could occur at some time.</td>
</tr>
<tr>
<td>E</td>
<td>Rare</td>
<td>May occur only in exceptional circumstances.</td>
</tr>
</tbody>
</table>

Note: These tables need to be tailored to meet the needs of an individual organisation.

---

**Table 2: Matrix of consequence and likelihood**


<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Insignificant</th>
<th>Minor</th>
<th>Moderate</th>
<th>Major</th>
<th>Catastrophic</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (certain)</td>
<td>H</td>
<td>H</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>B (likely)</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>C (moderate)</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>D (unlikely)</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>E</td>
</tr>
<tr>
<td>E (rare)</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

**Key**

E: Extreme risk, immediate action required.
H: High risk; senior management responsibility must be specified.
M: Moderate risk; management responsibility must be specified.
L: Low risk; manage by routine procedures.
6. Set up a reporting system to record hazards, risks and actions taken

What is a reporting system?
A reporting system is a formal means of collecting, recording, acting on and providing feedback to staff about hazards and risks to your operation.

Reported risks are those that have been identified and can be managed. Unreported hazards and risks are difficult to identify and therefore to fix. In setting up your reporting system, consider Reason’s illustration “Breach of safety defences” accident causation on page 20.

Mistakes, unreported hazards and risks, or employees choosing not to follow policy, may not be independently significant. However, the frequency with which they occur could indicate whether there are gaps in your safety defences.

When there are gaps in all your safety system defences, then there is a good chance accidents or incidents will occur. This is more likely when management and organisational weaknesses coincide with poor working conditions, poor communication and a poor safety culture.

It has been estimated that for each major accident there are up to 360 incidents that, if reported and investigated, might have identified underlying problems in time to prevent the accident. [Flight Safety Foundation 1999]

A systematic process for identifying hazards relies on an effective reporting system.

Define how the reporting system will function, who will be involved in the system and what resources will be required.

For example:
• Anyone from your organisation can submit a report. It will then be considered and the need for a solution will be decided in a timely manner.

Who should report hazards?
Hazards can be reported by staff, management, customers or passengers, and external contractors.

What hazards should be reported?
Any hazard that has the potential to cause damage or injury, or that threatens business viability should be reported.

For example:
• High workload during passenger boarding.
• Poor communication with Air Traffic Services.
• Flight crew stress.
• Failure to follow standard procedures.
• Information overload from NOTAMs.
• In-flight turbulence.
• Unsafe ground traffic movements.
• Failure of passengers to listen to and follow instructions.
• Lack of LAME retraining.
• Poor communication within the maintenance department/contractor.
• Unreasonable time pressure on maintenance staff to complete safety-critical tasks.
• Poor work continuity.
• Lack of up-to-date maintenance manuals.
• Poor cross-checking.
• Lack of emergency equipment, procedures and training.
• Poor communication between operational areas.
• Flight crew rushing flight checks, or inadequate checklists.

What are the features of a good reporting system?
The key features of a good reporting system are:
• Identification of what is relevant.
• Collection of current and applicable information.
• A procedure for receiving and acting on reports.
• A reliable method of accurately recording, storing, retrieving and maintaining safety reports.
• A procedure for distributing relevant or appropriate information to staff (and possibly contractors).
• Ability to be audited.

Safety Management Systems: An aviation business guide
How are the reports made?
Methods of uncovering hazards can range from informal interviews with staff about safety to computer-based hazard and incident reporting systems.
Staff should feel willing to use the hazard reporting system and trained to access the forms. The forms may be paper or electronic. They may be kept in a file with a summary sheet, or entered into a database or other tracking system.

All information should be accepted with the aim of fixing problems – not punishing people.

Hazard reporting methods
Both formal and informal processes can be used to gather information from staff about hazards in your organisation, including:

• Confidential hazard reporting.
• Confidential surveys or questionnaires of staff.
• Informal communication.
• Observations of work practices and work flow.

Confidential hazard report forms
Confidential hazard report forms allow staff to report hazards without fear of retribution.

A sample reporting form is included in the appendix. The reporting form for the Australian Transport Safety Bureau Confidential Aviation Incident Reporting (CAIR) system may also be adapted for this purpose.

In small operations, it may be difficult to conceal the identity of the person who submits the report. In such a situation it is vital that staff understand that any safety issue can be discussed without fear of reprisals.

Everyone in your organisation should be familiar with the reporting system that you have in place.

Confidential surveys or questionnaires
Confidential surveys or questionnaires can be used to get feedback from staff about specific areas of your operation.

The confidential survey or questionnaire encourages input or feedback about the way you do business.

It may be used for many purposes, such as identifying hazards or risks before changes are made, introducing new procedures, or gauging the success of recent changes.

Informal communication
One of the simplest, and most effective, ways of identifying hazards is to talk to staff.

Informal communication can be established by having an “open door” policy that invites staff to express their concerns directly to managers. It can be a chat over a cup of coffee away from work tasks.

