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## AVIATION RISK MANAGEMENT AN INTRODUCTION

CIVIL AVIATION AUTHORITY OF NEW ZEALAND  
BOOKLET FOUR



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# PREFACE

The Civil Aviation Authority (CAA) published Advisory Circular ACOO-4 *Safety Management Systems* in December 2012 to provide comprehensive guidance material to support organisations implementing a Safety Management System (SMS).

The CAA supports a risk-based approach to the implementation and conduct of SMS. In order to provide aviation organisations with the right guidance and tools to do so, this booklet focuses on what ‘Safety Risk Management’ means and how they can take this approach in an easy and effective manner.

It explains the steps that can be taken to successfully, systematically and proactively manage safety risk across all operational activities.

This booklet is based on application of AS/NZS ISO 31000:2009 *Risk management – Principles and guidelines*. Key phraseology and concepts have been compared with the International Civil Aviation Organization (ICAO) *Safety Management Manual*, Third Edition – 2013 (see Annex A).

This booklet may be read in conjunction with the other CAA Industry Resource Kit booklets:

- **BOOKLET ONE** – Safety Management Systems (SMS): an introduction.
- **BOOKLET TWO** – From Quality Management Systems to Safety Management Systems: an enhancement guide.
- **BOOKLET THREE** – Implementing Safety Management Systems: guidelines for small aviation organisations.



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# AVIATION RISK MANAGEMENT: THE FUNDAMENTALS

PRACTICING RISK MANAGEMENT NEEDS AN UNDERSTANDING OF THE THEORY AND PHILOSOPHIES BEHIND IT. THIS SECTION SUMMARISES THE INFORMATION YOU NEED TO GET STARTED AND STAY ON THE RIGHT PATH.

## SAFETY MANAGEMENT SYSTEMS (IN THE CONTEXT OF A RISK-BASED APPROACH)

The CAA defines an SMS as a **systematic approach to managing safety, including the necessary organisational structures, accountabilities, policies and procedures**. An SMS will only be effective through an understanding of hazards in your organisation, the associated risks, and the development of strategies to mitigate these risks.

Two of the thirteen key elements of an SMS are Hazard Identification (Element 4) and Risk Management (Element 5). These two Elements are the focus of this booklet.

## HAZARDS AND HAZARD IDENTIFICATION

A hazard is **an object or condition with the potential to cause injuries to personnel, damage to equipment or structures, loss of material or reduction of an ability to perform a prescribed function** (ICAO definition).

Hazards are an inevitable part of aviation activities. Identifying the hazards is a prerequisite of safety risk management; only when hazards are identified can they be visibly managed.

Hazard identification is the foundation of the risk management process in an SMS and may be conducted reactively, proactively and even predictably.

There are different kinds of hazards to consider in aviation operations:

- **Visible hazards** – these are the types of hazard that are easily seen, smelt, heard, tasted or felt. They're the most obvious, but for that reason can be easy to overlook. Examples in aviation may include an obstruction on a taxiway, an overheated tyre or a rough-running engine.
- **Hidden hazards** – these are the hazards that are not easily detected. They are the least obvious and can include physical hazards such as electricity and radiation, as well as hazards such as inadequate training, stress, system failure and the effects of altitude.

- **Emerging hazards** – these are hazards that at first seem minor and do not receive attention, but soon become worse and could cause great damage, such as a very small oil leak or an issue with teamwork amongst crew members.

## 'RISK' AND 'RISK MANAGEMENT'

Risk is defined as **the effect of uncertainty on objectives**.

Risk Management is the sum of the **coordinated activities an organisation does to direct and control risk** (AS/NZS ISO 31000:2009). The purpose of risk management is to make sure risks are managed to an acceptable level, and this is the way it helps create an effective SMS.

Here's the relationship between a hazard and a risk – a hazard is something with the potential to cause harm, and a risk is the potential outcome of a hazard. For example, an uneven runway surface would be considered a hazard, but the risk comes from operating on that runway; there is no risk if the runway is not used.

Risk Management can be applied to all facets of aviation activity.

## PRINCIPLES

AS/NZS ISO 31000:2009 identifies eleven principles for effective risk management (RM). Think about these when developing and implementing your own risk management practices.

