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1.0 INTRODUCTION

If you think safety is expensive, try having an incident!

Successful businesses achieve high productivity and quality while ensuring health and safety is a part of that success. Good technology combined with the best work systems can help to achieve these goals simultaneously.

The best operational processes are based on having a skilled workforce, with well-designed jobs that are appropriate to individuals' abilities and excellent risk management.

The overriding objective for each aerodrome is to operate to effect the efficient movement of passengers and freight while preserving the safety of personnel, assets, the environment and each organisation's reputation. Maintaining airside safety is a key component of this requiring a number of organisations to work cohesively to a common objective.

This is a guide developed to help all Australian Aerodrome Operators - and other organisations operating on the aerodrome airside - achieve effective airside safety performance. There is an implicit understanding that each aerodrome is different. There are differences between aerodrome types (i.e. capital city aerodromes and regional aerodromes) just as there are differences between aerodromes within each category.

This guide takes these differences into account and addresses those elements of airside safety that apply to all aerodromes or should, at least, be considered in context of each aerodrome's safety management system or safe system of work to ensure each aerodrome has an appropriate set of robust airside safety elements to prevent incident.

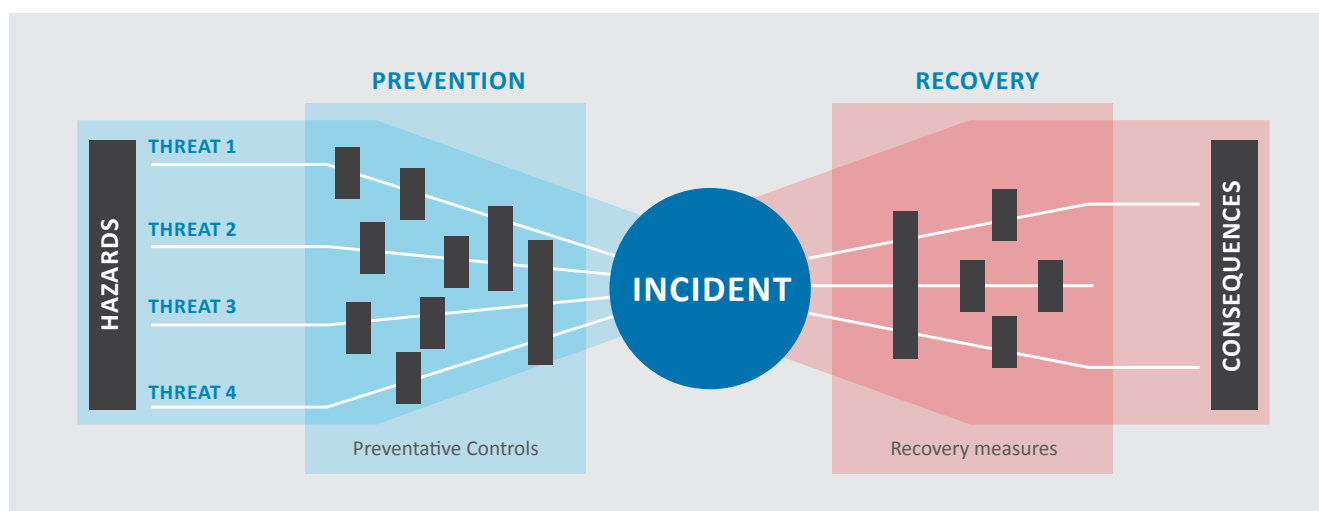
Circumstances at Australian Aerodromes differ however for security controlled airports, the airside is described as the part of the aerodrome from which unauthorised personnel without an Aviation Security Identification Card (ASIC) are excluded for security reasons. More generally airside is a term used to describe the apron areas, manoeuvring areas and movement areas collectively.

This guide is not designed to describe the safety precautions for other aerodrome areas such as the terminal or landside areas.

There are two concepts that are explained and used extensively throughout this guide to show the effective controls that should be in place to effectively manage airside risks and should become common to risk management at all Australian aerodromes.

The Bowtie method of risk evaluation is a simple model used in this guide and should be commonly used at all aerodromes to show airside workers how risks are managed and why the controls and rules in place are critical to maintaining and improving airside safety. Understanding why these controls are in place and being able to see how they act in concert to manage airside risks are important to help drive a safety culture.

FIGURE 1: BOWTIE RISK EVALUATION MODEL



Source: Global Safety Partners

As Low As Reasonably Practicable is the term given to the effective management of risks. This refers to the point at which the further expenditure will not lead to an appreciable reduction in the risk. That is to say, the point at which a regulator would believe the risk is effectively managed if it cannot be eliminated.

Effective airside safety is good business. Incident prevention is both cost-effective and time-effective when compared to managing the consequences of an incident. Consequently, the information in this guide is largely focused on incident prevention. That said, despite having robust preventative measures in place, incidents can still occur. For this reason, we still need recovery measures such as quality Emergency Response plans so this guide also provides details on effective consequence management.

A safe airside environment is a joint responsibility. The Aerodrome Operator cannot directly manage or control all hazards as many are introduced by organisations operating within the airside environment. The Aerodrome Operator does, however, have an obligation to ensure that the airside organisations operating within the aerodrome do have robust safety management systems and that these are all co-ordinated so that the totality of risks are adequately managed

The Australian Airports Association believes that the risk management strategies detailed in this guide form best practice and, where adopted will have a significant benefit to enhancing airside safety.

2.0 AIRSIDE AREAS DEFINED

The aerodrome airside is divided into movement, manoeuvring and apron areas. Each area has a different set of hazards associated with it which must be managed.

Airside

The airside is that part of the aerodrome from which unrestricted access is available to the aircraft movement area and from which unauthorised personnel – particularly the public – are excluded for security and safety reasons.

The Movement Area

This is the part of the aerodrome provided for the surface movement of aircraft, including the apron area, the manoeuvring area and any part of the aerodrome set aside for the maintenance of aircraft.

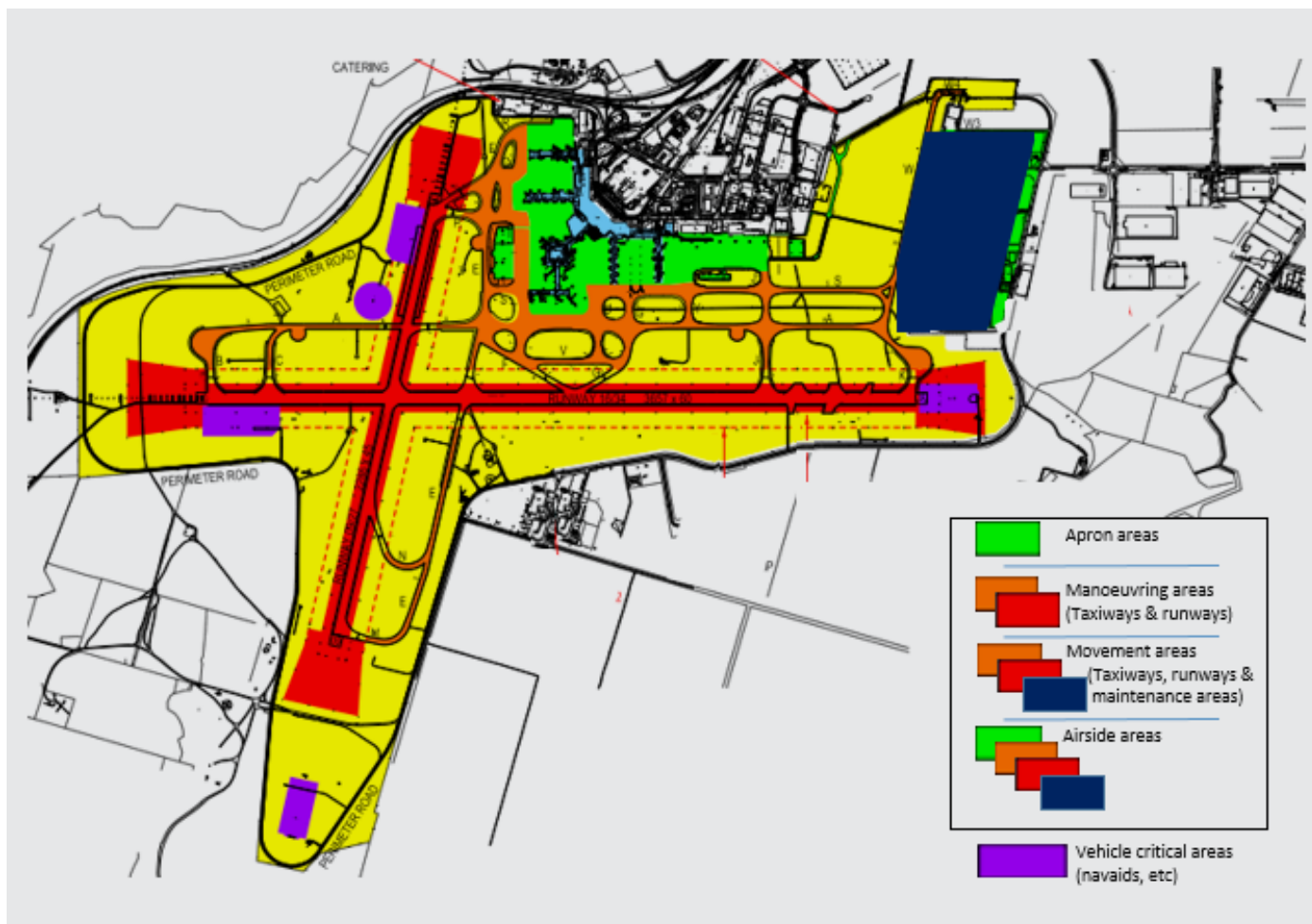
The Manoeuvring Area

This is the part of the aerodrome designed for the take-off and landing of aircraft as well as the surface movement of aircraft but excludes the apron area and any part of the aerodrome designed for maintenance of aircraft. Typically, the manoeuvring area consists of the runways and taxiways.

The Apron Area

This is the part of the aerodrome provided for the parking of aircraft and where most ground handling takes place. This includes cleaning, catering, fuelling, passenger movements, baggage and freight loading and unloading as well as limited aircraft maintenance work.

FIGURE 2: EXAMPLE OF AIRSIDE AREA CLASSIFICATION



Source: Melbourne Airport

3.0 LEADERSHIP

Airside safety cannot be achieved without quality safety leadership. Safety leadership is most effective when it is based on authority rather than role or seniority within any organisation. This means that the Team Leader or Airside Safety Officer is likely to be more effective in safety communications and maintaining appropriate behaviours with other aerodrome workers than the Safety Manager, Operations Manager or Line Manager.

Overall aerodrome safety leadership often falls to the Aerodrome Operator as the provider of the infrastructure. This gives the Aerodrome Operator the ability to set the tone for airside safety, to influence the safety initiatives and the safety plan and to establish airside safety rules that drive the safety outcomes desired. It also means that the Aerodrome Operator may bear proportionally more of the administrative burden.

This does not mean that the aerodrome manager has to do everything. Far from it. The aerodrome manager should delegate activities to others and co-ordinate the activities of stakeholders and monitor the success of these initiatives.

In order for the Aerodrome Operator to 'bring others along for the ride', there needs to be an airside safety plan developed each year. The plan needs to focus on analysing past incidents and near misses to determine actions required to prevent recurrences and to try and develop a positive safety culture across the aerodrome so that existing gaps in the safety defences can be identified to prevent future incidents.

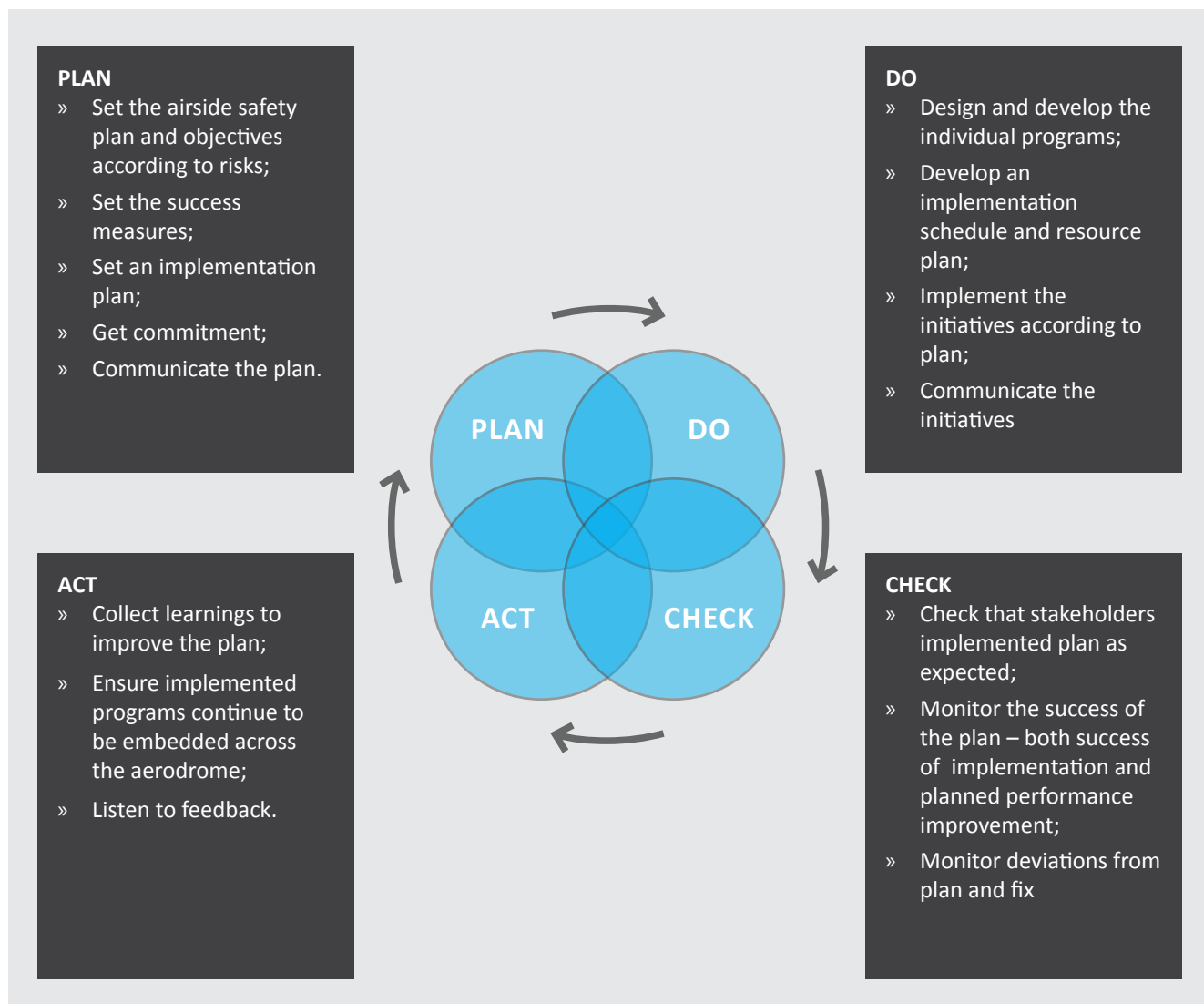
Airside safety leadership involves strong communication skills. For the Aerodrome Operator, an annual safety plan should be developed in consultation with the key airside stakeholders and should involve 4 simple stages.

- 1. Plan** – A high level airside safety plan should be developed for the aerodrome every year. This should be developed in conjunction with all stakeholders even though the Aerodrome Operator may provide a draft plan for initial discussion. This allows the Aerodrome Operator to set the tone and objectives for the stakeholders in accordance with the priorities of most value across the aerodrome.
- 2. Do** – Involvement of all stakeholders in the detailed planning of each program and its implementation will ensure a better outcome than a program designed and delivered by the Aerodrome Operator alone. Consultation with all airside stakeholders improves the quality of each of the programs, delivery practicality and consistency of roll out.
- 3. Check** – Review each of the programs according to the success measures initially agreed to help determine the success or not of each program. Not every program will be successful but it is important to understand what does work and what does not so the next plan or program can be adjusted to account for these learnings. There should also be airside observations performed to see that the programs are successful in the longer term. Those programs that people can relate to and see the safety benefits from, will tend to be more successful in the longer term so programs should be designed to be simple, practical and easy to implement.
- 4. Act** – Learn from what did and did not work to make modifications to the remaining elements of the current plan as well as considering how future safety plans need to be modified. This is crucial if we are to have success in improving the airside safety culture and performance.

The development of an effective safety culture and the leadership of it is part of the continuous improvement loop shown above. Feedback should be welcomed even if it is negative because it becomes part of the review process to develop better programs and plans for the future.

Airside safety requires constant attention and proactive measures to be most effective. It is not something that can be implemented once and left.

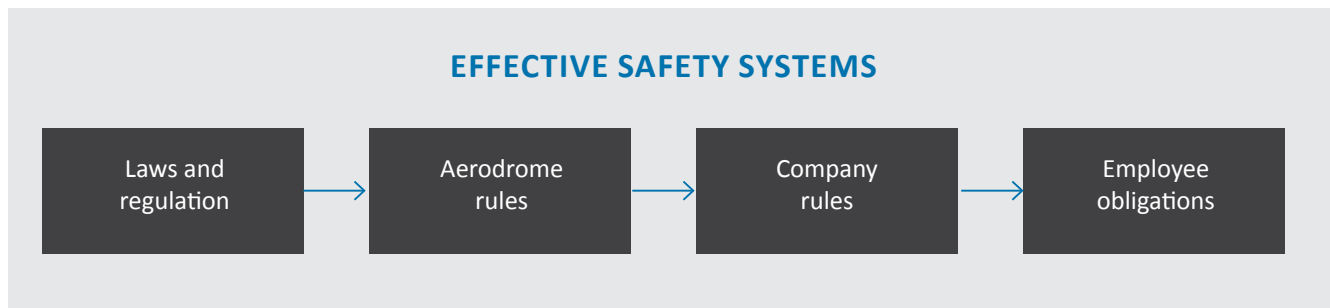
FIGURE 3: AIRSIDE SAFETY LEADERSHIP MODEL



Source: Global Safety Partners

4.0 ROLES AND RESPONSIBILITIES

FIGURE 4: EFFECTIVE SAFETY SYSTEMS



Source: Global Safety Partners

The health and safety of all personnel on the airside – passengers, workers and contractors – is a shared responsibility and one that requires an integrated approach.

The stakeholders involved in establishing and maintaining a safe airside environment include the regulator, the Aerodrome Operator, each of the airside operators, contractors and individual workers.

There are some minor differences between the Work Health and Safety laws of each of the states, however, the safety objectives are common. It is these that are the focus of this guide.

Within the law, each of us has an effective contract to maintain and improve airside safety.

Regulators such as the State WorkCover agencies, the Department of Infrastructure and Regional Development and the Civil Aviation Safety Authority (CASA) are responsible for establishing and maintaining the guiding legislation and regulations under which the Aerodrome Operator and airside operators and their staff and contractors must adhere.

The Aerodrome Operator has a responsibility to ensure that all credible airside safety hazards that could reasonably cause harm to people, assets, security or the environment are identified and suitably controlled. There will be many hazards over which the Aerodrome Operator does not have direct control, however, is responsible to ensure that these parties have proper safety management systems in place to identify and control these hazards.

The Aerodrome Operator is required to:

- » ensure the airside safety hazards and their credible consequences are identified and communicated and that the relevant controls are in place and robust;
- » ensure that those airside safety hazards for which they and their contractors are responsible are adequately controlled and satisfy themselves that each organisation has in place a safe system of work adequately controlling hazards specific to their operations;
- » set the airside safety objectives for the aerodrome, communicate these and ensure alignment of activities to achieve a common goal;
- » monitor and test the controls required to ensure that they are robust, understood and being complied with; and,
- » provide a collaborative approach through communication and consultation with regards to airside safety hazards, their controls, near misses (and incidents) and their learnings to be able to constantly improve the controls and airside safety generally.

For example, the Aerodrome Operator would be reasonably able to identify that airside speeding could cause serious injury to people and damage assets. The Aerodrome Operator has a responsibility to ensure everyone driving airside understands the hazard and to have rules in place to prevent such an incident. The Aerodrome Operator also has a responsibility to ensure their own staff and contractors abide by the rules. The Aerodrome Operator must ensure that each of the airside operators understand the rules and have suitable strategies in place to ensure that their staff and contractors abide by the rules.