Talks may be initiated when the safety officer or a senior manager walks around the workplace and asks people if they are having any problems.

Your interest in the safety issues of staff demonstrates concern about safety. Informal communication sometimes elicits more honest and accurate information than formal channels.

Observations of work practices and work flow
A critical review of specific work practices used in your operation can identify areas of hazard and risk that have been generally overlooked or taken for granted.

Standing back and making an overall observation of how well the work flow occurs in your operation is a process that can be used to identify bottlenecks and potential risks to your business.

You should ensure that the right people in your organisation are involved in providing the solutions to the identified risks.

Often an independent person can give a new perspective on a recurring issue.
Other reporting methods

There are other methods you can use to identify safety deficiencies.

For example:

• Small group meetings to identify hazards.
• A formal review of standards, procedures and systems.
• Internal and external safety audits/assessments.
• A suggestion box.

It is important to be self-critical, and honestly appraise all areas of your operation. Establishing discussion groups with staff and line managers is a good way to identify hazards. The purpose of group discussions is to identify those hazards that are most likely to cause injury or damage. The number of participants will depend on the size of the organisation; however, three participants should be considered the minimum.

Group discussions encourage staff to become actively involved in safety. Staff should be made aware that their contribution to the safety system is essential, and that no staff member will be penalised for raising a safety issue.

Discussion groups have several main advantages. They can:

• Provide a current assessment of the organisation’s safety performance.
• Encourage staff to report safety problems or concerns.
• Encourage staff to participate in safety management.
• Reaffirm the organisation’s commitment to safety.
• Make staff more aware of the safety implications in their job and the effect their actions have on others.

Feedback

Staff who submit reports should be provided with feedback about:

• The progress of their report.
• Any action taken as a result of their report.

Feedback is essential in letting staff know that the reporting system works and that their contribution to the Safety Management System is valued.

Checklist

☐ All reports are recorded and investigated.
☐ A combination of formal and informal reporting processes is in place.
☐ Staff are aware they will not be penalised for submitting a report.
☐ Confidentiality is protected.
☐ Staff who report hazards are given feedback.
☐ After investigations, recommendations are made available to all staff.
☐ A system is in place to allow the safety officer to monitor the status of each identified hazard.
7. Train and educate staff

The commitment to provide both induction and ongoing refresher training and checking to all staff is an essential element of any Safety Management System.

Induction training should be conducted by the safety officer and customised to suit staff members’ areas of specialisation. It should include information about the Safety Management System, the safety officer, the safety group or committee and the responsibilities of all employees to participate in the Safety Management System. Records of participation should be maintained.

Existing employees and new staff must be trained in the operation of the Safety Management System, and encouraged to adopt the safety practices of your organisation. Customising training allows you to impress your operational practices of safe behaviour, risk management decision making and quality control processes on all staff.

When you introduce new technology or equipment, or make changes to your operations, training should be provided. There are also regulatory requirements for specific training and checks, and ongoing technical training for your employees.

Evaluation of the training effectiveness can include review of staff abilities, knowledge of processes and practices used in the workplace and any specific competencies that are required in your operation.

Keeping staff informed and educated about current safety issues through providing relevant safety-related literature and sending them to safety-related courses and seminars improves the safety health of your organisation.

Checklist

- Staff understand how the Safety Management System operates.
- Staff are aware of the role they play in the Safety Management System.
- Staff understand that the aim of the Safety Management System is to improve safety – not to attribute blame.
- All personnel attend induction and ongoing safety-related training.

8. Audit your operation and investigate incidents and accidents

What is an audit?

An audit is a methodical, planned review of your routine operational functions. Internal safety audits should be carried out as a routine part of your safety programme. Every part of the working system is critically examined to identify strengths, weaknesses or areas of risk. A safety audit compares stated objectives and operating procedures with actual work practices.

All audit procedures should be well documented so that any deficiencies can be easily identified. The audit records and results need to be accurate, complete, reliable and readily accessible for comparison or trend analysis.

Any safety audit should include the activities of external contractors that influence the safety of your operation (e.g. maintenance contractors, staff accepting cargo on behalf of the operator, and aerodrome operators).

Who carries out an audit/assessment?

Internal safety audits can be carried out by staff from within the area being looked at. Using staff from other areas of your operation is beneficial – it may yield different results because those staff are less familiar with the intricacies of the daily tasks or working environment.

Larger organisations use teams, rather than individuals. Smaller operators benefit by having the safety officer or staff member from another area do the audit.

The most likely people to conduct the audits are:

- The safety officer.
- A representative of the safety group.
- An external safety consultant.
- The quality/inspection department.
Audit & assessment

How should the audit/assessment be carried out?
Depending on the nature and size of your organisation, audits may be carried out at regular intervals (bi-monthly) or prior to and following any changes to the operation. They should occur at least twice a year and should be part of the annual assessment plan for all functional areas.

The audit may involve interviews with key staff, correlation of policies and work practices, and observation of the working environment.