### 01 RM CREATES AND PROTECTS VALUE

Risk management is designed to improve performance and efficiency in lots of different areas of an organisation.

### 02 RM IS AN INTEGRAL PART OF ORGANISATIONAL PROCESS

It's possible to integrate risk management practices into your 'business as usual' activities, such as incorporating 'risks and hazards' discussions in regular meetings.

### 03 RM IS PART OF AN ORGANISATION'S' DECISION MAKING

A big part of managing safety is knowing what risks you face, and making decisions based on that information.

### 04 RM ADDRESSES UNCERTAINTY

Uncertainty is the state (even partial) of deficiency of information related to understanding or knowledge of an event, its consequences or its likelihood.

### 05 RM IS SYSTEMIC, STRUCTURED AND TIMELY

Making sure your risk management practices are consistently applied, as this will help improve your SMS.

### 06 RM IS BASED ON THE BEST AVAILABLE INFORMATION

Risk management brings about good habits in collecting the right kind of data to help identify risks, and the ways to manage them. You'll find yourself sourcing historical data, using stakeholder input, gathering information from audits, etc.

### 07 RM IS A TAILORED APPROACH FOR YOUR ORGANISATION

The best risk management practices are the ones you develop for your organisation (i.e. no 'cut-and-paste' approach). That's what the guidance in this Booklet is for.

### 08 RM TAKES HUMAN AND CULTURAL FACTORS INTO ACCOUNT

The risk management methodology helps your organisation take account of human factors and cultural considerations.



## 09 RM IS TRANSPARENT AND INCLUSIVE

Risk management encourages appropriate and timely inclusion of stakeholders, from your organisation and from other organisations or groups. This allows you to get their input and allows them to see your processes as well.

## 10 RM IS DYNAMIC, ITERATIVE AND RESPONSIVE TO CHANGE

Risk management gives you the structure to continually sense and respond to change.

## 11 RM FACILITATES CONTINUAL IMPROVEMENT AND ENHANCEMENT OF YOUR ORGANISATION

It's so much easier to improve your business when you know where to focus.

## BENEFITS

There are many benefits of effective risk management. The main one is safety, but there are some great indirect benefits as well.

### SAFETY BENEFITS

- Fewer operational occurrences or incidents.
- Fewer injuries and other workplace safety occurrences.

### OPERATIONAL BENEFITS

- More consistent and effective operational practices.
- Lower risk when expanding operational scope or capability.

### FINANCIAL BENEFITS

- Lower repair and unscheduled maintenance costs due to damage or less-than-ideal operational practices.
- Lower insurance costs.

## APPLYING RISK MANAGEMENT AS PART OF AN SMS

You need to embed your risk management practices into 'business as usual' and ensure that they're tailored to the context of your business.

### WHEN DO YOU APPLY THE RISK MANAGEMENT PROCESS?

Depending on how you are using it, risk management can be a detailed, formal process or a simpler one. Here are some examples and techniques of both.

#### When to do an informal risk assessment:

- If you are extracting contents from your Risk Register.
- When there is a variation to your usual operational tasks, such as a diversion to an airport that you don't usually use.

You can document these informal risk assessments in a company Risk Register.

#### Do a formal risk assessment:

- Whenever you're considering or implementing a significant change, such as a new aircraft type, a new commercial venture, merger or acquisition.
- When there have been external changes that may affect you, such as airspace changes or a shortage of pilots.
- Whenever management decisions are made that may affect operational activity.

You can document this type of detailed risk assessment as part of a formal risk management plan (see Annex E).

#### WHENEVER YOU ARE APPLYING RISK MANAGEMENT:

- Be careful not to accept unnecessary risk (and it's up to you to define what 'unnecessary' means).
- Accept risk only when the benefits outweigh the costs.
- Make risk decisions at the appropriate level.