Airside operators (organisations that have personnel operating on the airside) have a responsibility to:

- » ensure that the organisation, their staff and contractors understand the applicable legislation and regulations required to fulfil their roles;
- » ensure that their staff and contractors understand and comply with the Aerodrome Operators' airside rules to be able to act safely;
- » ensure their staff and contractors maintain the necessary security standards applicable to the airside;
- » ensure their staff and contractors understand and comply with the organisation's safety rules and all procedures to protect themselves and others from safety incidents;
- » ensure that those airside safety hazards for which the organisation and their contractors are responsible are adequately controlled and satisfy themselves that their contractors have in place a safe system of work adequately controlling hazards specific to their operations;
- » identify and report all hazards and at-risk behaviours to the Aerodrome Operator and either address these or have the Aerodrome Operator address these at the time with the relevant parties and enter into the safety incident system;
- » communicate and consult with staff and contractors regarding safety matters; and,
- » monitor the behaviours of staff and contractors to ensure that they are abiding by all safety requirements whilst performing their roles.

Contractors have a responsibility to:

- » understand and abide by the regulations, aerodrome rules, construction requirements and procedures relating to the way they conduct themselves and behave to ensure their own safety and the safety of others;
- » identify and report hazards and at-risk behaviours to their employer and to the Aerodrome Operator;
- » ensure they manage the work area preventing unauthorised personnel from entering and that all personnel entering the worksite are properly inducted to understand the hazards and the relevant controls in place or are fully escorted whilst on site;
- » ensure the security of the site when unattended and that no equipment or materials are left so that they may either cause a hazard or injury; and,
- » actively participate in safety discussions to ensure they are adequately informed and understand the hazards and controls in place to manage risks airside.

All individuals have a responsibility to:

- » understand and abide by the regulations, rules and procedures relating to the way they conduct themselves and behave to ensure their own safety and the safety of others;
- » identify and report hazards and at-risk behaviours to their employer and to the Aerodrome Operator; and,
- » actively participate in safety discussions to ensure they are adequately informed and understand the hazards and controls in place to manage risks airside.

Just as the responsibilities shown above cascade, so should the communications and consultation surrounding airside safety. A well-structured Airside (or Aerodrome) Safety Committee provides one of the best forums to cascade information amongst all airside operators, to discuss and agree safety objectives to benefit airside safety while reducing conflicting activities and duplication of effort.¹

1 See Airside (or Airport) Safety Committees in section 5.6

5.0 MANAGING AIRSIDE SAFETY

5.1 Safety Management System

While CASA's Advisory Circular 139-16(1) Safety Management System for Aerodromes requires Aerodrome Operators to have a Safety Management System in place, all organisations that operate airside should have a safety management system in place².

The International Civil Aviation Organisation (ICAO) describe safety management as 'organised common sense'. A Safety Management System (SMS) is nothing but a systematic approach to managing safety. It is tailored to the size and complexity of the organisation and is totally scalable. An example of this is that a major Aerodrome Operator's *Aerodrome Emergency Plan* is likely to be a quite complex manual detailing different plans for different situations but for the smallest organisation, the *Emergency Response Plan* may be a simple list of contact details. Most organisations will have an *Emergency Response Plan* somewhere between these models.

The most effective safety management systems are those that are relatively simple and will complement and support good management, engineering and human factors practices.

Safety Management Systems benefit businesses in a number of ways:

- » staff and contractors understand the structure of safety within the organisation; and,
- » management have a framework with which to make sound business decisions that aid good safety initiatives.

Business benefit from reduced direct costs through reduced likelihood of incidents or, should an incident occur, reduced consequence severity. Equally, organisations with effective risk management systems in place and lower incident rates can also improve indirect costs by accessing lower insurance premiums, incur reduced loss of business and post-incident recovery costs and, generally, have an enhanced reputation.

Case study: Wagga Wagga Airport has found the SMS process invaluable in their business to support their ongoing effort to manage risks effectively. The SMS has been used to improve safety and security briefings, contractor site rules and the quality of electrical safety management plans to provide long term sustainable operating improvements.

A Safety Management System does have a structure. The CASA-defined SMS structure has 15 key elements sitting within these four components – Safety Policy and objectives, Safety risk management, Safety assurance and Safety promotion. An SMS is a constantly evolving document and is central to an effective safety culture within every organisation.

1. Safety policy and objectives

This component of the SMS has seven key elements to be effective:

- a Management commitment and responsibility.** There needs to be a safety policy signed by the CEO or most senior person in the organisation clearly setting out the safety objectives for the company in a way that is clearly measurable. The safety policy needs to be appropriate for the nature of the business, its size and complexity. The policy needs to be visible throughout the organisation and regularly reviewed to ensure that its content and objectives are still relevant for the organisation.
- b Safety accountability of managers.** The SMS needs to define the safety responsibilities of each of the managers so that their success in fulfilling these responsibilities can be measured.
- c Appointment of key safety personnel.** A person who will have the principle accountability for safety within the organisation must be appointed to champion the SMS and its objectives. Contrasting to larger organisations that have a specific safety role, smaller organisations may have the safety responsibilities forming part of a senior person's role (i.e. the Operations Manager). The person with the principle accountability for safety must have a position description showing this and must have the required knowledge to be able to fulfil the role. The organisation must commit sufficient resources to support the SMS.
- d SMS implementation plan.** When first developing an SMS for the organisation, there must be an implementation plan that details the resources to be allocated to successfully implement the objectives. This will include performing a gap analysis so that missing elements can be identified and actions generated to put these in place and prioritise these actions based on the risks their absence presents to the organisation.

² www.casa.gov.au/wcmsw/_assets/main/rules/1998casr/139/139c16.pdf

FIGURE 5: THE FOUR COMPONENTS OF ALL SAFETY MANAGEMENT SYSTEM



Source: Global Safety Partners

e Contractors and third party interfaces. Prior to engaging contractors, a means of assessing their safety performance and safety systems is required as a key selection criteria. The subsequent contracts and service level agreements with third parties need to clearly specify the required safety standards and compliance monitoring and safety performance assessment must be performed.

f Emergency Response Plans. Each organisation needs to have emergency response plans in place for each of the likely emergency scenarios and major hazards. These need to be accessible to staff, tested to ensure they will work if called upon and staff trained to ensure they are effective.

g Documentation. The SMS must be documented and forms the safety management manual for the organisation. It contains copies of the policies, procedures and instructions for each of the SMS standards. Smaller organisations will have a single manual containing all these elements in sections but larger organisations may have many manuals referenced from the central Safety Management Manual. The manual and documents are authorised, document controlled and available to all relevant personnel either in hardcopy or electronically. The manual will also document how documents will be maintained and retained. The forms and reports for activities such as runway and apron inspections need to be filed as part of this documentation.

2. Safety risk management

This component of the SMS has two key elements to be effective:

- a Hazard identification.** Each organisation needs to have an ongoing hazard identification program including a hazard reporting system. Hazards within the organisation's, contractors' and third parties range of activities should be captured by the reporting system and there must be the ability for confidential and de-identified hazard reports. All reporting should include acknowledgement of receipt to the initiator and feedback following consideration.
- b Risk assessment and mitigation.** The process for assessing and managing risks needs to be documented and a process for continuously assessing hazards and their risk potential put in place. The process of managing risks should include assessment of whether the risks are tolerable and 'As Low As Reasonably Practicable'³. Appendix 1 shows an example of a risk assessment matrix used to assess risks for identified hazards.

Case study: *It often takes a step back to review the potential incidents and near misses to see possible improvements in risk management. The Engineering consultancy - Meinhardt Group - did this in 2014 as part of their regular risk management review and have implemented simpler systems and improved preventative controls. Not surprisingly, this type of critical review has resulted in greater use of technologies now available and has delivered cost efficiencies all with a safer working environment.*

3. Safety assurance

This component of the SMS has four key elements to be effective:

- a Safety performance monitoring and measurement.** In order to measure the relative success of the SMS, an organisation needs to select a set of relevant key safety performance measures. These should include leading indicators based on the risks being managed and should be monitored regularly and reported to senior managers within the organisation so that any necessary corrective actions can be decided. There will also be measures reviewing the organisation's compliance with all relevant regulations and laws.

- b Internal safety investigations.** Easy to use report forms or systems need to be in place for reporting hazards deficiencies, near misses and incidents. Once reported, these safety incidents need to be analysed with the more significant investigated in a systematic and professional manner to identify the root cause of the condition, immediate factors and any contributing factors. Adequate investigative resources need to be allocated in a timely fashion to investigate these incidents. The recommendations from the investigations need to be effective to eliminate or significantly lessen the likelihood and severity of the recurrences and must be tracked through to completion and continue to be reviewed in terms of effectively managing the risks into the future. A 'Just Culture' policy needs to be in place to consistently and equitably manage any at-risk behaviours identified by the investigation.
- c Management of change.** Change within an organisation results in the emergence of hazards. Unless these hazards are identified and controlled, incidents can result. Change management processes identify the relevant hazards, stakeholders and technical experts, risk management strategies and communication plans that need to be put in place to effect the change smoothly. There will often be detailed schedules and plans sitting behind, and feeding into, the change management process and communication processes so the actual change management form can be quite a summary document. Monitoring of the change is important to prevent the emergence of hazards not identified.
- d Continuous improvement.** As the SMS is one of the central safety documents for an organisation, its effective operation needs to be audited regularly. The audit will generally be done in accordance with the documented evaluation procedure.

4. Safety promotion

This component of the SMS has two key elements to be effective:

- a Training and education.** A safety training needs analysis is the starting point for determining the training requirements for each role and the person within the role. This is used to determine any competence gaps, training plans and development plans. Roles should be assessed regularly to ensure the training identified is appropriate and incumbents should be assessed in terms of their training plans, competence and understanding of the procedures required by the role. All training undertaken should be recorded.

³ Tolerability v As Low As Reasonably Practicable (ALARP). For a risk to be Tolerable, an organisation must have complied with Australian and international safety standards and laws, regulations and best practice recommended by industry bodies and compare their management of risk with similar hazards in other industries. For a risk to the ALARP, the cost of implementing additional risk management strategies must be significantly outweighed by the safety benefit gained by the expenditure.

- b Safety communication.** In order to keep safety alive and relevant within the organisation and with relevant stakeholders, regular safety communications about current safety issues are necessary. These will be a mix of verbal and written communications but should have a specific format. For instance, a safety meeting should have an agenda that is relevant, interesting and consultative. Safety Alerts should be written in a way that encourages people to read the alert and consider the information in their own activities. Safety focuses identify hazards and generate discussion amongst staff, contractors and stakeholders.

5.2 Competence and Compliance

Aerodromes are a dynamic workplace. Hazards change with changing activities and will change over time as equipment and processes change also. Both competence and compliance are critical to preserve airside safety and prevent incidents.

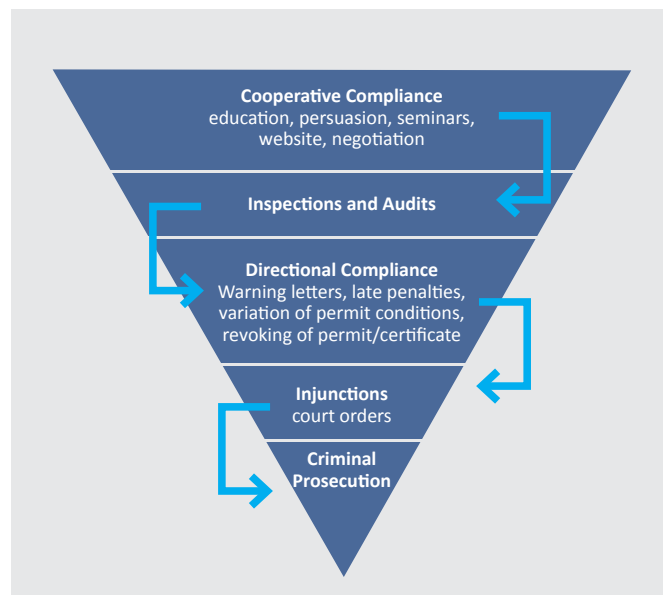
Competence is an outcome of training and the ability to apply the training in the appropriate manner at the appropriate time. Competence needs to be reviewed over time to ensure the training is still relevant and addressed the hazards appropriately.

The Aerodrome Operator is responsible for setting the airside safety expectations and to train their own staff, contractors and visitors in line with these. The Aerodrome Operator is also responsible for ensuring adequate communication with each of the airside organisations to ensure that they each understand the requirements for their staff, contractors and visitors and implement suitable training to ensure the expectations are delivered.

Each organisation is responsible for ensuring that their staff, contractors and visitors present on the airside are competent to perform the roles. Employees should be monitored to ensure they are technically competent and display behaviours that result in tasks being completed safely. Deficiencies identified in any areas must be addressed immediately.

Compliance with rules and procedures is critical so that people are performing tasks in a safe manner as determined by risk assessments and developed into rules and procedures. Rules and procedures do need to be reviewed as the work environment changes and hazards are either eliminated or introduced.

FIGURE 6: COMPLIANCE



Source: NICNAS

Most hazardous industries have developed a simple set of rules for addressing potential at-risk behaviours that have been born out of bitter injury experience. For example, fall-protection measures when working at height, wearing seat belts in any moving vehicle and permit to work systems for all non-routine work for which written procedures are not in place. Aerodrome Operators should also have a set of rules covering those risks assessed as most likely to result in fatalities or serious injuries if not followed.

Those organisations that have developed and implemented these “lifesaving” rules have seen significant safety benefits through reduced at-risk behaviours, improved understanding of the risks and the measures put in place to control the risks.

Case study: The Shell group of companies introduced 12 “Life Saving Rules” in 2009. Between 2009 and 2013, there was a 75% reduction in serious injuries as a direct result of the application of these rules to the higher risk activities conducted. Implementation included education of staff and contractors in the expectations the companies had in relation to application of the “Life Saving Rules” and the range of consequences that would be applied subject to investigation findings. These rules applied equally to personnel who observed a failure to apply the rules and did nothing to intervene.

Many people unfamiliar with the airside environment need to have these rules in place to understand what is expected of them as they will not necessarily understand the implications of their actions in this very different work environment. Equally, staff and contractors who are very familiar with the airside hazards can become complacent in performing some activities and either miss important safety steps in a procedure or develop safety-compromising shortcuts.

Both are unacceptable but the former is a management responsibility to prevent; the latter is an individual's responsibility to prevent.

Individuals wishing to initiate a change to a process, rule or procedure must bring the situation to the attention of their organisation and the Aerodrome Operator for review. These changes should then be subjected to a change of management process where the change can be subjected to a review of the hazards, be subject to consultation and technical expert input, be communicated properly to all relevant stakeholders and then be implemented. An individual simply ignoring the rule because they believe it is no longer relevant or that there are better ways to perform the task is likely to introduce unidentified hazards and may result in adverse safety consequences that cannot be tolerated.

Senior managers and safety personnel of Aerodrome Operators and airside operators need to spend a considerable amount of time in the airside environment to fulfil their responsibilities as defined in the Work Health and Safety Act. They need to:

- » observe the competence and compliance of their staff and contractors;
- » discuss the procedures and safety concerns with staff and contractors;
- » address safety deficiencies as soon as practicable and provide feedback to the initiator; and
- » understand the reason for such deficiencies so that the risk assessments, procedures and training can be reviewed.

5.3 Airside Security

Australian aerodromes are required to meet the aerodrome security requirements of federal government agencies and the Civil Aviation Safety Authority. Those that do not have specific security staff will employ resources to meet aircraft arrivals and departures or allocate this task to the Aerodrome (or Airside) Safety Officer.

An Airside Security Identification Card (ASIC) provides evidence that a person meets the required security clearances ensuring that they do not pose an unacceptable security risk to the aerodrome or aircraft. The Aerodrome Operator will provide access to the airside only to people who have a valid reason to access the airside AND have a valid ASIC.

The Aerodrome Operator should ensure that the individual understands the airside safety and security hazards and rules applicable to the areas to which they will have access. Aerodrome Operators should facilitate an aerodrome induction as part of the ASIC issuing process to achieve this level of understanding and comprehension.

Only workers who have a valid and current business need to be airside are permitted to enter the aerodrome airside checkpoint or gate. Additionally, at many aerodromes, airside access can only be provided by going through a security check point where bags are checked and the person scanned through a metal detector. Once entering the airside area, the ASIC must be displayed at all times and the Aerodrome Operator should instigate random checks to ensure that ASICs are displayed appropriately and are current.

Aerodromes are required to have a process for visitors who do not hold a current ASIC to enter the airside security zone under escort. The visitor will not have been subjected to the complete set of formal security checks required of unescorted workers so will be required to submit to the Aerodrome Operator's visitor access procedure. This will include being hosted and escorted by a current ASIC holder at all times and being the responsibility of that host. The Aerodrome Operator's visitor procedure should provide a visitor pass to the visitor clearly identifying them as a visitor for a certain period and require this to be clearly displayed at all times, ensure the host understands the escort requirements and ensure either the pass is handed back and accounted for at the end of the visit or is destroyed and accounted for. The reason for this degree of care of visitors is to account for the fact that they do not understand the airside hazards so must be accompanied at all times by someone who does.

The Aerodrome Operator's operations teams should be conscious of elements of the airside operations that can impact on the security of the aerodrome including:

- » aerodrome perimeter fence integrity;
- » unusual or concerning behaviours of airside personnel;
- » the airside presence of personnel without appropriate security clearances and authorisation; and
- » items are not within 3m of the fence landside, or 2m of the fence airside, as these could provide a pathway for unauthorised airside access to the airside security zone.

5.4 Work Health and Safety

The legislation governing all workplaces in Australia is the Work Health and Safety Act or the State or Territory equivalent in those jurisdictions that have not adopted the federal model Act. The legislation is quite extensive but easy to read and is not repeated here in detail. The clauses (paraphrased) highlighted below are some of those critical for Aerodrome Operators and airside operators to understand⁴:

- » **Identification of all reasonably foreseeable hazards** that could give rise to risks to health and safety must be identified by a person who has responsibility for managing the risks to health and safety in an organisation. This duty is relevant to many roles in an organisation.
- » **For each hazard there must be an assessment of the risks to health and safety.** These can be conducted for a class of hazards provided the assessment of risks does not result in any worker or other person being exposed to a greater, additional or different risk that if the hazards were assessed individually.
- » **Management of risks to health and safety,** must seek to eliminate or, where this is not possible, minimise the risks as far as is reasonable possible. In doing this, the 'Hierarchy of controls' shown in Appendix 2 should be used.
- » **Controls must be regularly reviewed** to ensure they are working as intended, are adequately controlling the risks and are fit for purpose. Typically, control measures would also need to be reviewed where it is observed that the control does not adequately address the risk (i.e. following an incident), where the hazard has changed, before a change takes place in the workplace (i.e. as part of the change management process) and when a new risk is identified.
- » **Information, training and instruction** given to a worker must be suitable for the nature of the work being conducted, adequate for the risks associated with the work and to ensure the control measures can be properly implemented. This starts with induction of new personnel to help them understand the hazards they may be exposed to and the safety expectations placed upon them. Training extends to task training to ensure workers are competent to undertake the tasks and understand the hazards specific to these tasks.
- » **The layout of the workplace** must, as far as is reasonably practicable, have necessary facilities and features so that people can enter and move about without risk to health and safety; even in an emergency.
- » **There must be sufficient first aid** equipment, access to it and people trained to administer it in the workplace.
- » **There must be an emergency plan in place** with effective procedures to ensure an effective response, evacuation procedures, medical treatment and notification to emergency services at the earliest opportunity, effective communication to co-ordinate the response and testing of the procedures.
- » **PPE issued must be adequate** for the hazards likely to be encountered and workers instructed in its use.
- » **Workers working in a noisy environment or with potentially harmful substances** require audiometry or health monitoring.
- » **Manual handling hazards** must be managed to prevent risk to health and safety of a person.
- » **New Plant and equipment** must be designed in such a way that it seeks to eliminate or, where this is not possible, minimise the risks as far as is reasonably possible. In doing this, the 'Hierarchy of controls' should be used. During commissioning there must be checks performed to ensure that the equipment, once commissioned can be operated, as far as is reasonably practicable, without risk to health and safety of any person. Procedures and training must be provided to the operators of the plant and equipment to allow them to operate the units without risk to health and safety. Inspections and servicing must be performed in accordance with the manufacturer's requirements.
- » **Guarding must be installed** around all hazards on equipment used in normal operations and, if required to be removed for maintenance, the equipment will not operate in normal operations with the guarding removed.