When conducting the audit, check:
- The timing of the audit.
- The preparation required to conduct the audit.
- That checklists are used and adhered to.
- That there is a comments section for items not included in the checklist.
- Confirmation of the findings.
- That reports are sent to appropriate line managers and the CEO.
- That there is appropriate follow-up.
- That staff are advised of the results/findings.

Operational areas that may be audited include (but are not limited to):
- Maintenance arrangements.
- Physical work environment.
- Equipment safety.
- Safe systems of work.
- Emergency procedures.

One trap when auditing is to limit the audit to the contents of your checklist. This can be avoided if audit documents are regularly updated and revised.

Staff doing the audit should be competent and familiar with the areas they are auditing.

A report of the audit findings is normally written, and should be given to the CEO and key managers for action.

Recommended actions may be phased according to the degree of risk that they pose and the relative cost of eliminating or controlling the hazards.

Small operator
It is necessary to continually update your knowledge of your operations and check to see if your operation is meeting its own safety standards. Are staff reporting hazards? If not, why? A safety assessment should be conducted at least annually.

Larger operator
The safety officer and the quality/inspection department (if applicable) should be responsible for planning and conducting regular safety audits/assessments.

Each functional area should be audited at least annually.

What is an investigation and why do it?
An investigation is a detailed study of the circumstances surrounding an event.

It is usually completed following any incident or accident and may be conducted by a team of experts as well as those involved in your routine operations.

When staff submit an incident or accident report, the safety officer may investigate the situation leading up to the event, the causes of the event and the event itself.

The safety officer is also responsible for reporting any short-term or long-term effects the event may have on the safety of your business operations.

The safety officer may require specific training in how to conduct an investigation and prepare reports for submission for the CEO or external agencies.

Courses for training in aviation investigation are commercially available.

Depending on the nature of the incident or accident and its consequences, the event may involve investigations by external agencies such as the Australian Transport Safety Bureau.

The recommendations from the investigation may allow you to improve the safety system defences of your operation and prevent the accident or incident occurring again.
Aspects of your operation that may be investigated include (but are not limited to):

- Management and supervision procedures.
- Physical working conditions.
- Accident prevention strategies.
- Safety information dissemination.
- Training for staff and contractors.
- Safety performance.
- Organisation safety standards and practices.
- Safety incident investigation and corrective actions.

Checklist

☐ A system exists to audit whether the company is meeting regulatory requirements and its own safety standards.

☐ Staff are encouraged to submit hazard reports and share safety concerns.

☐ Feedback is provided to those audited.

☐ Investigations are carried out for hazard reports, accidents and incidents.

9. Set up a system to control documentation and data

Your Safety Management System should be documented. It should be tailored to the needs of your operation and the staff who will use it. The range and extent of the documentation depends on the complexity of the operation, and the skills, training, competence and expertise of staff.

Documentation may form part of policy and procedures manuals and include:

- A policy statement by the CEO.
- The reporting chain and responsibilities of the safety officer and safety committee.
- The organisation’s hazard identification and risk management system.
- The safety communication pathways.
- The safety training program.
- Emergency and contingencies planning.
- Risk management methods.
- Audit schedules and investigation criteria.
- Safety Management System evaluation procedures.
- Any other activities of the Safety Management System.

Documentation needs to be accessible to those who need to use it, and may include online material, posters and videos.

A record should be kept of:

- All activities involving the identification and assessment of hazards and their defences and any incidents that have occurred.
- Any reports issued or received.
- Any safety recommendations.
- Any management action.
The document control procedures need to be tailored to the needs of the organisation.

**They need to cover:**
- The location of current, dated versions of documents.
- The review period, and who is authorised to change documents.
- What to do with obsolete documents.
- The identification and storage of significant documents.

**Small operators**
Smaller operators may find it more appropriate to document the Safety Management System with an existing manual, such as the operations manual.

**Larger operators**
Larger operators may want to document their safety program as a dedicated manual or document.

**Data control**
Collecting information about the health of your business operations through flight and maintenance reports, safety reports, and audits, checks and evaluation of your staff and your work practices generates a lot of data. This can be stored on paper or electronically.

Analysis of the data allows you to measure your progress towards your objectives and to make informed decisions about safety issues.

The management and control of this data may influence the quality of the analysis done on it. There are commercially available computer systems for processing and tracking data. The one you select should allow you to protect and back up your data.

Ensure that you collect relevant data, rather than lots of interesting but unrelated information.

**Checklist**
- Your Safety Management System is documented.
- Documents are accessible to those who must use them.
- Relevant safety data are kept.

**10. Evaluate how the system is working**
The CEO should ensure that the Safety Management System is properly reviewed and evaluated at regular intervals.

Both the CEO and the safety officer must ensure that the operation of the Safety Management System continues to improve.

The CEO needs to ensure that the program is adequately resourced, is supported by managers and continues to be effective in meeting the safety objectives.