## RISK MANAGEMENT – LINKAGES WITH SMS AND HSE

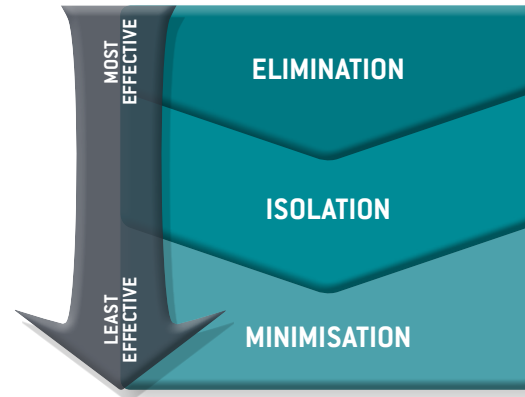
### LINKING RISK MANAGEMENT WITH SMS...

Risk management can be applied to much more than safety in an organisation. However, in the context of an SMS, risk management provides a philosophy for managing risks that then drives the right processes and practices. So, in the end, risk management helps with identifying, assessing and controlling safety risks, which is the core of the SMS.

### LINKING RISK MANAGEMENT TO HSE REQUIREMENTS...

Health, Safety and Environment (HSE) legislation and systems focus on reducing the risk of personal injury and environmental harm. However, HSE does not inherently focus on operational safety. The New Zealand Health and Safety Act imposes a duty on employers to identify hazards and to take all practicable steps to eliminate them and, where this is not practicable, isolate the hazard from the personnel. If isolation of the hazard is impracticable then the hazard is to be minimised by taking all practicable steps to reduce the likelihood that the hazard will be a cause or source of harm to personnel.

**FIGURE 1** *Health and Safety Hierarchy of Control*



The good news is that the risk management approach outlined in this handbook is compatible with the management and reduction of HSE risks. Using this approach will allow you to proactively identify operational hazards and safety risks as well as HSE risks. This creates an opportunity to have an SMS with risk management practices that can look at all types of risk.

# RISK MANAGEMENT – 5 IMPORTANT CONCEPTS

## DIFFERENCES BETWEEN A HAZARD AND A RISK

A hazard is something that has the potential to have a negative, harmful consequence. A risk is the combination of a consequence and the likelihood of it occurring; a risk arises from exposure to a hazard. In other words, a hazard can be a source of risk (but so can uncertainty and opportunity).

## ‘RISK MANAGEMENT’ VERSUS ‘MANAGING RISK’: LEVELS OF FORMALITY

As an aviation professional, you manage risk every day. This will always be essential. However, there are different scales of risk management practice, from the **immediate** and generally least formal to the **detailed** and formal.

## ‘REACTIVE’, ‘PROACTIVE’ AND ‘PREDICTIVE’ RISK MANAGEMENT

Having a combination of reactive, proactive and predictive risk management practices is important. So, what is the difference between reactive, proactive and predictive actions, in the context of risk management? Here are some examples:

### ‘Reactive’ risk management

- Managing the risks identified as part of an incident investigation.
- Using incident and injury reports to determine risks.
- Triggering a risk management plan only when a project has run into problems.

### ‘Proactive’ risk management

- Using a risk assessment checklist before each operational activity to highlight risks.
- Developing a risk management plan for a planned change.
- Providing a risk report to each Board meeting to provide assurance.

### ‘Predictive’ risk management

- Using predictive analytic tools and techniques that enable organisations to identify patterns in data that can be used to make predictions of future outcomes.

## THE RELATIONSHIP BETWEEN REGULATORY REQUIREMENTS AND RISK MANAGEMENT

It's important to identify that not complying with regulations is most certainly a risk to an organisation, but compliance management is not the same as safety management.

Complying with the various regulatory requirements means that you are managing some of the safety risks that exist as part of your operations. However, simply complying with regulations doesn't mean that you're managing all your risks. Regulations cannot, and are not intended to, cover every possible risk.

The most effective approach an aviation organisation can take is a **risk-based** approach. This means that anything that may affect safety is identified and assessed, and controls put in place to eliminate or minimise the impact of the risk.