4 The complete WHS regulations should be read by Managers of airside operations. This can be found at www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/model-whs-regulations

- » **Proper use of equipment** for its intended purpose is the responsibility of the person with management or control of plant at a workplace. A risk assessment is required for any other proposed use to ensure the proposed use does not increase the risk to health or safety.
- » **Records** of all tests, inspections, maintenance, commissioning, decommissioning, dismantling and alterations of the plant must be kept by the person with management or control of the plant at a workplace while the equipment is in use or until the person relinquishes control (i.e. sells or disposes of it).

The relevant safety legislation requires people in charge of a business or undertaking to remove risks wherever this is reasonably possible or to have such controls in place to reduce the risks to As Low As Reasonably Practicable (ALARP). This is not a simple cost/benefit analysis. ALARP refers to the point where significant costs yield such a minor benefit that such additional cost serves no good purpose. Understandably, this tipping point will be reached much earlier for low risk hazards than for high risk hazards where the consequences of an incident are more severe.

Collaboration between the Aerodrome Operator and relevant personnel from the organisations operating on the airside is needed. Whether a company has a formal SMS in place or not, the process needs to be the same:

- » ensure policies are in place and safety objectives are clearly explained and that all organisations are aligned;
- » ensure risks are managed through the identification of hazards, assessment of risks and the development of robust and practical control measures (prioritising the focusing on the higher risk hazards);
- » relevant checks and inspections are conducted by all parties to ensure that the procedures and rules are being complied with at all times; and
- » ensure safety promotion is adequate with quality communications issued to ensure all airside workers informing them of the hazards and controls in place to protect them and that these are built into their induction, training materials and procedures.

5.5 Expectations and Inductions

The first contact a person has with a workplace is the safety induction training. Induction training is designed to do four things:

- » it should set out the safety values of the organisation;
- » it should set out the safety expectations that the aerodrome and organisation has for its employees, contractors and visitors;
- » it should set out the hazard, near miss and incident reporting processes so that all risks can be captured and the risks can be addressed in a timely manner (and the reporter receive feedback); and
- » it should set out the just culture principles that will be applied in the event that people do not abide by the safety rules and expectations.

Induction training is often the first real contact a person has with the safety requirements of a workplace. It is often the most memorable safety message that can be delivered and will set the tone for a person's safety behaviour on the airside.

All people working airside should be re-inducted every two years. This provides a regular opportunity to create the alignments that we all need back to the initial safety messages.

It also provides an opportunity to ensure people understand any rule changes that may have been issued but they missed between inductions.

To be most valuable, the safety expectations of the Aerodrome Operator and airside organisation must align. The Aerodrome Operator should ensure that each airside organisation clearly understands and articulates these in their induction material. The airside organisations should ensure that their own safety expectations align with the Aerodrome Operator's and this can be presented as a single vision across the aerodrome.

The safety expectations explained in the induction materials must also align with the organisation's SMS or safety processes so that these explicit behaviours can become an ingrained part of the safety culture of all airside organisations. Every person who operates on the airside must be familiar with the same types of safety expectations and know that their safety performance on the airside will be measured against these expectations.

Each aerodrome must also have assurance that all visitors are subject to a more basic visitor induction. While under the care of their inducted host and escort/s, they still need to understand what is expected of them to ensure a safe airside. A visitor induction should include the aerodrome security requirements, PPE requirements, key hazards that they may be exposed to in the area/s they will be visiting, what they can and cannot do whilst airside, the fact that they must be accompanied by an Aviation Security Identification Card (ASIC) holder at all times whilst airside and the emergency procedures including the alarms, evacuation route and assembly point.

5.6 Expectations and Safety Committees

Airside Safety Committees are in place to discuss safety matters. There needs to be a very clear definition between safety matters and industrial relations matters. A Constitution or Terms of Reference ensures that the discussions are limited to raising and resolving matters of airside safety. All Committee members must understand the objective of this committee and be active participants.

The Airside Safety Committee is in the unique position of being able to collate and discuss safety concerns and recommendations from all airside organisations and to ensure aligned actions and communications between organisations.

The members of the committee representing each of the airside organisations and the Aerodrome Operator have the responsibility and authority to:

- » represent their respective organisations within the committee;
- » ensure that they adequately communicate the outcomes of the discussions within their organisations;
- » be bi-partisan in their discussions to make decisions as part of the committee for the improvement of airside safety even if this is at the expense of their own or any individuals or organisations specific view.

The Airside Safety Committee should be convened by the Aerodrome Operator and should have members from as many of the organisations operating airside as possible as this committee is key to effective communication on airside safety matters between all stakeholders – the Aerodrome Operator, airside organisations, contractors and individuals.

5.7 Expectations and Safety Behaviours

Airside behaviours must align with the safety behaviours explained in the safety inductions. These will align across the aerodrome if inductions are developed including the aerodrome's safety expectations.

Individual airside organisations are responsible for the safe behaviours of their staff, contractors and visitors. Equally, the Aerodrome Operator is responsible for the safe behaviours of their staff, contractors and visitors.

Each aerodrome should encourage “Strength to intervene, character to accept”. This is a culture that encourages and supports people raising behaviours they see concerning them directly with the person responsible. The person intervened upon should have the character to accept the intervention because the person genuinely has the person's wellbeing at heart.

Despite any intervention, any unsafe or questionable practices are required to be brought to the attention of the respective organisation to deal with and must also be reported to the Aerodrome Operator as part of their SMS responsibilities so that they can monitor safety performance across the aerodrome and address developing issues or new hazards in a timely fashion. These are not optional actions.

5.8 Human Factors and Human Factors Engineering

Individuals have a wide range of abilities and limitations. A Human Factors (or Ergonomics) approach focuses on how to make the best use of these capabilities: by designing jobs and equipment which are fit for people. This not only improves their health and safety but often ensures a better managed, more effective organisation.

Knowing that, in some way, human failure contributes to almost every incident means that Aerodrome Operators and airside organisations must attempt to reduce the reliance on humans to initiate or maintain critical airside safety barriers. Human failure can take two forms:

- » the root cause of an incident – for example taking the conscious and willing decision to disable a safety device on a piece of equipment; or

- » a contributing factor – for example forgetting to apply a step in a procedure such as testing the brakes of the vehicle before positioning against the aircraft or complacency where skipping the step in a procedure becomes a normal practice.

Everyone can make errors no matter how well trained and motivated they are; everyone can lose concentration no matter how committed they are but, in the airside environment, the consequences of such human failure can be severe.

All airside safety risks that rely on humans to maintain or initiate prevention actions must manage the potential for human failure as robustly as the technical and engineering measures they use for that purpose. The challenge is to develop error-tolerant systems and to prevent errors from initiating; management of human errors proactively should be addressed as part of the risk assessment process, where:

- » significant potential for human error is identified;
- » those factors that make errors more or less likely are identified (such as poor design, distraction, time pressure, workload, competence, morale, noise levels and communication systems); and
- » control measures are devised and implemented, preferably by redesign of the task or equipment to reduce the reliance on these risk controls or by ensuring the robust application of each safety critical activity

Some errors are slips or lapses - often “actions that were not as planned” or unintended actions. They occur during a familiar task and include slips (e.g. pressing the wrong button or reading the wrong gauge) and lapses (e.g. forgetting to carry out a step in a procedure). This type of error occurs commonly in highly trained procedures where the person carrying them out does not need to concentrate on what they are doing or has become complacent due to the frequency of performing the task. These cannot be eliminated by training, but improved design can reduce their likelihood and provide a more error tolerant system. Checklists can help remove these errors and should be used for all safety-critical activities where there is a reliance on human actions.

Other errors are Mistakes, errors of judgement or poor decision-making where the “intended actions are wrong” i.e. where we do the wrong thing believing it to be right. These tend to occur in situations where the person does not know the correct way of carrying out a task either because it is new and unexpected, or because they have not been properly trained (or both). Often in such circumstances, people fall back on remembered rules from similar situations which may not be correct. Training based on good procedures is required to avoid mistakes. For safety-critical activities, thorough training and testing of understanding can reduce these mistakes.

Violations (non-compliances, disabling safety devices, shortcuts) differ from the above in that they are intentional but usually well-meaning failures where the person deliberately does not carry out the procedure correctly. They are rarely malicious (sabotage) and usually result from an intention to get the job done as efficiently as possible. They often occur where the equipment or task has been poorly designed and/or maintained or organisations place undue pressure on an individual to get the job done in an unreasonable timeframe. Peer pressure, unworkable rules and incomplete understanding can give rise to violations. To avoid violations, Aerodrome Operators and airside organisations must ensure procedures are practical and well designed and perform frequent airside safety observations and interventions to ensure that procedures are applied properly.

Reliance on human factors cannot always be eliminated from tasks. For safety-critical tasks, there should be a preference to employ technology to remove or reduce the reliance on human controls. For example, selecting equipment that has interlocks preventing the equipment from operating if safety-critical features are not in place rather than relying on people to perform the checks reduces the risk of an incident to As Low As Reasonably Practicable (ALARP) and is generally cost effective when compared to the cost of an incident.

It is not always possible to remove the human interface with the process or equipment. For processes risk assessed as safety-critical, developing robust procedures minimising human failure potential requires the following steps:

- » risk assess the activity to determine where human failures could occur and where these would be critical to the safe performance of the task;
- » involve the workers in the design of the procedures to ensure they are practical to apply and will result in the expected outcomes;

- » design the job appropriately taking into account each of the safety-critical activities;
 - ensure that a large proportion of a person's strength is not required to complete a task as they are more likely to suffer injury and carry out the task inefficiently – possibly causing damage to the product and tools;
 - ensure the mental demands of a task are not too high within a given time to prevent a health issue for the worker and a quality or safety issue; and
 - ensure there is enough motivation within the task to avoid complacency and boredom resulting in loss of attention or mischief.
- » ensure the procedure is written with significant emphasis on these safety-critical steps;
- » train personnel in the procedures and ensure their understanding of the procedure, the safety-critical steps and the consequences of failing to apply these steps;
- » test their physical capability and competence to perform the task according to the procedure and the equipment required; and
- » perform regular observations to ensure the procedures are implemented as expected and the safety-critical steps are applied every time.

Job design is an organisational responsibility. Similarly, the provision of the equipment suitable to perform the task safely, training of the individuals, ensuring their competence and capability to perform the task safely and ensuring that they apply the safety-critical steps is the responsibility of the Aerodrome Operator and each of the airside organisations.

The importance of training in safety-critical activities cannot be understated. Whether it is an equipment maintenance activity or an operational activity, the procedures and training need to clearly detail the hazards, the credible consequence and the controls in place to ensure their safety and a person's comprehension of these hazards, consequences and controls are thoroughly checked. Any safety-critical activity where the controls can be subject to human factor errors must establish robust procedures and training to ensure the controls will function as expected every time. This may involve establishing a checklist and/or second person to verify the controls before work starts.

5.9 Emergency Plans

CASA requires all certified aerodromes to have in place suitable aerodrome emergency planning systems to be activated in the event of an emergency. CASA have produced Advisory Circular AC 139-7(0) Aerodrome Emergency Planning providing guidance to assist these Aerodrome Operators put in place high quality emergency plans.

The Australian Airports Association's Airport Practice Notes 1-3 provide significant assistance to Aerodrome Operators to prepare robust emergency plans.

While CASA do not specifically require operators of non-certified aerodromes to have such plans, the Australian Work Health Safety Act places an obligation on all facility operators (Aerodrome Operators) to be able to suitably respond in the event of an emergency. An Aerodrome Emergency Plan (AEP) sets out the procedures to be used in the event of all credible emergency situations, therefore, should be developed and maintained by all Australian aerodromes.

An Aerodrome Emergency Plan document should contain the following:

- » the purpose of the plans so it is quite clear to anyone reading the document the limits of the document scope;
- » the way in which emergencies are responded to and the response agencies;
- » the function of the Aerodrome Emergency Committee (AEC) with:
 - its structure;
 - the roles and responsibilities of the participating agencies;
 - the objectives, tasks and responsibilities of the AEC;
 - the availability of the nominated incident controller/emergency and a handover process to account for the fact that the nominated incident controller may not be immediately available.
- » the specific Aerodrome Emergency Plan contents required by CASA include:
 - an overview and description of the roles and responsibilities for all AEP stakeholders and participants who will respond to the type of emergency. Consideration to the complexity of the aerodrome facility and category of the critical aircraft servicing the aerodrome is essential.

- the AEP should make reference to support agency Standard Operating Procedures (SOP) or relevant sections of the SOP;
 - the AEP must ensure that the procedures associated with Control, Command and Coordination are clearly defined and are consistent with the applicable state, territory or federal legislation;
 - initial command of incidents and the handover process if appropriate;
 - the testing of multi-agency Command, Control and Co-ordination and credible scenarios;
- » conduct a full scale emergency exercise at least once every two years.

In addition to the CASA-required full-scale emergency exercise, Aerodrome Operators should carry out regular tabletop exercises and partial major exercises to both test parts of the emergency response plans (such as communications processes) that are most often identified as requiring improvement and to help train and prepare personnel. These exercises should be carried out under varying conditions such as low-visibility conditions or after normal working hours to simulate the most challenging conditions of a response.

Co-ordination of various organisations in emergency preparedness and contingency planning will result in effective response to actual emergencies. It is the responsibility of the Aerodrome Operator to communicate with each of the emergency services agencies to develop and refine the Aerodrome Emergency Plan in preparedness for any actual emergency event at or around the aerodrome. At the time of an emergency situation the local emergency services have the responsibilities of incident Command on arrival and the Aerodrome Operator will normally be required to hand this responsibility over once the agency command structure is established. This should be a formal handover process and acknowledged by the emergency response agency to ensure effective command of the incident and understanding between all parties as to which party is in Command. Once the Aerodrome Operator has handed over the Command role, they will then fall into a support role to the Commander.

Emergency training exercises should involve a number of likely responding agencies including:

- » Air Traffic Control;
- » Aerodrome Rescue and Fire Fighting Service (if located on the aerodrome);
- » airlines and ground handlers;

- » emergency services including police, fire and rescue and ambulance along with local hospitals; and
- » Local Governments.

Each of the organisations should understand their specific role in an emergency and practice this. It is important that their respective responsibilities are identified and understood to avoid conflict and confusion. Itemised 'Responder Action Sheets' for the responding staff or each organisation provide this discipline. During emergency exercises, observers should have a copy of these Responder Action Sheets to ensure that they are used appropriately by the responders to ensure all required actions are carried out or considered and the observers should also observe the human factors of the responders' command, communication and co-ordination activities to ensure an effective and efficient response from all agencies.

For aerodromes where a significant portion of an aircraft's departure and approach is conducted over water, the emergency procedures will need to take into account the response variations that these conditions impose.

Exercises should always include Observers who can take notes that can be used in debrief sessions to identify areas for improvement or where responses were exceptionally good so that these findings can be used to further improve the workings of the Aerodrome Emergency Plans, personnel training and response. The observers will usually identify areas of communication, access for emergency services, lack of knowledge in procedures from airside workers and the like to be improved.

Aerodrome Emergency Plan details based on the most credible types of emergency events may include:

- » aircraft accident on and off the aerodrome including possible HAZMAT responses taking into account composite materials used in the construction of aircraft frequenting the aerodrome;
- » aerodrome infrastructure incidents including fires or collapses;
- » criminal behaviour designed to cause damage or disruption to aerodrome operations (bomb threats, etc.);
- » fuel hydrant system rupture and significant volumes of fuel covering aerodrome buildings, aircraft and ground equipment with the potential for fire from hot exhausts;
- » natural disasters and weather events that may have an impact on aerodrome operations (tropical storms and cyclones or flooding events); and
- » other significant events as identified by the aerodrome that have the potential to disrupt operations.

The Aerodrome Operator should communicate with the relevant State and local council emergency resources to ensure the integration of emergency plans.

Case study: *Adelaide Airport ARFF resources found that co-ordination with the Adelaide Traffic Management Centre to develop a set of emergency route plans using public roads to various locations on the airport could be enhanced so that they could get “green lights” all the way. This improved response times to emergencies and enhanced public safety.*

The Aerodrome Operator must maintain a list of all airside personnel that have an emergency response role and ensure that if any of these people become unavailable to fulfil their assigned role, that the resource list is updated so that there are adequate personnel to fulfil the roles required.

All airside personnel must receive some level of Aerodrome Emergency Training. Those who will not be required should receive information in their induction training so that they understand the aerodrome emergency warning system, the safe evacuation routes and assembly areas and ensure that they understand that they are not to get involved in an emergency response for which they are not trained or required. These routes and assembly areas should be clearly signed or marked and kept clear of all hazards.

Personnel who are required as part of an emergency response team must receive training in their roles and responsibilities and then be practiced in these at regular intervals to ensure that they are prepared to respond should they be required.

Aerodrome Emergency staging areas for response personnel should be agreed upon to which responders can quickly and easily transit. These areas should be clearly signed and marked to assist with easy identification. Safe procedures to be able to then access relevant parts of the aerodrome from the staging area need to be pre-planned and included in emergency procedures.

The aerodrome should have a reliable activation and communication process to notify the responders of the basics of the incident and the need to assemble relevant personnel at the Aerodrome Emergency staging area.

Aerodrome Operators should ensure an identified emergency coordination centre is available to support and manage operations during emergency situations with the necessary support and communications equipment available and space to accommodate the required personnel. This can be a mobile command post if this is deemed appropriate.

Evidence must be preserved at the scene of any incident to assist Australian Transport Safety Bureau (ATSB) investigators with their examination of the incident, however, fire suppression and the recovery of injured people takes priority. Should wreckage be required to be removed to access personnel, this must first be approved by the ATSB to mitigate legal implications.

The aerodrome may also choose to develop a Business Continuity Plan detailing what actions are to be taken in the event of a major incident to assist in returning the critical aerodrome services to effective use allowing operations to resume. This is not a component of emergency plans but are important plans nonetheless.

Case study: *Rockhampton Airport’s Business Continuity Plan identified the critical services and utilities required to establish an operational airport following a significant incident allowing a timely recovery following cyclone Marcia. A Business Continuity Plan is vital to every airport to enable recovery of those resources critical to minimal airport operations to be identified and a plan to be built around how to recover these if required.*

6.0 AIRSIDE HAZARDS

FIGURE 7: HAZARD AND CONTROLS

Hazard	Consequence	Threat	Likelihood / severity ¹	Responsible Party
Foreign object debris (FOD)	Aircraft engine damage	Items left or dropped in areas where aircraft engines can ingest them.	3C (asset)	Ground handlers / airlines
Moving vehicles	Single fatality	Driver not paying enough attention to pedestrians whilst driving	4C (people) 1C (asset)	Vehicle owners

Source: Global Safety Partners

6.1 Hazard Identification and Assessment

Every workplace has hazards. Even administrative jobs have hazards including tripping, slipping in the kitchen, and electrocution from office electrical equipment. The airside environment, however, has far more hazards which will be considered in this section. With robust and well managed controls, hazards can be contained and incidents avoided.

Ensuring all relevant airside hazards are identified and managed requires a collaborative approach between the Aerodrome Operator and all organisations operating airside. There needs to be agreement about which party is responsible for managing which hazards to ensure all are adequately managed. An airside hazard register does this. The register comprises five key elements:

The **hazard** identified, the most credible **consequence**⁵, a description of the **threat** that allows the hazard to become an incident, the **likelihood** and most probable **severity** of consequence, and the **responsible party** or parties for managing the hazard.