The evaluation process should cover general activities of the operation and their impact on safety performance.

Staff should be given the opportunity to make recommendations.

**Evaluate the safety, quality and risk management systems for:**
- Passenger handling within terminals.
- Apron operations.
- Aircraft refuelling.
- Airside engineering.

Safety Management Systems begin with enthusiasm. However, once the initial interest has worn off, the system may begin to wind down.

As components of the system are established, the emphasis shifts to maintaining and developing the system to ensure that there are no gaps and to consolidate the safety culture.

If the number of safety reports reduces, it may not mean that you’ve reduced your hazards. It may be that there is something wrong with your system or your feedback cycle.

Talk to staff to find out why they aren’t submitting reports.

**Checklist**
- There is a plan to review the Safety Management System.
- Adequate resources have been allocated to the evaluation process.
- Staff are involved in the evaluation of your Safety Management System.
Integrated Safety Management Systems can benefit your operations. The application of the system depends on the size and nature of your operation. By customising your Safety Management System to the way you do business, you can ensure ownership of the process.

Management commitment, effective two-way communication and a positive safety culture are the foundations for success.

Effective Safety Management Systems contribute to successful business performance by involving people at all levels to:

- Set objectives, policy and procedures for safe operations.
- Set responsibilities, accountabilities and authorities for safety action.
- Report safety concerns.
- Identify and minimise hazards and risk within the workplace.
- Maintain document control.
- Participate in and improve the standards of safety performance.
- Monitor and evaluate the safety health of your operation.

Integrating safety, quality and risk management systems provides a cost-effective approach to protecting the resources of your operation.
This confidential hazard report form was proposed during Safety Management System national education workshops. It should be customised to suit your business activities and/or modified to elicit information relevant to your hazard reporting objectives.

Confidential hazard report form

The information supplied in this form will only be used to enhance safety. On receipt of this form your name and position will be removed and discarded. Under no circumstances will your identity be disclosed to any person in this company, or to any other organisation, agency or person without your express permission.

Part A to be completed by the person identifying the hazard

Date of occurrence________________ Local time________________ Location________________

Please fully describe the occurrence:

Include your suggestions on how to prevent similar occurrences. ____________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

In your opinion, what is the likelihood of a similar occurrence happening again?

<table>
<thead>
<tr>
<th>Likely</th>
<th>Unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4</td>
<td>5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Fatality</th>
<th>Minor damage to equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4</td>
<td>5</td>
</tr>
</tbody>
</table>
Is it working?

How to evaluate your Safety Management System
Why evaluate?

A Safety Management System is an integrated set of work practices, beliefs and procedures for monitoring and improving the safety and health of all aspects of your organisation.

Why evaluate?

Evaluation is a set of techniques for monitoring and reviewing the adequacy of your Safety Management System. It helps you make decisions about safety controls in your organisation.

Direct benefits:

Evaluation helps you determine:

- The causal factors leading to accidents or incidents.
- The sources of deficiencies in the Safety Management System.
- Areas that need improvement.
- The effectiveness and applicability of procedures.
- Areas of non-compliance with organisational operating procedures.
- Areas of non-compliance with legal requirements.
- Corrective action needed.

Evaluation answers the following questions:

- What are the outcomes of the Safety Management System?
- Are the objectives being achieved?
- Are there any shortcomings in the Safety Management System?
- Is the Safety Management System being implemented correctly?
- Have there been any positive or negative spin-offs?

Indirect benefits

Workplace relations

Positive safety evaluation results can enhance relations with staff by demonstrating that the organisation is acting to ensure their safety.

Marketing and public relations

You can use your evaluation results as a positive marketing and public relations tool to show customers you are working to prevent accidents and incidents.

Winning contracts

The demonstration of a successful Safety Management System could be the difference between winning and losing a business contract.

Insurance

A demonstrated reduction in accidents and incidents may deliver lower insurance premiums.

Industry leadership

A good safety record will enhance your standing in the aviation industry, and encourage competitors to improve their standards to meet or exceed yours.

Freeing up funds for expansion

Accidents and incidents cost money, so reducing them releases funds for business expansion.

The demonstration of a successful Safety Management System could be the difference between winning and losing a business contract.
Fact finding

Evaluation activities need to be built into your organisation’s management practices, not added on. You must be clear on what information you need before you start evaluation.

Evaluation should cover the 10 steps of your Safety Management System (Sections 2.1 to 2.10) as they apply to each area of your operations, including:

• Flying operations.
• Maintenance.
• Management.
• Equipment.
• Passenger handling.
• Facilities, buildings
• Employee training.
• Employee qualifications.
• Manuals.
• Defect reporting.
• Record keeping.

Evaluation should consider your product, people, processes, services and contractors. These are integral to quality management. For example, scheduling problems could turn into safety problems.

Product:
• Did you run the correct number of scheduled flights?
• Were the flights on time?
• Was maintenance performed on time?