## RISK MANAGEMENT TAKES A LOT OF DIFFERENT FORMS (IT'S NOT ALL ABOUT THE MATRIX)...

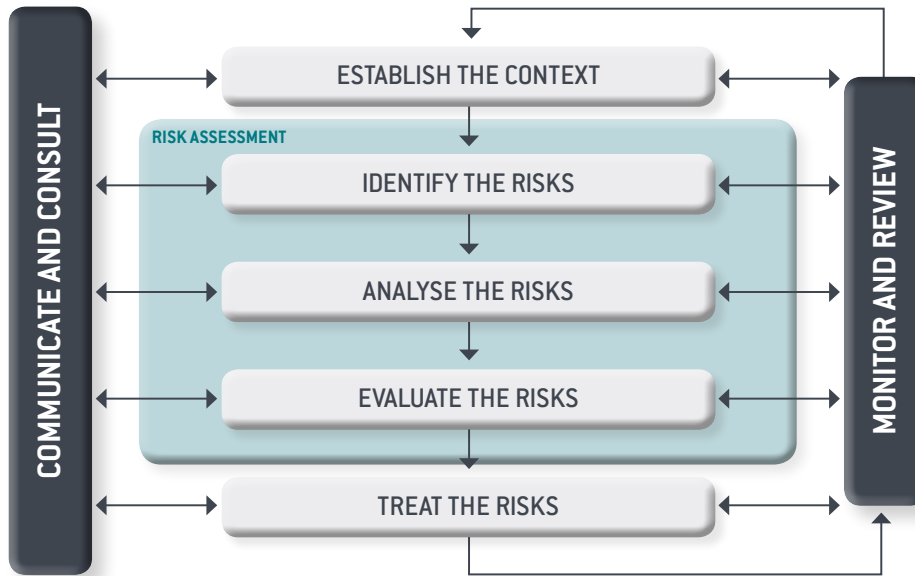
There's a common belief that risk management is based on a risk matrix. This isn't so: a risk matrix is simply one tool that can be used.

A risk matrix is one way to combine consequence and likelihood into a risk level (either qualitatively or quantitatively or both). This works well for more formal risk assessments, such as a Risk Management Plan. However, for smaller-scale risk assessments, you might just rank your risks according to what looks the highest. It's all about getting to the point where you've decided on actions to minimise unacceptable risks – it's not about whether they're perfectly organised.

## THE RISK MANAGEMENT PROCESS – AN OVERVIEW

The risk management process is the cornerstone of any risk-based SMS. It involves five steps, which are designed to help identify, assess and control safety risks, and two ongoing processes.

**FIGURE 2** *The Risk Management Process (AS/NZS ISO 31000:2009)*



# COMMUNICATION AND CONSULTATION

Consultation and communication must happen throughout the risk management process.

## WHAT'S INVOLVED...?

**Communication** provides others with information, and **consultation** seeks information. Both should involve a two-way exchange. It's a good idea to list all possible stakeholders that may need to be involved right at the beginning of the risk management process.

## BENEFITS OF EFFECTIVE COMMUNICATION AND CONSULTATION

- You can identify and record more risks, and improve your understanding of them.
- You can take others 'along for the journey' for better endorsement and support (which is especially important if they're involved in risk treatments later on).
- You'll increase confidence in the risk management process, and in your organisation's ability to manage risk.

## COMMON TOOLS FOR COMMUNICATION AND CONSULTATION

- Facilitated workshops or focus groups.
- Surveys.
- Regular progress reports, newsletters, emails.
- Interviews or one-on-one discussions.

### COMMUNICATION AND CONSULTATION CHECKLIST

- Have you listed your stakeholders?
- Do any of your stakeholders require communication only?
- What tools are you going to use?

CHECKLIST

# STEP 1: ESTABLISH THE CONTEXT

This step sets the frame of reference and identifies your organisation's objectives, and the internal and external factors that could be the source of uncertainty or harm.

## WHAT'S INVOLVED...?

### 01. Setting the aims and objectives (internal context)

- What is the task or activity?
- Why are you doing it?
- What's its significance to the organisation?

### 02. Establishing the external context

- Identify and examine the operating environment (incl. economic, regulatory, social, environment).

### 03. Setting the risk criteria

- Determine how the level of risk will be established.
- Decide on what risk level(s) are considered acceptable, and what are not. Decide on what actions should be triggered for each risk level.
- Get the risk level approved.

### 04. Assumptions and limitations

- List any assumptions you have made.
- List the limitations and exclusions (where you will stop, what you aren't considering).