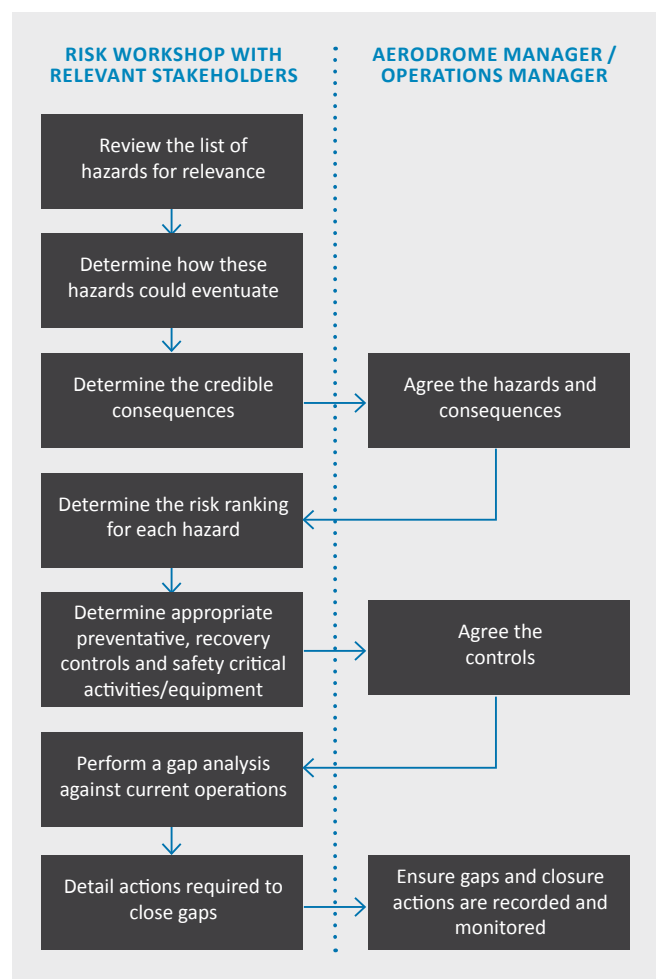
Once all hazards and their credible consequences have been identified, attention needs to turn to the management of these risks - both preventative controls and the recovery measures.

Preventative controls need to be adequate, practical and robust as well as maintainable to be effective. For higher risk hazards, the number of controls need to increase and their adequacy checked on a regular basis to ensure they can be relied upon.

The independence stops a single element common to a number of controls failing resulting in a number of deficient controls and the regular checks allow any deficiencies to be identified and rectified before the control is needed.

Despite all this, recovery measures are still required to both limit the escalation potential of an incident (i.e. limiting the injury to one requiring first aid rather than medical treatment) and allowing the business to return to normal operations as quickly as possible in the event that the preventative controls have failed.

The process of conducting a risk management process is shown here:



⁵ A worst case credible incident considers the probability of the consequence rather than the extreme consequence. This will find many injuries fall into the Lost Time Injury classification rather than becoming a fatality in the extreme.

For higher risk hazards⁶, the Bowtie model is one of the most valuable analytical and visual tools allowing people to see the controls in context. This can also help identify the safety-critical equipment and the safety-critical activities required to regularly check to ensure the controls will work as required.

In the above example of hazards identified, moving vehicles would be considered a high risk hazard as it can credibly result in fatality. This is most likely to be a single fatality of a pedestrian. As such, it should be subjected to the Bowtie model as shown below.

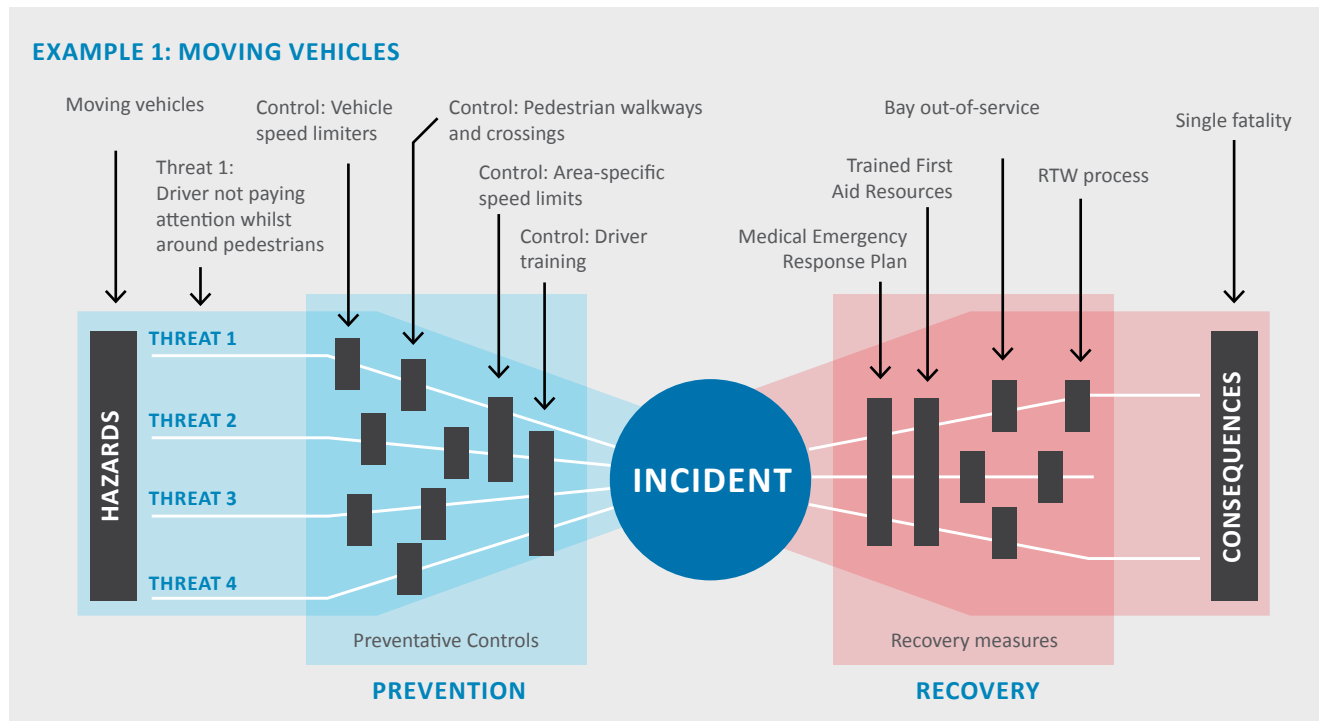
This clearly shows the controls being relied upon to maintain a safe airside environment in relation to moving vehicles. The safety-critical equipment – vehicle speed limiters (where fitted) and marked walkways need to be maintained and checked regularly.

Safety-critical activities – pedestrians using the designated walkways and crossings, drivers maintaining the set speed limits and driver training quality and understanding also need to be checked regularly. The responsible party to maintain each of these controls should be agreed and this communicated so that each party can ensure that the appropriate internal communication and checks are in place and that they will take action should deficiencies in these controls be found.

Similarly for the recovery side of the Bowtie, the measures identified to minimise the opportunity for a pedestrian to become a fatality need to be allocated to the responsible parties and maintained.

Further examples of bow ties for aircraft incidents and equipment unserviceability and maintenance are shown in Appendix 3.

FIGURE 8: BOW TIE METHODOLOGY



Source: Global Safety Partners

6 High risk for adoption of Bowtie risk management are typically those categorized as high risk or that could cause a fatality/PTD.

6.2 Dangerous Goods

Dangerous goods comprise a large number of hazardous substances that are capable of posing a risk to health, safety, property or the environment. Some dangerous goods are forbidden to be carried in any aircraft.

Some dangerous goods are forbidden to be carried in passenger aircraft. Dangerous goods that are permitted to be carried in aircraft are subject to quantity limitations and segregation requirements to prevent unintended reactions. The quantities depend on whether the aircraft is a passenger or cargo aircraft.

All consignments of dangerous goods must be checked against the ICAO Annex 18 Technical Instruction. The document also shows the packaging and labelling requirements.

The other consideration for airside safety is the handling of these packages at the aerodrome while they are in transit to or from the aircraft. Dangerous goods can be safely handled provided they are properly packed. They must be accompanied by documents advising what the substances are and either have a Safety Data Sheet supplied or show where access to the Safety Data Sheet can be sourced.

The Safety Data Sheet shows the properties of the substance, the health precautions, PPE requirements and how to handle a spill of the product should this happen.

The Aerodrome Emergency Plan should have a specific plan detailing the response plans for dangerous goods incidents. The Aerodrome Operator must be contacted immediately should a dangerous goods incident occurs. An initial response should mount a response suitable for an incident of maximum credible consequence to ensure containment then the response can be scaled back should further assessment show a lesser severity. This is far preferable to trying to assemble additional hazmat resources as an incident develops.

Hazmat resources should be assembled where available either on the aerodrome or from external emergency services. Unless the aerodrome or the airside operator has the required emergency plans, PPE and spill containment and clean-up equipment to handle a dangerous goods spill, specialist advice should be sought.

Focus of any dangerous goods incident should be on containment of the incident. For a spill of product, this means preventing the spill entering drains wherever possible by containing the spilled material with sand, soil or other spill containment materials. This should only be attempted where doing so will not expose personnel to the substance.

Case study: A Darwin Airport employee developed a bag insert for airside hazardous waste bins eliminating the need for staff to touch or expose themselves to the waste. An effective risk management strategy showing the effectiveness of the hierarchy of controls.

6.3 Airside Driving

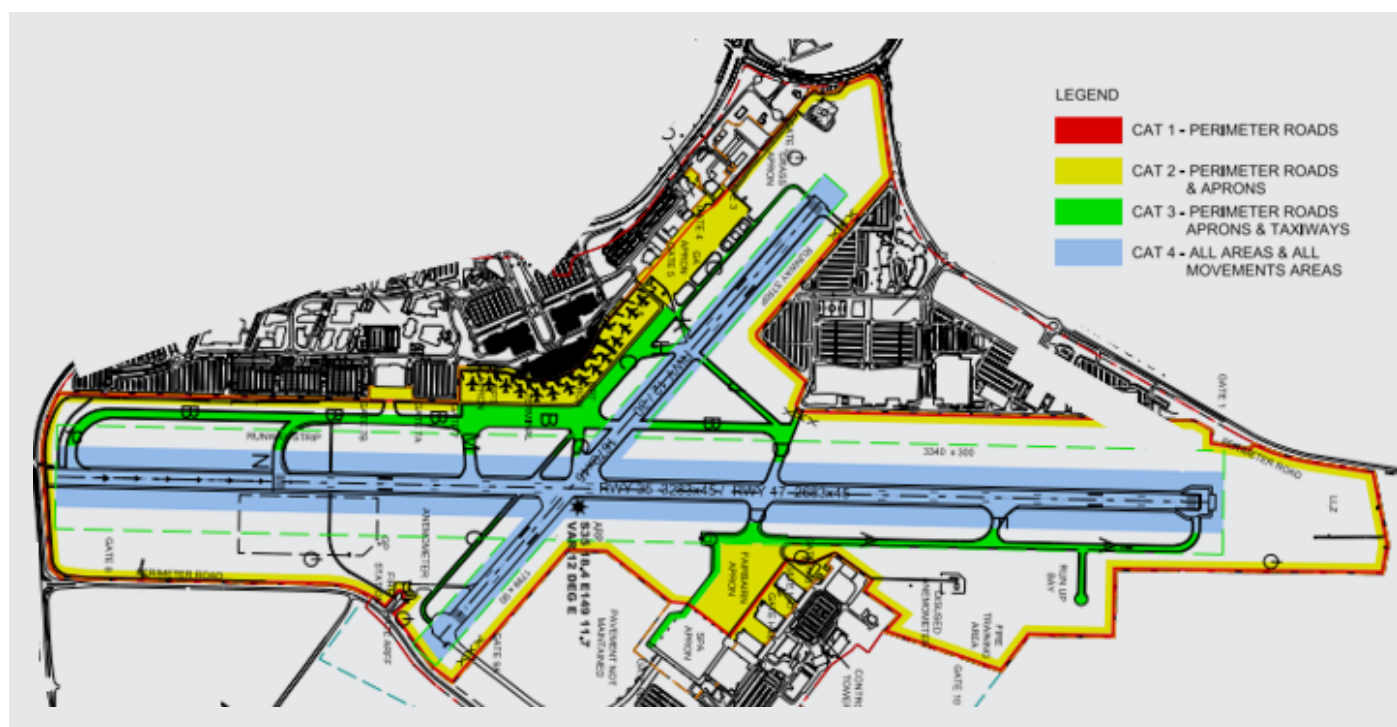
The hazard identification process for the aerodrome identifies that vehicle operations is one of the higher risk activities undertaken on an aerodrome. This includes a history of runway incursions caused by drivers losing situational awareness and entering runways without authorisation. A number of formal control measures can effectively manage these risk. These include limiting the number of drivers to those who have a business need to drive on the airside, providing driver training appropriate to the risks of the areas in which these drivers will be driving and accrediting drivers are some of the control measures that need to be in place. Others include the types of equipment and their maintenance programmes. These all form a part of the aerodrome's Safety Management System of risk management.

The Aerodrome Operator is responsible for having a formal training, assessment and licensing programme in place for all airside drivers to mitigate this risk.

Driving airside is possibly one of the most challenging airside activities and has a very different set of hazards to driving on public roads. Even within the airside, different areas have different risks so the airside is broken up into different driving areas requiring different driving authorities. Each has different training requirements reflecting the different hazards. These may vary between aerodromes so it is important that these are represented clearly on a map of the aerodrome so that all drivers understand the different authorities and training requirements for different airside areas. The following describes the typical driving authorities:

- » **Category 1** – perimeter roads and some terminal roadways;
- » **Category 2** – perimeter roads, some terminal roadways and apron areas;
- » **Category 3** – perimeter roads, some terminal roadways, aprons and taxiways;
- » **Category 4** – all areas and all movement areas.

FIGURE 11: EXAMPLE OF AIRSIDE DRIVING AUTHORITY LEVELS



Source: Canberra Airport

Airside drivers must demonstrate a thorough understanding of the airside driving hazards and the rules applicable to this activity and demonstrate the required competence to put these rules and skills into place practically when driving airside to perform this task safely. For this reason, the Aerodrome Operator must ensure that there is a quality airside driver training program in place including an adequate assessment of a driver's ability to read and understand relevant signage, comprehend and understand the training material and be able to apply the training in the relevant circumstances on the airside before being authorised to driver airside.

Drivers must understand the hazards of each area in order to be able to drive safely and they must understand the boundaries of their authorisation. Each of these areas has a different set of hazards that training needs to focus on.

This ensures a consistent delivery of the training material and ensures that the Aerodrome Operator has the opportunity to review drivers' understanding of the hazards, airside driving rules and shows the required competence when driving on the airside to be issued with an Authority to Drive Airside (ADA) and put into practice the rules and skills required to perform this activity safely.

Training provided by the Aerodrome Operator is the preferred method of training airside drivers. This ensures consistency of training delivery and the ability for the ADA issuer to ensure drivers understand the hazards and airside driving rules and display the required practical skill and competence to perform this activity.

The Aerodrome Operator can authorise trainers in other airside organisations to deliver the Aerodrome Operators training package. Where this approach is taken, the Aerodrome Operator is encouraged to:

- » ensure that the training provided by these authorised trainers is of an equivalent standard to the training they would provide themselves so that the drivers understand the hazards and airside driving rules and display the required practical skill and competence to perform this activity;
- » ensure regular reviews of the training quality to ensure delivery consistent with their own training; and
- » perform competence and understanding checks on their drivers.

Airside Driver Training Programme

The Aerodrome Operator will take the lead in developing an agreed upon standard for the driver training programme. Air traffic control, ground handling agents, airlines and other relevant airside service providers may provide input and will be required to co-operate and comply with the standard set by the Aerodrome Operator to ensure the airside driving activity can be performed safely.

The driver training programme may cover the following areas:

- 1 Operational requirements of driving any vehicle airside.
- 2 The health and safety aspects of the operation of vehicles in close proximity to aircraft, around other equipment and around pedestrian traffic.
- 3 The airside driving rules and hazards applicable to the areas in which they are seeking authority to drive including any penalties for failure to abide by the rules.
- 4 Specific training on the type of vehicle the operator will be using.
- 5 Specific hazards and controls of the areas in which the vehicles will be operated (i.e. aprons, taxiways and runways).
- 6 Verification of competency in the correct usage of radio communications equipment and the required communications protocols.

Airside driver training should consist of a theory and a practical component.

For an initial application for an ADA, it is expected that the training would consist of three elements:

- 1 An initial awareness of the airside driving hazards and rules applicable to all areas of the category they are seeking authority for. This would be done as a passenger with an accredited driver driving. The duration of this familiarisation would be specified by the aerodrome manager based on the size and complexity of the aerodrome.
- 2 An initial theory training session run by a qualified Airside Driver Trainer covering the airside rules, hazards, vehicle handling, aerodrome layout and signage. Line markings, lights, boundary delineation, parking and speed restrictions, low visibility driving, aircraft clearance distances, etc. for the areas in which they will be authorised to drive.

- 3 An initial supervised drive of the areas for which authority is being sought. This would have the applicant drive with a qualified driver coach in the passenger's seat assessing knowledge of the hazards, airside rules, behavioural suitability and driving competence according to a checklist.

Once the applicant has successfully completed all of the above components, they would be issued with an ADA valid for a period as determined by the Aerodrome Operator but typically not longer than two years.

Refresher or re-licencing should be done prior to the expiration of the current ADA for continued ability to drive airside. Refresher training would consist of two components:

- 1 Theory training similar to the initial theory training to ensure continued thorough understanding of the rules and hazards and acquaintance with any rule changes.
- 2 Practical supervised drive with assessment to demonstrate understanding and application of the rules, awareness of the hazards and behavioural suitability and driving competence.

Issuing an Airside Driving Authority

An ADA can only be issued to a person wanting to drive airside provided they hold a State or National drivers licence applicable to the class of vehicle they will be driving airside.

The Airside Driving Authority should be issued by a valid issuing authority (in most cases, the Aerodrome Operator) outlining rules for its validity in terms of time, conditions of use, restrictions and / or endorsements (night time, low visibility). An ADA should abide by the local enforcement and driving offence procedures.

The ADA is issued as a privilege to those airside workers required to drive vehicles as part of their airside activities.

ADA Exceptions

Vehicles being driven by people who would only access the airside environment singularly or on rare occasions are not required to hold an ADA provided they are escorted by an authorised aerodrome escort vehicle with a driver who holds an escort endorsement on their ADA.

Aerodrome Driving Regulations and Requirements

The Aerodrome Operator should develop the specific airside driving rules and local instructions appropriate to the specific hazards identified as applicable to their aerodrome/s. These rules will be presented as part of the theory training for airside drivers and disused with the ADA.

Any temporary aerodrome rules required to manage a specific and temporary condition should be disseminated to all drivers. This requires the Aerodrome Operator to have a means of distribution to these personnel and their employing organisations to ensure the changes are effectively communicated. An example of such a need would include closure or partial closure of a particular roadway due to construction works and the routing of vehicular traffic around the works through an area that a specific category of driver would not normally be allowed to use but can use for the period of the works with or without certain conditions.

It is recommended that each aerodrome implements some form of a Penalty Infringement System for failures to abide by the airside rules developed to manage airside risks relating to driving. The penalties would reflect the seriousness of the infringement and be attached to the driver's ability to hold an ADA. This may be via a system of demerit points and/or removal of the right to drive airside for a period or until able to demonstrate understanding and competence to apply the airside driving rules.

The infringement penalties and their application should be made known to the driver during theory training with a copy issued with their ADA.

Personal Responsibilities

All airside drivers should:

- » comply with and use personal protective equipment (PPE) having regard for the activities they will perform, whether they will alight from the vehicle and for the environment in which they will operate;
- » should ensure they DO NOT SMOKE airside; and,
- » ensure they do not create FOD and that their vehicle does not drop materials or fluids that could be of danger to the operation of aircraft or other equipment; and
- » ensure that the vehicle being used is suitable for the task and being used as intended.

Where the drivers are employees or contractors of airport operators, this is the responsibility of the respective airside operator. In all other cases, the Aerodrome Operator or authorised escorting driver must ensure that these requirements are explained to the visitor and that they comply before allowing airside access⁷.

6.3.1 Vehicle Seating

Most airside vehicles are designed principally to perform another activity. They often have limited seating and operators of this equipment and the Aerodrome Operators should enforce two specific rules with regards to equipment and vehicles moving around the aerodrome.