People:
How did your staff perform in:
• Check-in?
• Baggage handling?
• Cockpit or cabin?
• Maintenance?

Processes:
• Do your processes achieve the planned results?
• Is the correct number of steps in place?
• Is the sequence correct?
• Is the process complete?
• Is the process applicable?
• Is there any redundancy?
• Did the flights meet the prescribed weight limits?
• Were the aircraft serviceable?

Services:
• Do your services live up to your planned objectives?
• Are they needed?
• Are they efficient and profitable?

Contractors:
External contractors may include maintenance organisations, people accepting cargo on behalf of the operator and aerodrome operator personnel.

Before employing a contractor, you need answers to the following questions:
• Does the contractor have a Safety Management System? Is it compatible with yours?
• Are you required to inspect the contractor’s work premises? If so, how will you evaluate them?
• Are the contractors able to provide the service?
When to evaluate

Choosing the time

Evaluation of your business should take place regularly. It is an ongoing process and can be done either at fixed intervals or as required. Audits and evaluation may take place annually, in synchrony with the financial year. Safety audits may take place more frequently. Evaluation can be planned, or performed as required.

Planned or “proactive” evaluation is performed before a task is undertaken, or in the planning phase of the task. It establishes the baseline data for future measurements, and can pinpoint gaps in your system. However, you can perform it more frequently: daily (through talks with staff), weekly (at staff meetings), or monthly (at safety committee or management meetings). You can also perform it before or after you make a change or at the end of a specific task.

Indicators:

- Changes in passenger loads on particular routes.
- Changes in the number of safety reports being submitted.
- The number of staff undertaking scheduled training.
- Communication strategies.

Interactive evaluation draws information from staff to verify that corrective actions were reviewed and effective. It should be carried out daily, often through informal talks with staff.

Reactive evaluation is performed after an event to identify shortcomings in your Safety Management System. It can be driven by external concerns, identified safety trends, or airworthiness directives from the regulatory authority.

How to evaluate

Evaluation has four steps: planning, data collection, data presentation, and action.

Planning

When planning your evaluation program, consider what information you need and the resources available. The drivers for evaluation may be ongoing complaints, unmet needs of clients or customers, changes in regulations, or a need to check that your safety goals are being achieved.

When designing an evaluation program, consider:

- Purpose.
- Who the intended audience is.
- The kind of information you need.
- What sources you will use.
- How you will collect the information.
- When the information is needed.
- The resources available to collect the information.

Hint: Draw a flow chart to reflect the purpose of evaluation, who will be involved, and the expected costs and time scales.

Collecting the data

The methods you use to measure and assess your safety management system must be valid (that is, they must measure what they are meant to measure). They must produce results that are repeatable and consistent with results obtained using other tools.

Ways of getting the information you need include:

- Observation.
- Surveys and questionnaires.
- Interviews.
- Focus groups.
- Complaint forms or suggestion boxes.
- Audits.
How to evaluate

Observation
Observation, including informal site inspections, may highlight safety problems missed by other means of investigation.

Advantages:
• Quick to perform.
• Can prompt fast follow-up action.

Disadvantages:
• Difficulty in interpreting behaviour.
• Difficulty in categorising observations.
• Observation can influence the behaviour of those being observed.

Surveys and questionnaires
Safety surveys or questionnaires provide an in-depth analysis of an activity. They can be conducted on or distributed to:
• All staff.
• Specific staff.
• Customers.

Advantages:
• Can be completed anonymously.
• Cheap to administer.
• Generate results that are easy to compare.
• Can generate a large amount of data.
• Can utilise proforma surveys and questionnaires.

Disadvantages:
• May not draw considered feedback.
• Wording can bias answers.
• Are impersonal.
• May require statistical sampling expertise.
• Responses may not give the full story.

Interviews
Formal and informal interviews are conducted one to one and are an important way of getting information. Interviews can be held with:
• Clients.
• Staff.
• Other service providers.

The interviews can be structured, with all respondents asked the same questions, or tailored to the individual.

Advantages:
• Draw a full range and depth of information.
• Develop a relationship with respondents.
• Flexibility.

Disadvantages:
• Time consuming.
• Difficult to analyse and compare.
• Costly.
• Interviewer can bias responses.

Safety surveys or questionnaires provide an in-depth analysis of an activity.
Focus groups
Focus groups bring six to eight workers together to discuss their workplace. Normally, an outside facilitator leads the discussion. This elicits candid comments, which go to the evaluator in transcript for analysis.

Advantages:
• Quick and reliable pointer to common impressions.
• Produce a wide range and depth of information.
• Convey key information about the organisation.

Disadvantages:
• Difficulties in analysing.
• Require a good facilitator.
• Difficulties in getting six to eight people together at once.
• Pressure to answer questions without much time for thought.

Complaint forms or suggestion boxes
Suggestion boxes for workers or customers can be a useful source of information about the environment, services or people within your organisation.