## HOW TO GO ABOUT IT:

- Think about the resources you need for the risk management process – the documents, staff, facilities, etc.
- Review external factors such as the political, economic and technical environment.
- Consult your internal and external stakeholders.

### 'ESTABLISH THE CONTEXT' CHECKLIST

- Do I understand the importance of the activity and its relevance to the safety of my organisation?
- Have I defined my objectives?
- Have I set the risk criteria and have they been approved?
- What assistance do I need?
- What needs to be documented?

**CHECKLIST**





## STEP 2: IDENTIFY RISKS

This step is about identifying all the hazards and the associated safety risks. It's important to be structured in doing this to make sure you don't miss anything. An unidentified hazard can't be addressed.

One of the most important sources of hazard information are hazard reports. Make sure that everyone understands the importance of reporting every hazard they notice. Encourage your staff to look out for hazards, and maintain a register of these identified hazards.

### WHAT'S INVOLVED...?

- Decide how you'll go about identifying the hazards and the risks (see Annex B for hazard identification tools).
  - Decide who needs to be involved (your stakeholders).
  - Look at all your hazard information sources – these will be the key to most of the risks you need to identify.
  - Consider all aspects – aircraft, equipment, human factors, environmental factors, even competitors.
- If you just identify a risk, work backwards to identify the hazard that leads to it.
  - Articulate the risk – consider risk statements like: 'As a result of A, B may happen', or 'X may lead to Y'.
  - Document the results in your Risk Register (see Annex D for an example).
  - Keep asking yourself, 'WHAT IF...? WHAT IF...? SO WHAT?'

### SOMETHING THAT CAN HELP... A TASK ANALYSIS (SEE ANNEX B FOR AN EXAMPLE)

- Outline the different parts or sub-tasks of the task you're examining. Breakdown may be by function, chronological order, operational phases, or other factors.
- This breakdown will help with the systematic identification of risks.

## KEY QUESTIONS FOR IDENTIFYING RISKS

WHAT CAN  
HAPPEN?

HOW CAN IT  
HAPPEN?

WHY COULD  
IT HAPPEN?

WHEN COULD  
IT HAPPEN?

WHERE  
COULD IT  
HAPPEN?

### 'IDENTIFY RISKS' CHECKLIST

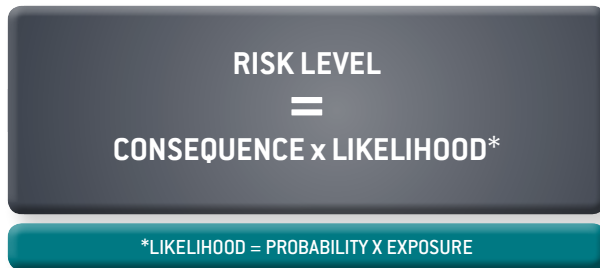
- What is the source of each risk?
- Does the list of risks look complete?
- Has everyone been consulted that needs to be?
- Who do I need to communicate the results to?

CHECKLIST

## STEP 3: ANALYSE RISKS

The aim of this step is to understand the nature of the risks you've identified and to determine the level of each risk. Remember that the risk level is a combination of consequence and likelihood:

**FIGURE 3** Risk Level Calculation



When dealing with hazards, you may need to break 'likelihood' down further into 'probability x exposure'. Both the frequency and the duration of exposure to the hazard can change the likelihood.

For example, flying between the South and North Island exposes you to water hazards, but the extent of that exposure depends on how often you make those flights.

### WHAT'S INVOLVED...?

- Identify any existing controls to the risks you've identified.
- Decide on any **risk analysis tools** you may want to use (e.g. a risk matrix, paired with consequence and likelihood descriptors). See Annex C for details on how to develop a risk matrix.
- Review each risk statement and consider the most reasonable maximum **consequence** (don't just jump straight to the worst possible outcome), and then the **likelihood** of that consequence occurring (keep in mind the original context).
- Document the results.

## CONSIDER:

- Are you going to analyse your risks on the basis of the worst possible consequence, or the maximum reasonable consequence?
- The ‘maximum reasonable’ scenario is best when assessing day-to-day risks.
- However, the ‘worst possible’ scenario can help you figure out what you may need in an Emergency Resource Plan.