The first is the “NO SEAT, NO RIDE” policy to ensure that everyone on a vehicle has a properly formed seat in which to sit and is not sitting or holding on to some part of the equipment that is not primarily designed to be sat on and transport people from one place to another.

The second is that a seatbelt is to be worn at all times a vehicle is moving. Vehicles that have seatbelts interlocked to prevent the equipment being driven without the driver and passenger wearing a seatbelt need to be designed so that the belt clip and buckle cannot be connected behind the driver or passenger providing no protection.

These two policies are basic requirements of driving on public roads and there is no reason that they should not be equally applicable on aerodrome airside environments at all times a vehicle is moving in order to protect the driver and passenger/s from serious injury.

6.3.2 Vehicle Standards and Permits

The operation of vehicles on aerodromes is essential to an efficient operation but the numbers of vehicles or pieces of mobile equipment should be controlled by the Aerodrome Operator to those justified to meet business requirements. For those vehicles required to be present on the airside, their appearance and operating performance must be to an acceptable standard to reduce the opportunities for the equipment to break down and create an airside hazard.

Aerodrome Operators are encouraged to develop and maintain specific standards for the condition of airside vehicles. This is to include vehicle maintenance in accordance with the manufacturer's requirements as well as those imposed by the regulatory agencies or specific to the Aerodrome Operator's vehicle and plant requirements.

⁷ While this section deals with airside driving, it should be noted that the visitors still need to comply with all requirements for issue of visitor passes required by the Aerodrome Operator before airside access can be granted.

The standards may include:

- » requirements for vehicles to be marked with company identifications and discrete vehicle identification. The colour of vehicles should not be the same as those used by the emergency services;
- » requirements for rotating beacons visible from all directions to be used whenever vehicles are moving;
- » where the vehicle is required to be used on taxiways or runways, then the vehicle may also be required to be fitted with a transponder and radio able to communicate with ATC and the driver required to hold a valid and current radio operator's licence;
- » performance of more daily vehicle serviceability inspections;
- » requirements to be maintained in accordance with the manufacturer's requirements and the various local, State or Federal requirements;
- » the visible display of Airside Vehicle Permits (AVPs) where required; and,
- » the company using the equipment holding suitable insurance.

There are rare occasions where a piece of equipment may be required to be used airside temporarily and for a short duration. The Aerodrome Operator should have a procedure that allows for these urgent and temporary instances so that it can issue a temporary Airside Vehicle Permit for the duration of the vehicle's intended use. This would normally be subject to the vehicle being inspected and being able to comply with those relevant aerodrome's airside vehicle requirements applicable for that area shown above.

6.3.3 General Aerodrome Layout

It is important that airside drivers are familiar with the aerodrome and general procedures in place at that aerodrome.

Airside drivers should be required to know:

- » general layout of the aerodrome;
- » the various areas of the aerodrome such as the manoeuvring area, movement area, service roads and perimeter roads;
- » all signs, markings and lights on the aerodrome for both vehicles and aircraft for the areas in which they are authorised to operate; and
- » specific procedures relevant to any local practices introduced for the aerodrome.

6.3.4 Hazards of Airside Driving

The specific hazards a driver may encounter on the aerodrome need to be considered when developing the airside training package. These are likely to include:

- » aircraft turnaround processes;
- » aircraft clearance requirements;
- » engine ingestion, jet blast, propeller wash and helicopter downdraft;
- » helicopters hover taxiing;
- » aircraft fuelling danger zones and clearance distances;
- » driving at night;
- » loss of sight due to environmental factors such as the sun and airport black spots;
- » driving in adverse weather conditions, particularly low visibility;
- » specific aerodrome area speed limits;
- » specific aerodrome vehicle and GSE parking areas;
- » FOD prevention and spillage reporting;
- » vehicle reversing restrictions;
- » barrow and dolly limits for towing;
- » pedestrian areas; and/or
- » aerobridges and associated services such as electrical ground power units.

6.3.5 Driving Incidents

The Aerodrome Operator should have incident procedures that all airside drivers need to be familiar with and understand.

These should include the immediate notification in the event of:

- » any sort of personal injury;
- » any vehicle accident including any collision with an aircraft or airside infrastructure; and
- » any vehicle breakdown.

6.3.6 Communications

Vehicles that operate in certain areas of the aerodrome must be fitted with radios that allow communication with ATC or communication within the Common Traffic Advisory Frequency (CTAF) environment. The drivers must also be trained in radio communication and be a certified aeronautical radio operator. Some aerodromes will also require the vehicle to be fitted with a transponder so the identity and location of the vehicle can be monitored.

The Aerodrome Operator must establish communications procedures including the protocols to be used particularly when operating in manoeuvring areas. The driver trainers must ensure that the drivers to be issued with an ADA of the level to allow the driver to operate in these areas requiring radio communications, that they can provide evidence of their aeronautical radio operator's certificate and can apply the required communications protocols in the appropriate areas.

6.4 Foreign Object Debris (FOD)

FOD on the aerodrome presents a hazard to aircraft, equipment and personnel. FOD can be ingested into engines causing significant and costly damage and can be blown across aprons by jet blast injuring personnel.

The Aerodrome Operator should ensure that all personnel working either airside or who have businesses adjacent to the airside are aware of the dangers FOD pose to aircraft operations. Ideally, this should be incorporated into the induction training presented to personnel when commencing work at the aerodrome.

Active FOD prevention materials will still be required to remind personnel of the dangers presented by FOD on the airside.

Regardless of training, it is still necessary for a number of FOD control measures to be put in place including:

- » FOD bins provided at logical points around the aerodrome for people to deposit FOD they pick up;
- » runway and taxiway inspections⁸ should be undertaken by the Aerodrome Operator daily to ensure nothing has contaminated these areas;
- » apron inspections should be performed prior to the arrival of aircraft to parking bays. For general aviation apron areas, this should be performed by the Aerodrome Operator. For aircraft parking bays, this should be performed by the handling agent for the aircraft prior to the arrival of the aircraft;
- » good cleanliness should be maintained on all areas of the airport particularly during the breakdown of cargo consignments inside freight sheds or other facilities away from the apron areas;
- » removal of packaging and transport items such as pallets from the apron immediately;
- » ensuring tenants pick up FOD within their lease areas;

- » organising regular joint aerodrome FOD Walks with tenants;
- » ensuring that all contractors working at the airport properly contain their materials to their work areas;
- » reviewing FOD that is collected to identify the likely source; and
- » review apron airside inspection reports with the Airside Safety Committee.

Regular consultation should take place with the Airside Safety Committee to obtain widespread support for FOD prevention measures. It is recommended to collect and measure the amount of FOD found on the airside at regular intervals.

Aerodrome Operators should perform checks of those areas where FOD can be introduced to ensure that proper controls are in place and working. Apron, runway and taxiway inspections are designed to identify items of FOD and remove it before damage occurs to aircraft. These inspections are performed routinely throughout the day with additional inspections required subject to certain events such as severe winds or reports of suspected damage.

6.5 Inclement Weather

Adverse weather makes it more difficult to maintain normal airside operations. Aerodromes should have procedures in place to manage the impact of specific weather conditions. These procedures may restrict the ground operations capabilities of aerodrome tenants however they should increase the safety of those working airside.

Weather events require the Aerodrome Operator to work closely with the Bureau of Meteorology, ATC (if applicable) and all aerodrome tenants to ensure that operations are able to continue safely.

With the forecast of inclement weather, the Aerodrome Operator should assess the likely impacts of this on airside operations and whether a restriction on the types of movements should be communicated. This may include limiting both access to the apron of vehicles and the types of vehicular movements on the apron to essential service vehicles only. The Aerodrome Operator should have developed access control restrictions that can be implemented in such circumstances including the communication of such access and movement restrictions to all airside organisations.

⁸ An example of an Airport Serviceability inspection report is shown in Appendix 5

Strong Winds

The main hazards associated with strong winds are unsecured items being blown across the aerodrome into aircraft or airside infrastructure causing damage or into personnel causing injury. Other incidents caused by strong winds include aircraft servicing equipment moving against an aircraft or an aircraft moving against ground equipment or aerobridges causing damage to the aircraft and the other assets or in rare cases, raised equipment to become unstable and topple.

Best practice encourages Aerodrome Operators to disseminate amongst airside operators a set of published procedures for operations during strong winds. These procedures will detail allowable operations and the conditions under which they may continue.

The Aerodrome Operator should have a means of communicating to airside personnel any forecast conditions of strong winds and actions that must be undertaken to minimise their impact. Mitigation actions can include:

- » securing of aircraft propellers;
- » additional chocking, orientation and tie-down requirements for parked aircraft;
- » arriving aircraft to receive positive chocking communication from ground crew before releasing parking brake;
- » ballasting aircraft which can include fuelling on arrival;
- » restriction on the use of aircraft servicing equipment that has extendable or elevated sections;
- » restrictions on aircraft servicing;
- » use of aerobridges rather than mobile stairs for passenger access to aircraft;
- » restriction on passenger movements across the tarmac;
- » securing of containers, baggage and materials; and
- » contractor works areas to be secured and, in some cases, the suspension of works.

Storms – Cyclones

Cyclones impact on a significant number of aerodromes across the north of Australia. The Bureau of Meteorology will categorise cyclones according to their expected wind strength:

Category 1	Maximum wind gusts between 90 and 124 kph. These are likely to cause minor damage to buildings and aircraft (often from falling trees or other items blown into these assets) and personnel from items being picked up and blown into them. Aircraft should be tied down and propellers secured to prevent windmilling.
Category 2	Maximum wind gusts between 125 and 164 kph. Minor damage can be expected to buildings, significant damage to signs, risk of power failure and unsecured light aircraft are likely to be blown around resulting in damage. Light unsecured ground equipment is likely to be blown across the aerodrome.
Category 3	Maximum wind gusts between 165 and 224 kph. This is likely to cause roofing to lift on some buildings, power failures and light to medium aircraft to suffer damage. Unsecured ground equipment and vehicles are likely to be blown across the aerodrome.
Category 4	Maximum wind gusts between 225 and 279 kph. Buildings are likely to suffer significant roof loss and structural damage, power failure can be expected, and aircraft can be expected to be damaged as is airside signage and equipment.
Category 5	Maximum wind gusts greater than 280 kph. Large scale destruction can be expected.

Cyclones will cause significant disruption to operations on the aerodrome. Even category 1 cyclones can be expected to pick up loose items across the aerodrome and blow them into aircraft or airside assets causing damage or injury to personnel. They can be expected to cause some damage to aerodrome navigation aids and aircraft servicing equipment and aerobridges.

Aerodromes susceptible to cyclones should have a cyclone plan and a set of published requirements detailing actions airside organisations are to take upon receipt of a cyclone warning as part of their aerodrome procedures. Airside organisations should be trained in these procedures so they are ready to enact the requirements should they be necessary.

The Aerodrome Operator should have a means of communicating to airside personnel any forecast cyclone warnings and initiate a cyclone briefing centre and co-ordinate cyclone preparations for the aerodrome.

Aerodrome cyclone procedures should include a number of stages from the initial cyclone watch stage when first becoming aware of a low pressure system that could result in a cyclone through cyclone warning stages based on wind strength and expected arrival time to cancellation of the cyclone warning. Each of these stages will have actions attached to them preparing the aerodrome for the imminent impacts of the cyclone.

The actions Aerodrome Operators and airside organisations should consider in their cyclone plans are as follows:

Cyclone Watch - Gale Force Winds above 75kph (41kt) and/or 24 - 48 hrs away

- » Aerodrome Operator to issue notification to airside organisations of initiation of cyclone watch.
- » Aerodrome Operator to review their cyclone procedures and amend as required.
- » Airside organisations to review their own cyclone plans and company procedures.
- » Secure or remove non-essential equipment from open areas.
- » Consider fuelling aircraft for increased ballast and to provide sufficient fuel for aircraft to be moved from aerodrome.
- » Check emergency stores and equipment (fuel, generators, radio's etc.).

Cyclone Warning (1) - Gale Force Winds above 75kph (41kt) and/or 24 hrs away

- » Aerodrome Operator to convene Cyclone Committee.
- » Monitor cyclone activity via Bureau of Meteorology website/media etc.
- » Complete initial preparation in line with cyclone plan.
- » Ensure airside organisations implement their cyclone plans and company procedures.
- » Complete removing/securing non-essential equipment.
- » Recommend removal or securing of all light aircraft and ground equipment.
- » Patrol aerodrome to determine that all relevant equipment is secured or removed from open areas.

Cyclone Warning (2) - Gale Force Winds above 100 kph (54kt) and/or 6-12 hrs away

- » Continue to monitor cyclone activity via BOM website/media etc.
- » Commence partial shutdown of facilities, computers, etc.
- » Reduce staffing to minimum levels required for aerodrome operations and cyclone preparation.
- » Recommend relocations of all light and medium aircraft or removal to hangars and securely tie down.
- » Instruct airside organisations to commence plans to shut down their own airside operations.
- » Consider flood precautions/sandbagging to prevent ingress of flood water to aerodrome from external sources while ensuring adequate drainage to remove stormwater from aerodrome.
- » Patrol aerodrome to determine that all relevant equipment is secured or removed from open areas.

Cyclone Warning (3) - Gale Force Winds above 100 kph (54kt) and/or 3-6 hrs away

- » Stage shut down of aerodrome facilities, including aerobridge, terminals, aerodrome ground lighting, radar etc.
- » Prepare ATC, ARFF, Airlines to cease operations for shutdown of aerodrome at next stage.
- » Instruct airside organisations to complete shutdown of their own operations.
- » In consultation with ATC issue NOTAM advising industry of aerodrome shutdown following departure of last aircraft or when unsafe to continue.
- » Stand down Cyclone Committee and instruct all aerodrome and airside organisation staff to depart aerodrome.

Cyclone Warning (4) - Gale Force Winds above 100 kph (54kt) are experienced at the aerodrome

- » All operations have ceased.

Cyclone Warning (5) – Gale Force Winds (above 100 kph) (54kt) have passed

- » All aerodrome operations remain shut down until ALL CLEAR is announced by the Bureau of Meteorology.

Cyclone Warning (6) – Gale Force Winds have passed town/city, however, cyclone warning active

- » Cyclone Committee reconvenes with the focus on preparing to resume operations.
- » Have essential aerodrome staff and other support agencies attend aerodrome to plan repairs and recovery operations.
- » Assess the status and undertake recovery actions required to return the aerodrome to operational duty.
- » In consultation with ATC issue NOTAM advising industry of aerodrome operational status and any facilities or navigational aids unavailable or expected timing of next status update.

Cyclone Warning Cancelled - Declaration of All Clear by Disaster Manager

- » staff returning to aerodrome to re-commence operations;
- » airside organisation recovery operations commence;
- » airside organisations to liaise with Aerodrome Operator to advise any service and operational impairments and damage to facilities; and
- » aerodrome Operator to monitor recovery actions until complete. This may be required over an extended period.

Storms – Lightning and Electrical Activity

Each airside operator must ensure they have a procedure to protect their personnel from injury in such events. It is recommended that this includes the following, when electrical storm activity is within 5Nm of the aerodrome:

- » remove all airside personnel from open areas back into buildings or enclosed vehicles;
- » cease all passenger boarding and disembarkation operations at non-aerobridge bays;
- » cease aircraft fuelling operations; and
- » cease construction works and have construction personnel moved to buildings or enclosed vehicles.

The Aerodrome Operator or a service provider such as the Bureau of Meteorology should have a means of communicating to airside personnel the presence of electrical storm activity within 5Nm of the aerodrome so that each airside organisation can implement their own storm procedures. These will generally involve the removal of personnel from open areas to reduce the likelihood of lightning striking and injuring the personnel.

A number of options exist for the Aerodrome Operator or a service provider such as the Bureau of Meteorology to communicate the presence of impending electrical storm activity at the aerodrome. Systems include lights and/or sirens to warn airside personnel, radio communications or phone/email/fax services to airside organisations or a number of these. Regardless of the means of communication each airside organisation should have a procedure in place that can be implemented and their personnel and contractors trained to respond appropriately.

Other options for airside organisations to inform themselves of impending lightning strikes include:

- » the Bureau of Meteorology-operated lightning detection system for certain areas across Australia which is available via the internet to organisations on application; and
- » portable hand-held lightning detectors that can be used by airside workers to monitor the potential for lightning strikes.

Specific actions should be taken including:

- » ceasing use of headset communication by ground crew with the aircraft cockpit;
- » ceasing the loading and unloading of aircraft;
- » ceasing boarding or disembarking of passengers via the tarmac;
- » ceasing all tarmac operations requiring personnel to be out in the open;
- » advise personnel to seek shelter inside closed buildings and vehicles;
- » advise personnel to stay clear of tall metal structures;
- » delaying aircraft refuelling activities; and
- » temporarily ceasing construction and maintenance work in open areas of the aerodrome.

Storms – Sand and Dust

Sand and dust storms can significantly reduce visibility on an aerodrome and are a risk for aerodromes across Australia. Sand is generally confined to levels close to the ground however dust can be lifted into air columns and, in extreme conditions to significant altitudes. If followed by rain, the dust can settle in the rain resulting in reduced runway friction values.

Airside organisations should consider:

- » possible malfunction or short-circuit of electronic equipment requiring thorough cleaning before re-use;
- » blocking of pitot tubes on aircraft requiring cleaning before the aircraft is safe to depart;
- » sealing openings into essential equipment rooms and/or aircraft, engines or ground equipment; and
- » availability of aerodrome sweeping equipment and resources.

Aerodrome Operators should consider:

- » preventative sealing of critical strategic buildings housing navigation aid control systems and critical computer equipment;
- » possible contamination of aerodrome electrical equipment requiring thorough cleaning before re-use; and
- » deterioration of guidance system and lighting system performance that may require cleaning.

Storms – Heavy Rain and Flooding

Heavy rain can reduce aerodrome capacity due to increased aircraft separation distances and slower aircraft turnarounds. In some cases, it can also result in flooding of the runway, taxiway and apron areas making it difficult to maintain normal operations, particularly when drainage systems become overwhelmed with the volume of water flowing into them. This can also be affected by the cumulative effects of water entering off-aerodrome drainage systems, both upstream and downstream of the aerodrome.

Aerodrome Operators should ensure runways are designed to shed water as efficiently as possible and adjacent drainage systems are designed to cope with the worst credible storms. Maintenance crews may need to assist unblock drains or attend to equipment inundated by water during periods of heavy rain.

Aerodrome Operators should consider:

- » limiting vehicle movements on the airside; and
- » preventative sealing of critical buildings housing navigation aid control systems and critical computer equipment.

In some instances, king tides can also cause sea water and stormwater encroachment onto the airside. This is more likely at aerodromes close to the sea and when accompanied by rain which cannot readily escape through drainage systems already inundated with water backed up from higher sea levels.

Storms – Low Visibility – Fog and Cloud

There are a number of reasons for low visibility conditions at aerodromes. The most common are fog and low cloud bases.

ATC, where applicable, will generally impose greater separation distances where the visibility is sufficient to allow continued aircraft operations. Depending on the visibility, restrictions may be required concerning runway capacity and operating in close proximity of critical navigation aids suspended to prevent inadvertent damage of these aids.

Aerodromes should have low visibility procedures available for ground operations and have these communicated to the airside organisations so that they understand the limitations that will be imposed to operations in such conditions. Aerodrome procedures may include limitations on vehicles entering the airside areas, cessation of certain activities, increased separation between manoeuvring aircraft and, potentially, the cessation of all ground operations for periods of time.

Additional restrictions included in the Low Visibility procedures may include:

- » possible physical closure of some airside vehicle access points,
- » cessation of vehicles using taxiway or taxi-lane crossings or changes to the way these routes are used;
- » restrictions on vehicles operating on the taxiways and runways;
- » restrictions on routes able to be used by vehicles and speed restrictions for vehicles performing essential airside activities;
- » restrictions on the towing of aircraft;
- » restrictions on the types of work activities allowed on the airside;
- » restrictions on vehicle and/or passenger movements on aprons for aircraft parked in stand-off positions limiting the interaction between vehicles and pedestrians or increasing passenger movements by bus between terminal and aircraft;
- » closure of airside access gates to non-essential vehicles; and
- » cessation of all vehicle movements.