Advantages:
• Anonymous.
• Suggestions are often more honest.
• Easy to administer.

Disadvantages:
• Open to abuse.
• Contents must be monitored constantly.

Audits
Audits are "microscopic" examinations of every component of a total system.

Advantages:
• Provide clear directions.
• May be more objective.
• Form part of a planned process.

Disadvantages:
• Consider requirements of standards only.
• Limited perspective.

Data presentation, interpretation and reporting
Electronic databases enable you to process data to analyse trends. They point to ways to eliminate or counter problems.

The easiest way to interpret your evaluation results is to represent them graphically as:
• Flow charts.
• Pie charts.
• Bar graphs.
• Scattergrams.
• Checklists.

How you report your evaluation data depends on why you collected them, and your audience.

For example, was the evaluation done to upgrade your Safety Management System, to investigate an incident, or to demonstrate compliance with regulations?
In most cases, the data will be compiled and analysed in a report. Staff will then have the opportunity to review the information.

We suggest you present the report in the following format.

1. Title page.
2. Table of contents.
3. Executive summary.
4. Purpose of the report.
5. Organisational background and what is being evaluated.
   a. Previous safety records (12 months).
   b. Program description.
      i. Statement of the problem.
      ii. Overall goal.
      iii. Outcomes.
      iv. Staffing.
6. Overall evaluation goals.
7. Methodology.
8. Interpretations and conclusions.
10. Appendixes.

**Action**

If the evaluation data turn up a recurring operational problem, you will be able to use this information as a basis for change. Discuss the problem and recommended action with relevant staff and communicate decisions to everyone involved.

This section takes you through evaluation of each of the 10 steps to establishing a Safety Management System as outlined in Chapter 2 “Getting Started”.

**Step 1: Establish senior management commitment**

While safety management encourages the involvement of all staff, without commitment from senior management your Safety Management System will not be effective. Management commitment is hard to measure, but evidence of it includes:

- Allocation of time to safety management.
- Allocation of time for staff training.
- Participation in staff training.
- Provision of information and advice.
- Provision of adequate safety management resources.
- Written safety policy objectives.
- Determination of occupational health and safety objectives and strategy.
- Communication with staff on safety issues.
- Action to ensure that staff know their responsibilities.

**Check:**

- Is management committed to the safety management program?

**Step 2: Set safety management policies and objectives**

The purpose of developing safety management policies and objectives is to set out what your organisation is striving to achieve and how it is going to get there.

**Checklist:**

- Are there written aviation safety policies, signed by the CEO?
- Are the policies and objectives workable, knowable and measurable?
Step 3: Appoint a safety officer (if applicable)

The safety officer’s outcomes can be measured against the responsibilities of the job laid out in the organisation’s operations manual.

For example, one responsibility of the safety officer is to monitor the progress of safety reports and ensure that hazards are eliminated or minimised promptly.

Hint: To check that this has been done, you could track safety reports and follow-up action.

Evaluation should identify reasons why any report was not resolved, and point to ways of averting the problem. Reasons could range from time constraints to a lack of resources.

Checklist:
- Are safety reports being prepared promptly?
- Are hazards being eliminated or reduced promptly?
- Is the safety officer receiving enough support from the organisation?
- Is the safety officer credible?
- Is there a mechanism by which the safety officer can report to the CEO and make recommendations for change or action?

Step 4: Set up a safety committee (if applicable)

The work of the safety committee should be evaluated against the functions and responsibilities set out in the organisation’s operations manual.

The percentage of reports actioned and the number of hazards identified or eliminated are examples of statistics you can use to evaluate the committee’s performance.

Checklist:
- Are hazards being eliminated or reduced?
- Is there a mechanism by which the safety committee can report to the CEO and make recommendations for change or action?

Step 5: Establish a process to manage risks

Risk management focuses on identifying hazards, analysing the risks, ranking them according to their probability and likelihood, and setting priorities for action.

Checklist:
- Is there an effective ongoing hazard identification program?
- Is there a system to rank hazards by their risk potential and prioritise them for action?
- Are the defences against the hazards identified?

Step 6: Set up a reporting system to record hazards, risks and actions taken

The reporting system is the easiest part of the Safety Management System to evaluate. You can sort your reports by type and compare them with previous years’ results to find out whether incident frequencies have changed, or whether there is a trend in results.

Hint: If you use an electronic database to record and track your safety information and reports, it is easy to extract specific information and produce a graph or report for discussion.

Checklist:
- Is there a reporting system for hazards and risks?
- Does the reporting system cover contractors?

Step 7: Train and educate staff

Training can be evaluated in several ways.

Keep records of staff annual training requirements, such as renewal of ratings, certificates or acquisition of specialist trade skills to ensure that they are equipped with the latest information relevant to their work tasks.

Hint: It is more efficient to resolve training inadequacies immediately, as they could compromise safety.

Keep records of:
- The type of training.
- The frequency of training.
- The application of training to the workplace.