## RISK MATRIX

It may be useful to use a risk matrix, particularly if you have a lot of risks. However, it’s important that you build your own risk matrix and descriptors – using someone else’s won’t give you the right scope and scale. See Annex C for more information.

### ‘ANALYSE RISKS’ CHECKLIST

- What are the existing controls?
- Have you considered the most reasonable maximum consequence?
- Have you discussed the risk levels with stakeholders (just to check them)?

CHECKLIST



# STEP 4: EVALUATE RISKS

This step involves comparing the risk levels found from the analysis against your risk criteria and deciding whether or not each risk can be accepted.

## WHAT'S INVOLVED...?

- Look at all the risks and work out which ones are acceptable at their current level (use your risk criteria from Step 1).
- List all the unacceptable risks in order of priority for treatment.

## SO WHAT ARE YOUR CHOICES FOR RISK ACCEPTANCE? YOU CAN...

- Accept the risk as it is.
- Choose to treat the risk to reduce the risk level.

### 'EVALUATE RISKS' CHECKLIST

- Which risks can you accept?
- Which risks are not acceptable (and need treating)?

CHECKLIST

# STEP 5: TREAT (OR CONTROL) RISKS

A risk treatment is any action or resource which, when applied to a risk, reduces its consequence, likelihood, or both.

## TREATMENT OPTIONS:

IMPLEMENTATION GUIDE	
<b>AVOID THE RISK</b>	Adopt a completely different way of doing something, or simply abandon the task
<b>REDUCE THE RISK</b>	Reduce the likelihood or consequence of the risk. This generally means reducing the likelihood
<b>SHARE THE RISK</b>	Get someone to share the responsibility for the risk; a trouble shared is a trouble halved
<b>REFER THE RISK</b>	Pass the risk to someone else to treat (usually someone above you in the organisation)
<b>RETAIN THE RISK</b>	You may just have to carry any risk that remains

## WHAT'S INVOLVED...

- Assess these options on the basis of their relative feasibility, effectiveness and cost.
- Prepare your risk treatment plan and implement it (in order of priority), with consideration of what's realistic to do.

### 'TREAT RISKS' CHECKLIST

- Do your treatments for each risk make enough difference?
- Do the benefits of the treatment outweigh their costs?
- What additional hazards or risks have resulted from those treatments?
- Who is the best person to accept residual risk?
- How will you be able to show the treatments are effective?

CHECKLIST



# MONITOR AND REVIEW

It is important to monitor and review what you're doing at each step of the risk management process. This will make sure that you're meeting your objectives. Monitoring is checking what is going on at each step, and reviewing means checking the results at each step.

## WHAT'S INVOLVED...

### What to monitor

- Changes to stakeholders and the effect this may have.
- Changes to the internal and external context.
- Quality and effectiveness of your communication and consultation.
- How you used the risk management process.
- Emergence of new risks.

### What to review

- The risks identified.
- The risk levels.
- The treatments that you've implemented.
- The effectiveness of the treatments.
- The resultant risks after a period of time (say, 6 months).
- Lessons learnt.

Any changes may require a re-analysis of the risk and your treatment plan.

#### 'MONITOR AND REVIEW' CHECKLIST

- What monitoring processes have you set up?
- What reviews have you undertaken?
- Have the risk treatments worked?  
If not, what else can be done?

CHECKLIST

## ANNEX A:

# COMPARING RISK MANAGEMENT PHRASEOLOGY AND CONCEPTS BETWEEN AS/NZS ISO 31000:2009 AND ICAO SAFETY MANAGEMENT MANUAL (THIRD EDITION)

Within this booklet, the phrases and concepts used are primarily derived from the international standard AS/NZS ISO 31000:2009 *Risk management – Principles and guidelines*. Aligned with this, ICAO sometimes uses different phrases and concepts; however, they all relate to the systematic identification, assessment and control of risks. To compare and contrast the two, the following table outlines some of the key differences, and how they related to each other.