The Aerodrome Operator's Low Visibility procedure should include a detailed communications plan to communicate to airside organisations the enacting of restricted operations. These should consider the following means of communication and are likely to include a number of these options:

- » signage at airside pedestrian and vehicle access points;
- » radio notification to drivers; and
- » phone/email/fax notification to the airside organisations.

Snow and/or Ice

There are a small number of Australian aerodromes where snow is possible and a larger number where ice is possible. Snow and ice on an aerodrome are a hazard to aircraft, vehicles, equipment and pedestrians.

Runway and taxiway friction for arriving and departing aircraft can be significantly reduced due to the presence of ice or snow. Reduced apron friction can cause vehicles and equipment to lose control when braking or cornering, equipment being towed to jack-knife and pedestrians to slip and fall.

In snow, some of the critical infrastructure such as ground-mounted lighting and signage can be covered limiting directional information for aircraft.

Aerodromes with the potential to be affected by snow and/or ice should have procedures in place for clearing runways, taxiways, emergency response routes and aprons to minimise the impact on continuing safe operations.

Aerodromes with the potential to be impacted by snow and ice should have adequate personnel training and exercises in place to ensure staff are ready to respond if required. These would normally commence with clearing of runways and rapid exit taxiways before moving on to clear taxiways then apron areas.

The activity levels of Australian aerodromes susceptible to snow are low and the specific activities include:

- » preparation and planning with appropriate procedures, training, equipment and staff rostering;
- » communication of the snow removal plan to airside operators;
- » communication of snow warnings when snow is forecast;
- » identification of the areas into which the removed snow will be dumped so it does not impede on aerodrome operations or aircraft movement;
- » communication of times for recommencing passenger movements between terminals and aircraft;
- » communication of activity restrictions to airside organisations; and
- » restrictions on airside vehicle movements and increased vehicle/aircraft clearance distances.

Large amounts of snow can obscure lights, signs and markings. Great care must be taken when clearing this snow to avoid damage to the equipment. The correct operation of this equipment must be ensured before the runway and taxiways are open to aircraft movements.

Aircraft De-icing

Where aircraft de-icing operations are required, Aerodrome Operators should consider providing a specific de-icing area on the airside for this operation to contain the chemical storage, treatment and recovery to an area where environmental impacts can be minimised. The best designed facilities include the recovery and reuse of de-icing fluids.

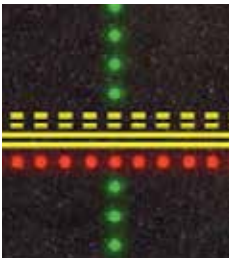
Risks with de-icing on the aerodrome aprons include lowering pavement friction. This can impact both vehicle braking ability and cause pedestrians to lose footing. Additionally, drivers of vehicles can have their feet slip on the vehicle control pedals resulting in loss of control of the vehicle.

6.6 Airside Area Markings and Delineation

Delineation of areas airside is important so that workers understand their use and drivers understand the limits of their travel allowed by the Airside Driver Authority category.

Aerodrome Operators should ensure that their airside driver training includes a comprehensive explanation of these different pavement markings and that each airside driver thoroughly understands these.

CASA's Manual of Standards Part 139 Chapter 8 provides a comprehensive list of the markings required. Below, we have provided a summary of these and some additional markings for Aerodrome Operators to consider.

Required markings	
	Taxiway Centre Lines are defined with a yellow line on a contrasting background. These provide pilots and aircraft tug drivers with an indication of the middle of the taxiway.
	Taxiway Edge and Apron edge Markings are defined by double yellow lines on a contrasting background. These mark the edge of the usable taxiway and the edge of the usable apron areas.
	Low Strength Pavement Markings are defined by double yellow lines on the edge of the taxiway. Where aircraft or vehicles can travel on the low strength pavement areas, the maximum weight allowed will be written across the single yellow line denoting the centre line of the pavement. Extended shoulders are marked with yellow chevrons. Drivers should never drive over low strength pavement.
 	Runway Holding Point Markings are defined with double hatched yellow lines on a contrasting background preceding double solid yellow lines on a contrasting background. These markings are used at the intersection of taxiways and runways for aircraft and vehicles wishing to enter or cross the runway to hold short of runway awaiting clearance to enter the runway. These can be improved even further at aerodromes where ATC services are present with the addition of red stop bar lights adjacent to the holding point markings. ATC will turn these off when providing clearance to enter or cross the runway.



Aircraft Lead-in Lines are defined with a solid yellow line on a contrasting background for primary parking positions.

Aircraft follow these lines when taxiing into a parking bay. Secondary parking positions are marked with a dotted yellow lead-in line.



Aircraft Lead-out Lines and secondary lead-in lines are defined with a broken yellow line on a contrasting background.

Used for secondary parking positions, it is the marking that a pilot will follow when taxiing out from a parking bay



Push Back Lines are defined by a broken white line on a contrasting background.

Aircraft are pushed back along a broken white line. The line provides an indication of the path for the tug to follow.



Push Back Limit Line are defined by two white bars on a contrasting background across the pushback line.

Aircraft are pushed back along the Push Back Line no further than this Limit Line.



Tow Bar Disconnect Points are defined with white wording 'TOW BAR DISCONNECT' on a contrasting background.

The aircraft is pushed back or pulled forward to this mark.

The tug disconnects at this point and the aircraft then departs under its own power unless, due to mechanical fault, the tug is called for to reconnect and pull the aircraft back onto the bay.



Gable Markers are defined by white triangular sections and are used to mark the edge of the runway strip. They are set back from the sealed or defined runway edge.

Vehicles are not permitted to enter the delineated runway without clearance.



Helicopter Apron Edge is defined with either a solid blue line on a contrasting background or by the use of weighted blue cones.

These mark the edges of designated helicopter parking areas.



Parking Position Designation Marking is defined by yellow alphanumeric marking on a contrasting background.

This marking indicates the unique bay number and is often placed on the aircraft lead-in line.



Aircraft Nose wheel Stop Bar is defined by a yellow bar on contrasting background across the aircraft lead-in line.

This signifies the parking position for the relevant aircraft type suitable to each parking bay.

These lines are set per aircraft type to accommodate the infrastructure of each bay.



Unserviceable areas are defined by a White cone with red banding.

This signifies areas temporarily unavailable within the manoeuvring areas



Apron Service Roads are defined by a solid white line marking the extremities and a dashed centre line where two way traffic is allowed.

This is the same line marking used on public roads.

Marking apron service roads channels apron vehicle movements along the safer routes and creates a more orderly traffic flow reducing the apron hazards.

Double-white lines should be used on the taxiway side of apron service roads where this roadway runs adjacent to a taxiway to indicate that drivers **MUST NOT CROSS** into the taxiway.





Live Taxiway Crossings are defined with staggered lines each side.

These crossings allow category 2 drivers to cross the taxiway at selected locations between apron areas.

Great care must be taken at these locations. Aircraft have right of way. Drivers must bring their vehicle to a complete halt, check for aircraft before proceeding.



Aircraft Parking Clearance Lines are defined by a red line and may be bordered with a yellow line each side delineating the clearance between parked and taxiing aircraft.

Apron service roads should be marked on the taxi lane side of the aircraft parking clearance line to avoid drivers driving too close to parked aircraft.

Airside drivers should remain on the taxiway side of this line to drive past parked aircraft, however where an aircraft is taxiing on the taxi lane and an aircraft is parked within the aircraft parking clearance line, airside drivers must wait inside the aircraft parking clearance line for the taxiing aircraft to pass before re-entering the taxi lane to continue their journey.



Equipment Storage Areas are defined by a solid red line on a contrasting background (providing differentiation from Hazard Areas which do not have the black background).

These areas are assigned to parking of aircraft handling equipment and vehicles for a maximum of 24 hours. They are not long term storage areas.



Works Areas or areas that are out of service are defined by using orange witches' hats, orange bollards or water-filled/concrete barriers. At night these markings are supplemented with red lights.

Drivers and pedestrians should not enter these areas without clear authorisation to do so and understanding of the hazards present within these areas.

Where using cones or bollards, care must be taken to ensure these are appropriately weighted to prevent them being blown by strong winds or jet blast, prop wash or helicopter downdrafts.





Passenger pathways are defined by solid white lines on a contrasting background.

Additional markings for consideration subject to a risk assessment



Equipment Staging Areas are defined by a broken red line on a contrasting background.

These areas are assigned to the staging of equipment and vehicles for the next aircraft to use that bay. Equipment can be staged prior to an aircraft arrival, while the aircraft is on the bay and for a short time after its departure. These are not to be used as equipment storage areas. They are for short term use only.



Hazard Areas are defined with diagonal red hatching on a contrasting background and indicate areas that should be avoided.

They should not be driven through and equipment should not be parked in these areas.

These markings should be used around inspection pits, under moveable aerobridges, at emergency exits, etc.



Road Signs need to be consistent with those used on public roads wherever possible but they need to be used to reflect the hazards (and rules) that apply to the airside. These include:

- » SPEED signs which can also be painted on the airside roads;
- » GIVE WAY and STOP signs at roadway intersections;
- » NO PARKING;
- » PEDESTRIAN CROSSINGS.

Care should be taken to ensure signage is practical, addresses identified risks and is not overwhelming.



Engine Run Ground Cones may be used when an aircraft engine run is underway to warn airside drivers and personnel of the presence of high velocity jet blast behind the aircraft and the ingestion risk in front of the engines.

One example is a green cone with white banding and the words ENGINE RUN.

The cones should ideally be positioned to the side of the aircraft in line with the tail and wing to avoid ingestion or jet blast.



Engine Start Position may be required for those areas where jet blast can be an issue to instruct the tug operator to pull the aircraft forward of this point before an engine start is permitted.

One example of this is defined with a white E on a black triangle.



Aircraft Refuelling Hydrants points can be marked by a white box with or without red hatching.

Equipment should not drive or park over these points to prevent damage to the hydrant lid which could prevent an aircraft being able to be refuelled on the bay and to prevent damage to the hydrant valve below.



Height Clearances bars on chains showing the maximum clearance height are important to protect critical airside infrastructure.

These should be used where airside roads travel under terminal buildings and overhead fuel pipelines and should be set at a position before the infrastructure to allow the driver time to stop before the building if the vehicle will not fit.

Escort vehicles need to be aware of these locations and their height limits as well as the height of the vehicle when performing escort duties as they may need to escort over-height vehicles via other routes.

Source: Melbourne Airport, CASA

6.7 Driving Around Aircraft

Driving behind an aircraft when it is being pushed back is a dangerous action as it can result in a collision between the aircraft and the vehicle, it can result in the aircraft having to come to a sudden and abrupt halt resulting in injuries to passengers and crew and it can subject the vehicle to jet blast if the engine is starting during the pushback sequence.

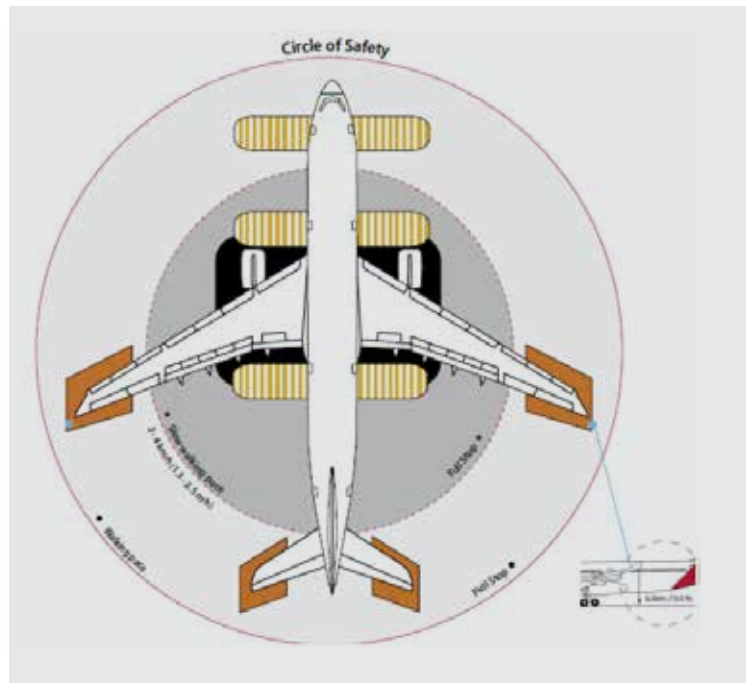
Aerodrome Operators should have and apply a suitable penalty for airside drivers performing such a dangerous act. Driver training should have drivers looking for signs that the aircraft is about to move including looking for the anti-collision beacon on the aircraft. Unfortunately, sunlight at certain angles can make it difficult to determine whether the beacon is operating so other signs such as engine operating, chocks removed, aerobridge withdrawn, engineer or handling personnel in attendance, or tug connected are all signs that should be considered by the airside driver and included in the training.

Driving too closely behind an aircraft that has engines running and is about to or is moving forward is also very dangerous as the vehicle would be subjected to jet blast that has been known to overturn vehicles. Aircraft necessarily have to apply more engine power to start moving and this causes significant jet blast for a distance of approximately 75m behind the aircraft.

Driving in front of a manoeuvring aircraft is equally dangerous. Pilots can have a limited view of the ground from the cockpit and have many checks to perform so will not necessarily see the vehicle being driven in front of the aircraft. If seen, the aircraft may need to brake heavily resulting in injuries to passengers and crew. Aerodrome Operators should have and apply a suitable penalty for airside drivers performing such a dangerous act.

Driving around parked aircraft, airside drivers need to ensure that their vehicles do not contact the aircraft. For this reason, vehicles should not drive under any part of the aircraft when arriving or departing from the aircraft. Those vehicles required to service the aircraft and required to drive under wings must be of a height to ensure that they will not contact the aircraft and drivers must be trained in driving procedures to avoid contact with the aircraft. All vehicles required to reverse towards an aircraft must either have a guide or have technology allowing the driver to observe the aircraft while reversing (i.e. reversing camera providing a panoramic view of the aircraft and the extremities of the vehicle, proximity sensors or similar).

FIGURE 16: CIRCLE OF SAFETY



Source: Australasian Aviation Ground Safety Council

All vehicles approaching an aircraft for servicing and that are going to butt up against the aircraft should use the 'Circle of Safety' philosophy which checks the operation of brakes of the vehicle twice.

The first check should be performed before approaching the aircraft after which the vehicle approach speed should be no greater than 4 kph. A second check should be performed with enough space to avoid a collision with the aircraft after which the approach speed should be equivalent to a slow walk (approximately 2kph). If the vehicle is to be positioned almost against the aircraft and the driver does not have a complete and unobstructed view of this, it should be finally positioned using a person to guide it. A guide should be used to ensure clearance of engines, propellers and other protruding equipment. Vehicle contact with the aircraft should be avoided to prevent damage.

6.8 Aircraft Danger Zones

Awareness of aircraft danger zones is a joint responsibility but one primarily that falls to the airside organisations that have personnel working airside.

The Aerodrome Operator should ensure that the airside induction process for airside workers appropriately informs all airside workers of these hazards.

Fixed wing aircraft have the following dangers:

- » The propeller must be avoided at all times. When still, it has a very shallow profile that is hard to see and when running, is spinning so fast that it also cannot be easily seen. Both situations present a risk to airside personnel. The former can result in significant facial injuries from walking into the propeller; the latter can cause fatality.
- » Prop wash is the term given to the air pushed behind the aircraft from a running propeller when exerting thrust for forward movement. This is similar to jet blast because it can blow grit and loose objects into people or into other assets.
- » Propeller windmilling can occur when the propeller is not secured to prevent it rotating in wind gusts. The risk is that it will hit and injure personnel in its arc.

Airside workers should remain conscious of aircraft propellers and stay clear of them at all times.

- » Jet engine ingestion is caused by the large volumes of air that are drawn into the front of a turbine engine to provide forward thrust. The air closest to the inlet cowl moves at a high velocity and will ingest FOD or personnel standing too close. The required forward and side clearance is at least 3m when the engine is at idle power and significantly more when under movement.
- » Jet blast is the expulsion of high velocity air behind the engines that can be 100kts 70 metres behind the aircraft. This is sufficient to blow equipment and personnel over.

Airside workers must stay clear of the area in front of a turbine engine and the area behind the engine at all times.

- » Airside workers need to understand that the visibility from large commercial aircraft cockpit is very limited so that vehicles and equipment on the ground in close proximity to the aircraft may not be able to be readily seen by the pilots. Aircraft have the right of way over ground equipment and vehicles.
- » Aircraft engines operate at high temperatures. The exhausts are hot and will take a considerable time to cool when the engine is shut down. These are areas that airside workers should avoid at all times.

Helicopters create rotor wash similar to the prop wash of fixed wing aircraft. Because helicopters require high amounts of lift to take off, the downward airflow creates high wind velocities that can blow people over and can blow equipment and unsecured items around the apron. Boarding and disembarking should be performed only at the direction of the operator.

Additionally, helicopters, at times, will taxi above the ground along taxiways so may be significantly harder for airside drivers to see. They may not be visible in the vehicle mirrors and may tend to 'appear from nowhere' when unexpected. At aerodromes that have helicopter operations, these are risks that drivers need to be aware of. For other aerodromes where helicopter operations are rare, the Aerodrome Operator should ensure these aircraft have a safe route to and from the runway or take-off area or consider escorting these aircraft as the airside drivers will have low levels of experience interfacing with these aircraft.

6.9 Working Around Aircraft

Aircraft have a number of safety critical items extending from the fuselage. For this reason, all aircraft servicing equipment that is required to butt up against the aircraft is required to be guided into position by a second person acting as a guide or spotter. It is their role to ensure correct positioning of this equipment and that critical items are not touched or damaged. Items such as pitot tubes, aials, control surfaces, propellers and engines should not be contacted by mobile equipment.

Any damage to aircraft sustained at the aerodrome must be reported to the pilot/s, the aircraft operator and the Aerodrome Operator for investigation and to determine airworthiness.

Any damage found to the aircraft on arrival, either suspected to have been sustained enroute or at another aerodrome must be reported to the pilots and aircraft operator.

Vehicles other than those required to abut the aircraft to provide services to the aircraft shall stay clear of the aircraft and shall not drive under any part of the aircraft to prevent collision with the aircraft.

Vehicles reversing towards the aircraft must have either suitable technology to be able to monitor the vehicle's progress or a second person acting as a guide to prevent the vehicle touching the aircraft. Those vehicles with restricted visibility required to reverse away from the aircraft that may contact either another aircraft, may have to reverse onto a taxi lane or is at risk of collision with one of the aircraft control surfaces shall be reversed with a second person acting as a guide.

6.10 Airside Roads

Aerodrome Operators should ensure that there is a traffic management plan in place to effectively manage traffic flows across all parts of the aerodrome. These can be effectively used to minimise driving hazards by channelling vehicles to areas reducing interaction with aircraft and pedestrians, creating orderly traffic movements and minimising conflict between drivers and vehicles travelling in different direction. Traffic management plans need to consider the types of vehicles and equipment that will be using these areas to ensure that they are of suitable dimensions so that the roads can be used or are designed appropriately to meet the needs of this equipment.

Good traffic management plans should include apron roadways. Where possible, these should minimise the number of movements on aprons behind aircraft to increase operational efficiency for airside organisations by reducing congestion for arriving and departing aircraft and to assist the drivers avoid driving behind or in front of moving aircraft. Where this is not possible due to the existing design of the aerodrome, marking apron roadways reduces the number of vehicles crossing the apron randomly by channelling traffic to logical and practical crossing points where visibility is good for aircraft and drivers.

Traffic management plans should be considered as part of any airside works. This may mean that temporary diversions need to be established and consultation with the users of normal roadways should be undertaken to jointly agree the most efficient and practical placement of temporary roads to avoid the construction hazards, allow access to the site by construction personnel, vehicles and equipment deliveries and for airside workers to avoid the construction hazards or delays that may occur otherwise. Any temporary or permanent changes must be communicated clearly to airside drivers and airside organisations allowing a period for adjustment and education.

Airside roads should have speed limits applied to them that reflect the hazards. Roads where there is pedestrian access and limited vision may need lower speed limits than other airside roads. The speed limits applicable to any road must be communicated to drivers along with the reason for any reduced speed limits so that the driver understands the context of the speed limit and is more likely to comply. Regardless, these areas will need to be patrolled on a regular basis to ensure driver behaviours take account of the hazards that are the reason for any lower speed limits.