Monitor the skill level of staff and the expiry of certificates and ratings in order to plan for annual refresher courses.
Audits, often performed by outside agencies, are critical to evaluation.

**Checklist:**
- Is there a formal system to ensure that all staff meet the minimum regulatory requirements for their job?
- Is staff training, including annual renewal of ratings, up to date?

**Step 8: Audit your organisation and investigate incidents and accidents**

Audits, often performed by outside agencies, are critical to evaluation. You need them to manage your business finance, and you will extract quality safety information from them. They follow a set format and are measured against specific rules or regulatory requirements.

**Checklist:**
- Do your audit criteria match your operating procedures?
- Have all incidents and accidents been investigated adequately?

**Step 9: Set up a system to control documentation and data**

Documentation is an auditable trail of action to minimise risk. It can provide evidence if you need to defend your actions.

- Keep records of:
  - Hazard assessments.
  - Safety reports issued or received.
  - Safety recommendations.
  - Remedial actions.

**Hint:** Measure the control of documentation against the document requirements laid out in your operations manual. Check documentation against the requirements within the Safety Management System. If evaluation prompts you to change the reporting or documentation systems, let your staff know.

**Checklist:**
- Are files maintained and kept for the prescribed length of time?
- Are records of meetings and safety incident reports easily retrieved?
- Do staff know how to use the reporting system?

**Step 10: Evaluation**

The evaluation process itself can be reviewed and improved upon where necessary.

**Checklist:**
- Is your evaluation process giving you the answers you need?
- Is your evaluation system identifying gaps in your Safety Management System?

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**The evaluator**

The evaluator can be either a staff member or an external expert. If staff resources are limited, you could get an outside agency to design the evaluation and use a staff member to conduct the evaluation.

The evaluator should:
- Be qualified to the highest appropriate standards in the area.
- Explore the strengths and weaknesses of your organisation.
- Communicate clearly their intentions before the evaluation.
- Demonstrate honesty and integrity.
- Respect the opinions and actions of others.
- Communicate findings effectively.

Both internal and external evaluators may have advantages and disadvantages, some of which are shown in the table below.

<table>
<thead>
<tr>
<th>Internal</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Familiar with the business</td>
<td>• Too close to the action</td>
</tr>
<tr>
<td></td>
<td>• Greater understanding of the issues and background</td>
<td>• Judgement may be distorted by past experiences in the organisation</td>
</tr>
<tr>
<td></td>
<td>• More committed to the result</td>
<td>• Costs less</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Distraction from primary duties</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pressure to deliver report rather than have accurate content</td>
</tr>
<tr>
<td>External</td>
<td>• More detached and critical</td>
<td>• May cost more</td>
</tr>
<tr>
<td></td>
<td>• Fresh perspective</td>
<td>• May be misled about the purpose of the evaluation</td>
</tr>
<tr>
<td></td>
<td>• May have higher knowledge/skill base</td>
<td>• Little understanding of industry procedures</td>
</tr>
</tbody>
</table>

If resources are limited, you could get an outside agency to design the evaluation and use a staff member to conduct the evaluation.
Choosing the right person

Ensure that your evaluator is aware of:

• The purpose of the evaluation.
• The expectations of the organisation.
• The timeline for conduct of the evaluation and for submission of findings.
• Who to report to and where to get support and information.

Internal evaluators

The safety officer may be responsible for the daily operating of your Safety Management System and could be the most appropriate person to act as evaluator.

Other internal evaluators may be:

• A senior administrative officer.
• The chief maintenance engineer.

External evaluators

External evaluators must be qualified in the relevant subject matter to the highest standard possible. They may include:

• CASA compliance auditors.
• Financial auditors.
• Occupational health and safety or WorkCover inspectors.

Check: □ Is your evaluator qualified?

Safety Management Systems are an integrated set of work practices, beliefs and procedures for monitoring and improving the safety and health of all aspects of your operation. They can be implemented in any organisation regardless of size.

The application of the system depends on the size and nature of your operation. By customising your Safety Management System to the way you do business, you can ensure ownership of the process.

Integrating safety, quality and risk management systems provides a cost-effective approach to protecting the resources of your operation.

Experience has shown that Safety Management Systems make good economic sense, provide marketing advantages and can lead to improved communication, workplace morale and productivity.

Management commitment, effective two-way communication and a positive safety culture are the foundations for success.

Effective Safety Management Systems contribute to successful business performance by involving people at all levels to:

• Set objectives, policy and procedures for safe operations.
• Set responsibilities, accountabilities and authorities for safety action.
• Report safety concerns.
• Identify and minimise hazards and risk within the workplace.
• Maintain document control.
• Participate in and improve the standards of safety performance.
• Monitor and evaluate the safety health of your operation.

Evaluating your Safety Management System is an essential and on-going part of your business. Regular review of your Safety Management System will ensure that it remains effective and relevant to your organisation. It helps you rate your organisation’s performance and solves safety problems. It is not a process to be feared but one to support.