	AS/NZS ISO 31000:2009	ICAO SAFETY MANAGEMENT MANUAL
DEFINING RISK...	<b>Risk</b> – effect of uncertainty on objectives	<b>Safety risk</b> – the predicted probability and severity of the consequences or outcomes of a hazard
DEFINING RISK MANAGEMENT...	Coordinated activities to direct and control an organization with regard to risk	The assessment and mitigation of safety risks
WHEN ANALYSING RISKS...	<b>Likelihood</b> – chance of something happening <b>Consequence</b> – outcome of an event <b>Risk level</b> – magnitude of a risk, or a combination of risks, expressed in terms of the combination of consequences and their likelihood	<b>Probability</b> – the likelihood or frequency that a safety consequence or outcome might occur <b>Severity</b> – the extent of harm that might reasonably occur as a consequence or outcome of the identified hazard <b>Risk index</b> – the composite of probability and severity
RISK CRITERIA / TOLERABILITY	<b>Risk criteria</b> – terms of reference against which the significance of risk is evaluated	<b>Risk tolerability</b> – [derived from context] the degree of acceptability of a risk
RISK TREATMENT / MITIGATION	<b>Treatment</b> – process to modify risk	<b>Mitigation</b> – The process of incorporating defences or preventive controls to lower the severity and/or likelihood of a hazard’s projected consequence

## ANNEX B: METHODS OF HAZARD IDENTIFICATION

These methods can help with identifying hazards. There are lots of ways to do this and whatever works for you is fine. But remember, hazard reporting is the most important.

### TASK ANALYSIS

A Task Analysis is a great way to systematically ‘unpack’ the activity, task or process that you’re assessing. The example is of a small helicopter operator that is considering starting tourism flights.

NO.	LIST TASK / ACTIVITY	WHAT COULD GO WRONG?	HOW COULD IT HAPPEN?	SO WHAT?
1	Flight planning	Incorrect weather information	Inaccurate sources and insufficient updates	Inaccurate planning, resulting in undertaking the flight into adverse weather
2		Incorrect passenger weights	Last-minute bookings and insufficient opportunity to accurately ascertain weight	Incorrect weight and balance could cause instabilities especially in adverse conditions

### OTHER METHODS AND SOURCES OF INFORMATION

- Brainstorming
- SWOT analysis
- Risk Dimension Analysis
- Workplace inspections
- Interviews with staff
- Surveys
- Safety meetings
- Checklists
- Audits
- Safety investigations
- Hazard reports
- Audit reports
- Review and analysis of incident and other safety reports
- Injury and illness history
- Industry data and experience
- Information from similar organisations

## ANNEX C: DEVELOPING A RISK MATRIX

Start by developing a set of consequence descriptors. The example shows how they could be constructed, but it's critical that you develop your own, so that they suit **your** organisation's operations, size and nature. The consequence levels need to be set for each dimension you choose (be it finance, reputation, etc). The table below outlines possible descriptors for a safety risk.

CONSEQUENCE LEVEL	DESCRIPTION
CATASTROPHIC	One or more fatalities Loss of aircraft or major equipment
CRITICAL	Serious injury to one or more people, resulting in permanent disability Sustained or extensive damage to aircraft or equipment
MAJOR	Injury that requires hospitalisation (with no permanent disability) Damage to aircraft or equipment resulting in temporary inability to use it
MODERATE	Injury requiring only First Aid (no permanent disability) Isolated and quickly-repaired damage to aircraft
MINOR	No injury or very minor injury that does not require First Aid Minor or no damage to aircraft or equipment

The next step is to determine your likelihood descriptors: again, these must reflect **your** organisation.

LIKELIHOOD LEVELS	DESCRIPTION
LIKELY	Expected to occur at least once during the task or activity
PROBABLE	Could occur during the task or activity
POSSIBLE	It's conceivable it could occur, but only expected infrequently
UNLIKELY	It's conceivable that this could happen, although only in unusual circumstances
RARE	It's not conceivable that this could occur

The examples show 5 levels of consequence and 5 of likelihood, but you can use more or less as appropriate – you could have 4 of one and 5 of the other. (Less than 3 of either is not much use).

Now you can build your risk matrix. The risk matrix connects the consequences and likelihoods to give a set of risk levels.