6.11 Apron Management

The aerodrome apron should be clean and orderly at all times. The Aerodrome Operator is responsible for setting the specifications for apron use and detailing the acceptable conditions. Individual airside organisations, as users of the infrastructure, have the primary responsibility for maintaining the condition of the apron to the specifications set by the Aerodrome Operator.

These conditions should be practical and detailed so that airside organisations understand their obligations and can regularly inspect their own areas or the joint-user areas in which they operate to ensure the areas are maintained in a suitable condition.

Aerodrome Operators should arrange regular apron inspections with the users of the respective areas to both inspect the areas and hear from the users about issues and concerns they may have about the use of the areas.

Items that should be part of any such apron inspection include:

- » equipment parked for less than 24 hours but not for the next arriving aircraft should be parked in equipment storage areas;
- » equipment parked in staging areas should be there in anticipation of the next aircraft only;
- » equipment must be parked totally within the respective areas leaving the rest of the apron clear of equipment;
- » aircraft chocks and other small items should have designated storage areas and not be left on the ground where they can be a trip hazard;
- » the apron must be free of FOD and any items that may become FOD in certain weather conditions;
- » waste bins should have covers and these should be locked in place to prevent wind or birds opening them and creating FOD;
- » there should be adequate waste bins on the apron to meet the needs of the users;
- » emergency equipment required should be available and in operable condition;
- » hazards zones under aerobridges, at emergency exits and evacuation access routes must be free of impediments;
- » refuelling hydrant Emergency Stop Buttons must be free of impediments; and
- » maintenance of vehicles (except breakdown maintenance) should not be performed on the apron

6.12 Aircraft Refuelling

Fuelling procedures for aircraft are complex and the refuelling staff highly trained. Aircraft fuelling can be performed by tanker or via a hydrant dispensing vehicle from an underground hydrant system. Hydrant refuelling systems are an efficient means of distributing fuel to fixed aircraft bays used for those aircraft supplied with Jet A-1 fuel and fuelled via an underwing connection. Refuelling tankers are required for aircraft parked in areas without an underground hydrant system, for aircraft fuelled via over-wing connections and for all aircraft fuelled with Aviation Gasoline (Avgas).

Aerodromes with a hydrant system will also have hydrant Emergency Shutdown Buttons placed strategically around the apron to be activated in an emergency. These should be well signed and airside personnel trained to press these if they suspect a fuel emergency.

Aerodromes that have a hydrant system should encourage some fuel tanker capacity is retained as this will be required if it becomes necessary if aircraft have to be parked in an area where there is no underground hydrant connection or if an aircraft required defueling for any reason. It should be noted that defueling into a refuelling tanker can only be achieved if the tanker has aircraft defuel capability and should only be considered as a last option because of the potential for contaminants to then enter the tanker. Fuel availability at the aerodrome can be impacted if the tanker is required to be steam cleaned after conducting a defuel operation.

The key points to be considered for safe fuelling procedures include:

- » a three metre fuelling safe zone should be established around each of the following:
 - the fuelling hydrant connection;
 - aircraft fuelling connection;
 - aircraft fuel vents; and
 - fuelling equipment.

Within this three meter safe zone, the use of Portable Electronic Devices (e.g. phones, handheld radios, pagers, photographic flash bulbs or electronic flash equipment), as well as other sources of ignition or fire (e.g. vehicles, matches, cigarette lighters, etc.) are prohibited unless they are certified intrinsically safe (i.e. cannot generate a spark);

- » a single person should be in charge of the entire process;
- » all staff in the vicinity of the fuelling operation should be aware of how to operate the hydrant emergency shut-off system and the appropriate fire-fighting equipment to be used in a first response;
- » the responsible person should establish safety zones around all aircraft filling and venting points, the hydrant system connection and the fuelling vehicle due to the flammable fuel vapour expelled during fuelling;
- » the aircraft should be chocked whenever refuelling is being undertaken to prevent the aircraft moving as the weight with the fuel uplift changes;
- » there must be a bonding wire connecting the refuelling vehicle with the aircraft at all times to prevent excessive static electrical charge building during refuelling;
- » passengers boarding or disembarking via the tarmac must be instructed to not use electronic equipment and should be supervised to ensure that this is adhered to;
- » where passengers are boarding or disembarking during refuelling, they must be kept out of the fuelling safety zone and their movement should be under the supervision of a responsible person. They must be marshalled outboard of the wing tip fuel vent which can release fuel in the event that the aircraft fuel tanks are overfilled;
- » escape routes for staff, passengers and vehicles should be free of obstructions; and
- » aircraft APUs should not be started or stopped during fuelling but can continue to operate if already operating.

Aircraft refuelling is one of the more hazardous activities undertaken. CASA⁹ allows passengers to be boarded and seated while refuelling is performed but with some additional restrictions:

- » the flight crew and ground staff should be made aware that the aircraft emergency chute deployment areas should be clear of obstructions and cabin aisles and emergency exits must be kept clear if the aircraft is attached to an aerobridge, main door must remain open;
- » the cabin crew make announcements ensuring that passengers understand the aircraft is being fuelled;
- » there are an adequate number of cabin crew in each section of the aircraft ready to assist with an emergency evacuation should this be required;
- » aircraft doors are 'armed' ready for passenger evacuation if required;

⁹ CASA CAO 20.9 details refuelling precautions.

- » passengers are instructed NOT to fasten seat belts until the refuelling is completed; and
- » a means of communication between the Refueller and the flight deck is available either directly or via the aircraft handling staff.

The Aerodrome Operator should ensure fuelling activities are included in apron safety awareness training for all staff. Airside driver training must also make drivers aware of the risks associated with high pressure hoses and hydrant connections and the need to ensure the bonding wire is not interfered with or driven over.

Refuelling and defueling of aircraft will not normally occur in hangers or other buildings due to the increased risk of fuel vapour collection inside the buildings and increased risk of ignition from non-intrinsically safe electrical equipment. Should this be required, additional precautions including the attendance of ARFF resources or local fire service resources is required and the removal of all personnel from the facility.

6.13 Oxygen Replacement

Pure oxygen is more highly flammable than fuel. Commercial aircraft carry emergency supplies of oxygen for emergency and medical use. There are occasions when this needs to be replenished and this will be done as a maintenance activity. Whilst oxygen bottles are being replaced or refilled, passengers should not be on board the aircraft due to the flammability risks involved. Where oxygen bottles are required on the apron, the activities undertaken on the ramp will need to be modified to remove all sources of ignition. The aircraft maintenance personnel will create an exclusion zone around the operation whilst performing the tasks and this must not be breached.

6.14 Bonding Wires

Significant amounts of static electricity are generated during refuelling. As fuel is pumped at high flow rates through pumps, filters and hoses, they generate high amounts of electrical potential. Without a bonding wire, the aircraft would become highly negatively charged and the refuelling vehicle positively charged. A static spark would be created both within the aircraft fuel tanks and when the connection between the aircraft and fuel hose is made and broken which could cause a fuel fire.

Bonding is also used for the transfer of oxygen to reduce the opportunity for any static electricity generated through this activity igniting the oxygen and causing an explosion that could injure the personnel involved and damage the aircraft.

The bonding wire allows for the charge between the aircraft and refuelling vehicle or oxygen bottles to be maintained at equilibrium at all times. Should this be removed accidentally, the transfer of fuel or oxygen must be stopped immediately and a period allowed for any static charge to dissipate before the reconnection of the wire and recommencement of the fuel or oxygen transfer.

The Aerodrome Operator and airside organisations should ensure that all airside staff understand that they must never remove or reconnect a bonding wire if this is accidentally removed. They must advise the Refueller or aircraft engineer immediately so that they can take the necessary action.

6.15 Mobile Phones and Non-Intrinsically Safe Equipment

Mobile phones, radios and the vast majority of electronic equipment are not intrinsically safe and as a result can create a source of ignition through internal sparking or battery separation either when the battery compartment is opened, due to an internal short circuit or when dropped causing the battery to fall out. This equipment introduces a significant fire and explosion risk to aircraft refuelling operations or oxygen replenishment and should not be used within 3m or such distance advised by the Refueller or Engineer.

Intrinsically safe electronic equipment is many times the cost of normal equipment and is designed and constructed to meet strict Australian Standards requirements before being tested and certified.

6.16 Apron Spills

The most common types of apron spills include:

- » fuel from aircraft or airside vehicles;
- » hydraulic fluids and oils from either the ground support equipment or the aircraft;
- » lavatory waste; and
- » water and other chemicals or HAZMAT.

Should a spill occur, the primary action is to place spill containment equipment on the apron or at drains to prevent fuels, oils, hydraulic fluids, toilet waste, and hazardous substances entering the apron drainage system.

Once fuel enters the drainage system, effective control of the fuel flow is lost, vapours will be emitted from drain grates a considerable distance away from the initial spill. These can be exposed to sources of ignition creating an underground drain fire and environmental damage.

Other substances can be harmful to the environment and some hazardous substances can cause health impacts to people airside or in the community, native animals or fish.

A small number of aerodromes have drainage interceptor systems in place where drains leave the aerodrome boundary. These can separate out some harmful chemicals and fuels but only not impacted by other products that could cause them to be carried through the interceptor systems. Consequently, the priority with all spills, unless known to be water, is to prevent these substances reaching drains. This can be done by containing the substance as close to the source of the spill as possible or by watching where the spill will track to and creating dams around drain entry points in advance. A response should only be attempted when the substances will not affect the health of the response personnel or else advice and assistance should be gained from the ARFF on aerodrome, external Hazmat resources or local emergency services as required by the Aerodrome Emergency Plan.

The waste material collected must be disposed of appropriately to minimise harm to the environment and the Aerodrome Operator is to be contacted whenever a spill occurs so that they can assist to co-ordinate a suitable response and enact the Aerodrome Emergency Plan.

6.17 Baggage Make-up Areas

Baggage make-up areas are generally areas with a high degree of interaction between equipment and personnel so have some specific hazards that must be managed. The two most demanding are personnel injury prevention through effective human factors engineering and processes as well as the effective segregation of personnel from vehicles/equipment.

The terminal baggage transportation system should be designed and maintained so that it is safe to use and does not have surfaces that can catch on clothing to pull a person into the system. Airside organisations should specify clothing standards and ensure that personnel wear their clothing appropriately so that this will not get caught in the equipment.

Under no circumstances should personnel be allowed to ride on the equipment. It is not designed for this purpose and airside organisations using the equipment must be responsible for ensuring that personnel understand this and behave appropriately.

The main baggage belt should be designed to be of a height to minimise lifting of baggage between the mobile baggage equipment (containers or barrows) and the baggage belt. Handling agents should also ensure that their equipment is matched as well as possible to the height of the baggage belt to limit the lifting and manual handling effort required by their personnel. Where there are proposed changes to the baggage rooms or equipment is being replaced, consultation with the users should be a priority to obtain equipment that considers the human factors and ergonomic design most applicable to preventing injuries.

Wherever possible, mobile equipment should be physically segregated from personnel with fixed barriers to eliminate or reduce the opportunity for collision between personnel and equipment. This is not always possible but should be the priority focus for baggage rooms where personnel and mobile equipment operate in close proximity to each other. This can be achieved in a number of ways:

- » low physical barriers limiting the ability of mobile equipment to intrude into personnel workspaces while still allowing adequate positioning of the equipment for the user to load and unload;
- » relocation of personnel whilst mobile equipment is positioning or removing equipment from the area using area safe havens or similar;
- » creation of access routes using stairs over roadways rather than pedestrians crossing roadways or where required to cross roadways, have marked crossings where visibility is maximised and suitable lighting for these; and
- » airside organisations should have suitable baggage room training packages in place to ensure that their personnel understand the hazards associated with the equipment and manoeuvring equipment and adopt the procedures required to protect them. This will include manual handling training to minimise injuries.

The Aerodrome Operator should ensure that their traffic management plans include vehicle movement in baggage rooms and that the vehicle speed is no greater than 5 kph and that this is managed. This can be achieved with regular speed monitoring or technology:

- » requiring vehicles to be fitted with 'geo-fencing' technology and fitting transponders in the baggage rooms to automatically control the maximum vehicle speeds possible within the area; or
- » radar and speed camera technology.

Wherever possible, personnel operations should be segregated from vehicle movements and a traffic management plan should be in place taking this into account.

Baggage areas are integral to aerodrome operations due to their role in the time critical process of the consolidation and despatch, as well as the arrival and breakdown, of baggage. Baggage make-up and break down areas often have limited space available with simultaneous operations including pedestrians and vehicles operating in close proximity to one another. Maintaining the most effective segregation between people and moving equipment is paramount to creating a safe environment for all users. The Aerodrome Operator should consider undertaking the following:

- » regularly inspect the safety equipment in the baggage facilities (i.e. inductive loops, electric eyes or strips, manual opening devices, etc.);
- » remove ground level pedestrian walkways within and immediately outside the baggage rooms where possible;
- » install audible and visual alarms (both inside and outside) that will be activated when equipment is about to move;
- » install height restriction signage and barriers adjacent to the entrance and exit of the baggage make-up and break down areas; and
- » ensure mirrors or camera displays are available throughout the baggage rooms to aid drivers departing or entering the facilities.

6.18 Freight Areas

Aerodromes with freight processing facilities often have interfaces between the public areas and the airside so must ensure airside security standards are maintained and that the public and livestock can be effectively isolated from the airside. Aerodrome Operators should ensure that suitable processes and design of these facilities are in place to maintain the required airside security requirements.

Freight areas often have a variety of specialised handling equipment including forklifts, freight tugs and other specialised equipment interacting with personnel in confined areas.

The organisations operating these facilities need to ensure they have a traffic management plan for the facility and that they have effective segregation processes in place between personnel and equipment. The priority should be to have fixed barriers between forklifts and other heavy equipment and pedestrians to limit the possible interaction.

Where unloading or loading trucks using forklifts, this should include creating exclusion zones from which the driver and other personnel may not enter while the forklift is operating or that the forklift stops while personnel need to attend to the freight.

The design of the facilities should prioritise the provision of stairs and overhead walkways over pedestrian crossings for roadways and equipment traffic areas or ensure that pedestrian crossings are clearly marked in high visibility areas, well lit and that all mobile equipment comes to a complete stop while pedestrians are in the immediate area. A concept such as the '3 metre halo' where pedestrians must observe a 3m exclusion zone around moving forklifts and heavy equipment or the equipment will stop should a pedestrian enter this 3m zone should be included as part of the effective traffic management plans for such facilities.

Personnel should not be allowed to work unprotected at heights including working on the back of trucks without some form of fall protections. This is required by Work Health and Safety regulations and so must be a feature of each freight organisation's works processes.

Aerodrome Operators should review these to ensure their satisfaction that these organisations are adequately managing the risks.

6.19 Passenger Movements on The Apron

Passengers are generally members of the public without any detailed knowledge or understanding of the airside hazards. As such, they need to be protected from these by the Aerodrome Operator and airside organisations.

Many years ago, passengers boarded and disembarked aircraft via the apron, then larger aerodromes installed aerobridges for most passengers removing them from the apron and the associated hazards but the trend of having passengers use the aprons is again becoming more prevalent. Of course, some aerodromes have only ever had passengers transiting to/from aircraft via the apron.

There are a range of hazards associated with passengers using the apron including:

- » mixing passengers with mobile equipment which requires Aerodrome Operators to consider passenger controls required to be implemented by airside organisations and airside organisations to consider how they use and position mobile equipment;
- » jet blast, propeller wash and how passengers are protected from this requiring the Aerodrome Operator to consider aircraft engine start procedures, aircraft pushback and disconnection points and positioning of stand-off bays. Airside organisations must consider the marshalling of passengers and stopping boarding operations with certain aircraft movements or when aircraft are arriving on certain bays;
- » fuelling incidents requiring passengers to be marshalled outboard of aircraft wing vents, away from refuelling vehicles and ensuring mobile phones and other sources of ignition are removed from the passenger apron movements;
- » where passengers wander away from the aircraft and into hazardous areas. Aerodrome Operators must ensure airside walkways are clearly marked and that airside organisations have robust passenger control and marshalling procedures. Airside organisations need to monitor passengers and have sufficient resources to ensure control of passenger movements along the allocated pathways; and

- » airside security may be compromised at those aerodromes where passengers board light aircraft by accessing a boundary gate with the pilot where the Aerodrome Operator must provide robust training to the airside organisations and ASIC holders to ensure that they understand and respect the security obligations they have.

6.20 Disabled Passengers

Disabled passenger movements require specialised equipment to move the passenger into the aircraft and, once on board the aircraft into the appropriate seat. The Aerodrome Operator and airside organisations are required to ensure the safety and dignity of passengers at all times.

6.21 Aerobridges

The safe operation of an aerobridge requires specific training so as not to damage the aircraft it abuts. This training should have both a theory and a practical component. Training can be provided by the Aerodrome Operator or by suitably qualified personnel from airside organisations.

The training should include:

- » checking for obstructions;
- » manoeuvring and steering towards an aircraft;
- » protection of aircraft and aircraft doors;
- » retracting from the aircraft;
- » parking;
- » emergency procedures; and
- » operation in adverse weather conditions.

Retraining of operators should be conducted at least every two years to confirm competence as well as after any incident involving the aerobridge.

The aerobridge manoeuvring areas should be marked on the tarmac as a red hatched area to signify the area as a danger zone where no parking of equipment or vehicles should be allowed. When not in use, a manoeuvrable aerobridge must be parked in a 'home' position with the wheels within the designated parking position. Prior to the arrival of an aircraft, the ground staff should check that the aerobridge is parked in its 'home' position so that the aircraft can taxi onto the bay without risk of striking the aerobridge.

7.0 MANOEUVRING AREA RISKS

7.1 Runway and Taxiway Incursions

Runway incursions, excursions and confusion events are one of the highest safety concerns for aerodromes. A runway incursion refers to any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of the surface designated for the landing and take-off of an aircraft.

Aerodrome Operators are encouraged to establish a Local Runway Safety Team, or to incorporate elements of a Local Runway Safety Team into other safety committee meetings to review any incidents and determine how they can be prevented in the future.

At aerodromes where it is not practical or sustainable to establish a Local Runway Safety Team, the topic of runway and manoeuvring area safety should be discussed at Airside Safety Committee meetings.

At larger airports ATC manage the clearance systems required for airside vehicles to enter taxiways and runways. The airside driver must hold the appropriate category of Airside Driver Authority (ADA) and have completed the required airside driver training to understand the hazards and controls associated with the manoeuvring areas to be able to access these safely.

Aerodrome Operators must take the possibility of runway incursion as a very real potential hazard associated with airside driving and ensure that the ADA training satisfactorily addresses these risks and that pavement markings are maintained in good condition. Where possible positive clearance systems should be added to runway entry points in the form of activated light systems that are continuously red and extinguished when clearance is provided to allow positive visual confirmation for the vehicle or aircraft to enter the runway. Read back of verbal clearances should also be instituted as part of the aerodrome runway clearance confirmation process.

7.2 Aerodrome Lighting

Like pavement markings, airside lighting used to assist aircraft and vehicle movements through the airside manoeuvring areas is important. Aerodrome Operators should ensure that their airside driver training includes a comprehensive explanation of these different lights and that each airside driver thoroughly understands these.

Colour	Designation
	Apron or taxiway edge
	Holding points
	Runway edge
	Taxiway Centre Line
	Unserviceable

Source: ICAO

Those aerodromes with ATC towers may use radio contact with the driver of airside vehicles or may use light signals. Where light signals are used to signal to the driver, drivers at the aerodrome need to understand this means of communication with the tower and should have the meaning of these signals displayed in the corner of their windscreen:

FLASHING TAXIWAY LIGHTS	Look towards the tower and observe the tower light signal
GREEN FLASHES	Permission to cross runway or to move onto a taxiway
STEADY RED	Stop immediately
RED FLASHES	Move off the runway or taxiway and watch out for aircraft
WHITE FLASHES	Vacate the Manoeuvring Area and contact Air Services Australia Duty Team Leader

7.3 Protection of Navigation Aids

Key aids to navigation need to be protected to ensure their continued reliable operation. The Aerodrome Operator should consider the types of activity restrictions to apply in these conditions and any equipment required to physically protect this critical equipment.