Regular review of your Safety Management System will ensure that it remains effective and relevant to your organisation.
Appendix C

Implementation and Evaluation Checklist
The following have been identified as key points in aviation safety management. Answer the questions frankly for your organisation. Any points to which you tick “no” require further exploration or action.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>FACTOR</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANAGEMENT</td>
<td>1. Is management committed to the Safety Management Program?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>2. Is there a written aviation safety policy, signed by the CEO?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>3. Has a safety officer been appointed?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>4. Is the safety reporting chain appropriate?</td>
<td>☐Yes  ☐No</td>
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<td></td>
<td>5. Is the safety officer sufficiently supported within the organisation?</td>
<td>☐Yes  ☐No</td>
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<tr>
<td></td>
<td>6. Is there a safety committee?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>7. Is the safety officer credible?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>8. Is the safety officer an enthusiast for his or her job?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>9. Are the roles and responsibilities of the personnel in the Safety Management System documented?</td>
<td>☐Yes  ☐No</td>
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<td></td>
<td>10. Are the values of management identified as being safety oriented?</td>
<td>☐Yes  ☐No</td>
</tr>
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<td></td>
<td>11. Are sufficient resources (financial, human, hardware) made available for the Safety Management System?</td>
<td>☐Yes  ☐No</td>
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<td></td>
<td>12. Are there appropriate safeguards in place to ensure that the Safety Management System itself is properly evaluated?</td>
<td>☐Yes  ☐No</td>
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<td></td>
<td>13. Have appropriate standards been documented?</td>
<td>☐Yes  ☐No</td>
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<td></td>
<td>14. Is there an appropriate emergency response plan?</td>
<td>☐Yes  ☐No</td>
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<td></td>
<td>15. Is there an effective on-going hazard identification program?</td>
<td>☐Yes  ☐No</td>
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<td></td>
<td>16. Does the hazard identification program include a confidential reporting system?</td>
<td>☐Yes  ☐No</td>
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<td></td>
<td>17. Are confidential reports properly de-identified?</td>
<td>☐Yes  ☐No</td>
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<td></td>
<td>18. Are hazards associated with contracted agencies included in the hazard reporting system?</td>
<td>☐Yes  ☐No</td>
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<tr>
<td></td>
<td>19. Is there a procedure established for acknowledging safety-related reports?</td>
<td>☐Yes  ☐No</td>
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<tr>
<td></td>
<td>20. Is there a process whereby the hazards are continuously assessed for their risk potential (likelihood and severity)?</td>
<td>☐Yes  ☐No</td>
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<tr>
<td></td>
<td>21. Are the defences against the hazards identified?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>22. Does the process include the identification of the need for further defences or hazard avoidance?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td>HAZARD ASSESSMENT PROCEDURES</td>
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<td>23. Is there an effective mechanism by which the safety officer or the safety committee reports to the CEO?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>24. Can the safety officer/committee make recommendations for change or action?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>25. Is there an obligation on the part of the CEO to give a formal response to any safety-related recommendations?</td>
<td>☐Yes  ☐No</td>
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<tr>
<td></td>
<td>26. In the event that the CEO makes an unfavourable response to a safety recommendation, is there a procedure whereby the matter is monitored by the safety officer or safety committee until resolution is reached?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>27. Are the results of hazard reports and safety suggestions made available to the initiator?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>28. Are the results of hazard reports and safety suggestions made widely available within the organisation?</td>
<td>☐Yes  ☐No</td>
</tr>
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<td></td>
<td>29. Is the process for risk assessment and management, as described in the above procedures, fully documented?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>30. Does the Safety Management System require the recording of identified hazards and defences?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>31. Is there a supply of safety-related literature (e.g. periodicals, magazines, books, articles, posters, videos) readily available to all employees who have safety responsibilities?</td>
<td>☐Yes  ☐No</td>
</tr>
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<td></td>
<td>32. Are employees encouraged and assisted in attending training courses and seminars related to safety?</td>
<td>☐Yes  ☐No</td>
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<tr>
<td></td>
<td>33. Are employees trained in the procedures and policy of the Safety Management System?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>34. Are new employees given sufficient training and checking in their technical duties prior to being permitted to work either supervised or unsupervised?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>35. Is the continuation training and checking of all employees adequate?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>36. Are employees given sufficient training in new procedures?</td>
<td>☐Yes  ☐No</td>
</tr>
<tr>
<td></td>
<td>37. Are trainers and checkers adequately trained and checked, both for competence and standardisation?</td>
<td>☐Yes  ☐No</td>
</tr>
</tbody>
</table>
Further information


Civil Aviation Authority (UK) 2002. CAP 716 Aviation maintenance human factors. CAA, London.


Further information
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Contact Information
For general information, visit CASA’s website: casa.gov.au
For Safety Management Systems information, visit:
or Call CASA’s Safety Promotion Division, ph: 131 757 (local call).
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