		LIKELIHOOD				
		RARE	UNLIKELY	POSSIBLE	PROBABLE	LIKELY
CONSEQUENCE	CATASTROPHIC	MEDIUM [16]	MEDIUM [10]	HIGH [6]	HIGH [3]	HIGH [1]
	CRITICAL	LOW [20]	MEDIUM [13]	MEDIUM [9]	HIGH [5]	HIGH [2]
	MAJOR	LOW [21]	MEDIUM [15]	MEDIUM [11]	MEDIUM [8]	HIGH [4]
	MODERATE	LOW [23]	LOW [19]	MEDIUM [14]	MEDIUM [12]	MEDIUM [7]
	MINOR	LOW [25]	LOW [24]	LOW [22]	LOW [18]	MEDIUM [17]

Next, set the risk levels for **your** organisation. Number them in order of priority, and, if you need to, you can have more than these three.

RISK LEVEL	DESCRIPTION
HIGH	A considerable potential for fatalities or serious injuries, or the loss of an aircraft or equipment
MEDIUM	A moderate potential for injuries requiring hospitalisation, or the damage of an aircraft or equipment
LOW	Minimal potential for injuries (above those requiring First Aid) or for any consequential damage to aircraft or equipment

To use the matrix, use the descriptors to determine the consequence and the likelihood for each risk, and then read off the risk level from the matrix.

Now prioritise the risks from highest to lowest (that's where the associated risk level number on the risk matrix can help), and you can move on treating the risks in order of priority.



## ANNEX D: RISK REGISTER TEMPLATE

You need a place to record all your risk information, and this can be done in a risk register. So why a ‘risk register’ rather than ‘hazard register’? A hazard register can be useful, but it only holds hazard information (which is a risk source): **a risk register is where hazard information becomes transformed into risk information.**

It’s best to designate one person in your organisation to maintain the register, but it’s important that everyone knows how to use it, and what’s in it. Here is one example of what could be included in your risk register.

SERIAL NO.	IDENTIFY			ANALYSE			EVALUATE
	HAZARD / SOURCE OF RISK	RISK AND IMPACT ON OBJECTIVES	EXISTING CONTROLS	CONSEQUENCE	LIKELIHOOD	RISK LEVEL (ACCEPTABLE?)	TREAT Y/N?
1							
2							
3							
4							

## ANNEX E: RISK MANAGEMENT PLAN TEMPLATE

A formal risk management plan is useful for a major project or when your organisation is undergoing a big change. This is a basic risk management plan template. It allows you to document the context, the risks identified, your risk assessment and your treatment strategies.

BACKGROUND	
OBJECTIVE	
PURPOSE OF THE RMP	
ASSUMPTIONS	
LIMITATIONS	
RISK CRITERIA	
DEPTH OF ANALYSIS	
SUMMARY OF CONSULTATION	
RISK DECISION	

RISK ASSESSMENT TABLE								
NO.	RISK STATEMENT	IMPACT	CONSEQUENCE	LIKELIHOOD	RISK LEVEL	TREATMENT	RESIDUAL RISK	PRIORITY
1								
2								
3								
4								
5								
6								



RISK TREATMENT PLAN					
RISK PRIORITY	TREATMENT STRATEGY	RESOURCES REQUIRED	WHO'S RESPONSIBLE	BY WHEN	STATUS OF RESIDUAL RISK

MONITORING AND REVIEW PLAN			
WHAT TO MONITOR/REVIEW	TIMEFRAME	MEASURE OF SUCCESS	RESPONSIBLE PERSON(S)

I have reviewed the Risk Management Plan and endorse its contents.

\_\_\_\_\_

{Name}

\_\_\_\_\_

{Position}

\_\_\_\_\_

{Signature}

This booklet is based upon CAA Advisory Circular AC00-4  
*Safety Management Systems*, Revision 0, 19 December 2012.

**FOR MORE INFORMATION CONTACT CAA STAFF AT**

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**“WITHOUT RISK THERE IS NO  
REWARD OR PROGRESS,  
BUT UNLESS RISK IS  
MANAGED EFFECTIVELY  
WITHIN AN ORGANISATION  
THE OPPORTUNITIES WILL  
NOT BE MAXIMISED AND  
THE THREATS MINIMISED”**

– KEVIN KNIGHT