Types of protection required will vary depending on the location and activities undertaken adjacent to the navigational equipment, however, general protection principles should consider the application of the hierarchy of controls – elimination, substitution, isolation or engineering controls where possible - before considering more administrative controls such as procedures and training:

- » placing vehicle access prevention systems around the equipment provided that these do not inhibit the operation of the equipment itself;
- » provision of warning signs, markings or lights at the perimeter of the area to indicate restricted access;
- » installing the equipment away from roadways and access routes to ensure their protection into the future; and
- » implementing procedures or permanently removing grass from an area immediately adjacent to the equipment to prevent mowing vehicles having to pass too close.

7.4 Wildlife Hazards

Wildlife in and around aerodromes can present serious hazards to aircraft operations.

Birds in particular easily adapt to human development and activity. Aerodrome infrastructure allows many opportunities for nesting and roosting and human activity will often result in an abundance of food scraps which all have the undesired effect of attracting birds.

There are a number of activities an aerodrome can undertake to reduce the opportunity for bird strikes occurring. These include:

- » cutting the grass so it does not attract insects and small animals for birds to feed on;
- » reducing the area where top soil stripping takes place, exposing worms and insects;
- » ensuring no new water features or waste dumping sites are placed around the aerodrome as these will attract birds that may fly through approach and take-off paths;

- » designing buildings and infrastructure to minimise perches, ledges, holes, overhangs or installing barriers to reduce nesting, roosting or perching opportunities for birds;
- » screening or blocking holes and openings in buildings;
- » Installing flexible netting across the base of rafters inside buildings to prevent birds accessing the rafters and across any necessary water bodies on aerodromes;
- » installing quick-acting roller doors in baggage rooms and the like to close the areas when the entries/exits are not in use and to respond quickly to increase operational efficiencies; and
- » select vegetation that is planted as part of the aerodrome landscaping that do not produce fruit and seeds that attract birds.

Aerodromes are strongly encouraged to collect data about bird activity in order to conduct a species-based risk assessment to help understand the specific risks posed by wildlife. This data is also useful in the development of Wildlife Hazard Management Plans that can further reduce bird activity close to the aerodrome.

The Aerodrome Operator should ensure practical communication of these risks and, particularly the attraction of foodstuffs to birds and animals to ensure that airside personnel dispose of these properly to help mitigate these aerodrome safety risks,

Bird dispersal options such as bird distress calls, shell-crackers or 'bangers' and lethal control may be required to deter and control bird activity on the aerodrome.

Occasionally, animals transported as cargo may escape from their cages and access the airside environment. This is largely controlled with the types of cages allowed for animal carriage and the locking mechanisms specified on these cages which are all checked when the animal is accepted for carriage. Regardless, some animals break through their cages and escape. Airside handling agencies must immediately report any airside animal escape to the Aerodrome Operator and work closely with the Aerodrome Operator to rapidly contain the animal and recapture in a timely fashion.

7.5 Airside Monitoring and Review

Aerodrome Operators have a responsibility to monitor the airside environment to ensure that their safety requirements are being maintained. One of the main reasons for monitoring airside safety behaviours and conditions is to identify opportunities for improvements.

Critically reviewing the airside procedures, behaviours and changed conditions allows the Aerodrome Operator to see whether improvements can be made to further airside safety and/or make operations more efficient. For instance, installing a temporary roadway as a consequence of airside works may identify that vehicles cannot pass each other within the marked roadway by re-routing one direction to another road. This may both improve the safety for all drivers and deliver operations improvements.

Monitoring of airside conditions can come from physical observations or by engaging the airside users through apron inspections, hosting of Airside Safety Committee meetings and airside project meetings. The Aerodrome Operator should ensure that there are sufficient opportunities to engage with stakeholders to understand airside safety issues and where improvements can be made.

Recognition

There are many airside workers who understand and apply the airside rules, act safely and will go out of their way to further airside safety initiatives and assist others. The Aerodrome Operator and the respective airside organisations should act in tandem to recognise these people and ensure they know that their efforts are appreciated. To deal with just those who breach the airside rules and act unsafely, is not sufficient. Establishing a positive airside safety culture takes time and effort. Those personnel who assist the Aerodrome Operator need to be recognised and the Aerodrome Operator should establish some recognition program. Regardless of the type of recognition system the Aerodrome Operator uses, the person seen to be aiding the airside safety initiatives should be thanked at the time as this is generally one of the most powerful reinforcement tools available. The Airside Safety Committee should devise a recognition system to prevent airside safety hazards that can result in incidents is far more effective and lower cost than either enforcement activities or the cost of incidents.

Unsafe Condition Management

Accordingly, the Aerodrome Operator has the following responsibilities:

- » to ensure that their employees, contractors and visitors understand and comply with the airside safety requirements and airside rules at all times;
- » to ensure that all aerodrome or contractor equipment is maintained appropriately, used only by those who are licenced or properly accredited and trained to use it;
- » to ensure that all aerodrome and contractor equipment is operated within the allowable areas; and
- » to ensure that the aerodrome staff and contractors do not create a hazardous environment that could impact on their own safety or the safety of others or the environment.

In relation to airside organisations, it is **not** the responsibility of the Aerodrome Operator to directly manage the activities or behaviours of the respective organisations' employees, contractors or visitors. This is solely the responsibility of each airside organisation, however, Aerodrome Operators need to be explicit in their safety expectations with all airside organisations and must be vigilant to ensure that each airside organisation (through their personnel) meets these expectations.

Aerodrome Reporting Officers or appropriate aerodrome personnel may still have to directly intervene in unsafe airside practices and even issue Penalty Infringement Notices for non-complying actions by airside workers. Monitoring of airside safety should include:

- » Joint airside safety walks with airside organisation representatives for the respective areas to review the application of the airside safety expectations across the aerodrome.
- » Observations by Aerodrome Reporting Officers of compliance with airside safety rules.
- » Intervention by the Aerodrome Operator in observed unsafe behaviour and actions contravening the airside safety rules:
 - Aerodrome Reporting Officers or appropriate aerodrome personnel shall intervene directly with any worker observed acting unsafely or directly with the senior operations personnel to correct deficiencies (i.e. inappropriate equipment parking) where no person is identified;

- the Aerodrome Reporting Officer shall make a report of the incident to the Aerodrome Manager or Airside Operations Manager; and
 - the Aerodrome Manager or Airside Operations Manager shall communicate with the senior representative of respective airside organisation and request an investigation report identifying the root cause of the incident and a remediation plan to ensure that the airside organisation understands the seriousness of the incident and properly addresses the causes to the satisfaction of the Aerodrome Operator.
- » The Aerodrome Operator should collate all reports and perform trend analysis so that these can be discussed in the Airside Safety Committee meetings and appropriate communications and strategies or programs can be developed to address these safety issues.

Case study: *Melbourne Airport identified an unacceptable trend of driver speed behaviour so implemented a program including education of drivers and airside operators, increased monitoring, a recognition program and revised penalties for these behaviours. The success of the program was almost immediate and continues with a significant behavioural change in drivers and their company's control of driving behaviours.*

The Aerodrome Operator should take a firm stand on all airside safety matters as awareness and continuation of such issues infers a safety responsibility on the Aerodrome Operator as well as the respective airside organisation and individual. The Aerodrome Operator should:

- » ensure that the airside organisations operating on the aerodrome understand the airside safety expectations, aerodrome rules and regulations, any conditions shown in their lease and the Conditions of Use documents and that these are adequately communicated amongst their staff, contractors and visitors so that all airside workers understand the safety requirements;
- » ensure that airside organisations operating also hold and enforce equivalent conditions amongst their own staff and contractors; and

- » raise any safety concerns or deficiencies with the relevant airside organisation/s and require an action plan be put in place to address the issue within a reasonable timeframe and to the satisfaction of the Aerodrome Operator to remove the unsafe condition or hazard from the airside.

Incident Management

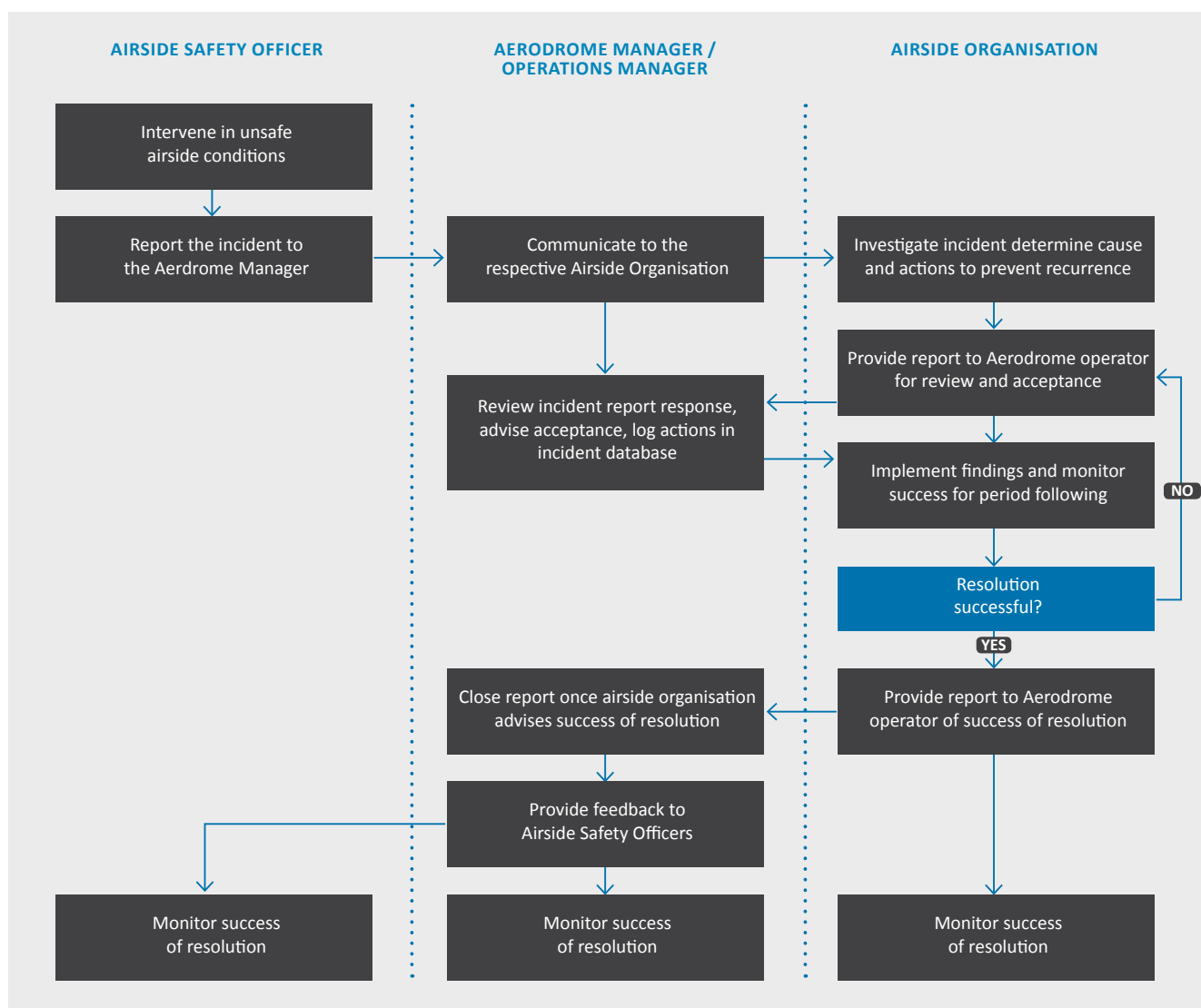
Each breach of an airside safety rule and any unsafe condition should be viewed by the Aerodrome Operator as either a potential incident or a near miss incident. Whether it causes injury or not, it is still an incident and must be recorded as such and dealt with if we are to prevent incidents occurring.

The Aerodrome Operator is not responsible for the behaviours of another airside organisation's employees. It is, however, the responsibility of the Aerodrome Operator, to bring such matters to the attention of the individual and the respective airside organisation to require an investigation of the circumstances and a satisfactory resolution to prevent this safety matter occurring again and ensuring that this is the case.

There are a range of possible reasons for an airside workers' failure to comply with relevant airside rules ranging from a lack of knowledge of the rule/s through to a knowing and willing violation of the rules. Implementation of the 'Just Culture' model following the investigation into the circumstances should be used in any disciplinary actions.

Case study: *Karratha airport developed a Safe Events and Reporting Analysis tool increasing the effectiveness of incident reporting and analysis so that the root causes and contributing factors could be disseminated allowing all airside companies to review their SMS documents and improve their controls where necessary.*

FIGURE 17: INCIDENT MANAGEMENT WORKFLOW



Source: Global Safety Partners

7.6 Aerodrome Works

The Aerodrome Operator needs to continually maintain the airside infrastructure. This, necessarily, results in undertaking non-operational and non-routine works from time-to-time in the airside areas.

If aerodrome activities are to continue whilst construction works are ongoing, a number of procedures have to be developed to ensure the safety and security of the airside personnel, aircraft and the aerodrome itself.

A Method of Working Plan (MOWP) must be in place for all airside works. This details exactly the scope of the works, the risks that these will introduce to the airside, the way in which the works will be controlled and schedules so that the Aerodrome Operator can ensure the disruption to normal operations can be minimized and suitable arrangements can be put in place to manage the introduced risks. This is normally developed by the Aerodrome Operator. It can also be developed by the Principal Contractor, in which case, the Aerodrome Operator would review and agree to the plan. In either case, these works should then be managed under the Aerodrome Operator's own 'Works Permit' system to ensure permissions are recorded and agreed.

A 'Works Permit' system provides the following benefits:

- » it shows what permissions and legislative authorities are required to undertake the works;
- » ensures engagement of all relevant stakeholders during the project planning phase;
- » ensures that the requisite permissions are in place before works begins; and
- » should include a hazard register to understand what hazards are likely to be introduced and how these will be adequately controlled.

Procedures specific to the works and areas in which the works will take place should be prepared to satisfactorily integrate the non-routine works with the routine operational activities. In order to adequately control the airside works, controls and procedures should consider inclusion of the following:

- » pre-start and regular site safety meetings to ensure safety requirements are met and possible activity conflicts are resolved;
- » work health safety requirements should be monitored and enforced;
- » aerodrome security requirements should be monitored and enforced;
- » an emergency response plan should be developed for the credible emergency scenarios or modification to the existing Aerodrome Emergency Plan to incorporate the credible works emergency scenarios. These should be tested to ensure their robustness. If there is to be a Works Emergency Plan separate to the Aerodrome Emergency Plan, both should be reviewed to ensure there are no conflicts;
- » the Method of Working Plan should include procedures to ensure construction personnel are segregated from general landside access and must rely on other means to access works areas;
- » escort arrangements for contractors and deliveries or provision of airside driver training and testing;
- » traffic Management Plans should be agreed to and clearly identified to minimise interference with the operation on the aerodrome;
- » site fencing should be installed to protect workers and equipment from jet blast and to ensure FOD is contained within the site;
- » lighting of the works areas that does not interfere with aircraft operations;

- » infrastructure clearance checks should be undertaken before work commences to ensure underground infrastructure is not damaged;
- » establishment of specific work permits for higher risk activities such as excavation, hot work, electrical isolation or working on live electrical systems, confined space entry, etc. specifying further specific risk control measures;
- » allocation of competent and qualified Works Safety Officer/s to oversee works and ensure there are no conflicts between the aircraft and the construction personnel;
- » cranes must be used according to the aerodrome permit issued for this purpose and be suitably lit;
- » all contractors should have adequate FOD, noise and dust control measures in place to minimise the risks that these hazards pose to the aerodrome operations;
- » vehicles and equipment accessing the worksite may need to be cleaned to prevent FOD in the airside area; and
- » issue any required NOTAMs alerting pilots to the presence of the works and any changes to the aerodrome that these works create.

Where construction projects impact the airside areas, these should be discussed in the aerodrome safety meetings to ensure relevant stakeholders are aware of any potential changes to standard operations at the aerodrome.

A checklist for establishing works sites and returning them to operational use should be used by the Works Safety Officer. An example is provided in Appendix 7 – Worksite Checklist.

Case study: During airside works at Melbourne Airport, significant improvements in both FOD management and works safety was able to be generated through monthly communications meetings run by BECA, Fulton Hogan, McConnell Dowell and Melbourne Airport. This forum, run like a Toolbox session - allowed for early identification and sharing of FOD issues and discussion of actions involving all stakeholders in the project.

8.0 AERODROME SAFETY CONSIDERATIONS

8.1 Stakeholder Interaction and Communication

Stakeholder engagement between the Aerodrome Operator and organisations working at the aerodrome is vital to assist in the efficient and effective operation of the aerodrome. Regular meetings help to maintain a level of communication and familiarity between these parties so that safety concerns, operational issues, incidents and near misses can be jointly managed effectively and in a timely manner. Clear communication with these organisations is vital to the effectiveness of safe aerodrome operations.

The airside safety communication includes the areas of airside works, airside safety, runway safety, aerodrome security, inclement weather, emergency preparedness and the external community and can be undertaken in a single forum or through a number of stakeholder committees. Clear and concise communication is the key to effective liaison with these stakeholders ensuring mutually beneficial relationships are maintained.

8.1.1 Communicating Airside Works

Major airside developments will need to be co-ordinated by the Aerodrome Operator and communicated through the Works Safety Officer.

Whenever project works are being planned, initial communication should include all airside stakeholders to ensure that all organisations understand the scope of the works and can assess the likely impacts on their operations and safety. Those stakeholders specifically impacted can be identified in this initial meeting and be included in future communications/meetings with the Works Safety Officer to detail specific work schedules, impacts and develop solutions.

8.1.2 Communicating Airside Safety

Aerodrome Operators should ensure that there is an Airside Safety Committee or similar. The committee will have a specific airside safety focus and be separate from other meetings such as security and aerodrome emergency planning. Small regional aerodromes that have committee members common to all issues, may have a common meeting covering all aspects of airside operations. In this case, the Aerodrome Operator should ensure there is specific time within the agenda spent on airside safety issues distinct from the other elements to ensure adequate focus is given to safety.

The Airside Safety Committee should have a very clear charter that involves identifying, assessing and managing airside risks for all airside users – airside workers, passengers, equipment and aircraft. This will necessarily involve the Aerodrome Operator co-ordinating and facilitating these meetings and a representative from each airside stakeholder attending these meetings.

The Airside Safety Committee should meet monthly at the larger aerodromes and quarterly at the smaller aerodromes. The meeting should have a standing agenda developed by the committee focusing on managing airside safety risks to 'As Low As Reasonably Practicable'. Additional items can be added as relevant from time to time. The agenda would typically include the following elements:

- » incident reviews – those that occurred at the aerodrome and the learnings from investigations, industry safety learnings and any proactive actions to be implemented at the aerodrome;
- » review of airside inspection findings and any actions required;
- » airside rule infringements and actions required;
- » forthcoming legislative changes that need to be reviewed for the airside environment;
- » observed safety trends and concerns;
- » forthcoming works programmes for hazard identification and assessment;
- » review of elements of the airside risk management controls to ensure their robustness; and
- » safety promotions as detailed in the Safety Plan, safety bulletins, etc.

The meeting should be held in a relaxed and open atmosphere conducive to discussion and sharing so as to maximise the learnings and development of ideas. Depending on the activities undertaken by the Aerodrome Safety Committee, there may also be sub-committees developed from time-to-time to deal with specific issues and learnings who would then report back to the Airside Safety Committee at the next meeting.

Minutes of the meeting should be issued to all airside organisations and should be disseminated within these organisations by their Airside Safety Committee representative ensuring that all airside personnel have access to the summary of discussion and can discuss these with their representative on the Committee.

8.1.3 Communicating Runway Safety

For larger aerodromes, there should be a separate Runway Safety Committee that deals with safety issues in the manoeuvring areas of the aerodrome including the runways, taxiways and apron areas. This committee will be made up of representatives from the Aerodrome Operator, ATC, ARFF, airlines and may include CASA.

The Runway Safety Committee should meet monthly at the larger aerodromes and may be part of the quarterly Airside Safety Committee at smaller aerodromes. The meeting should have a standing agenda developed by the committee focusing on managing issues and trends relating to the manoeuvring areas with aircraft, vehicle and personnel to 'As Low As Reasonably Practicable'. Additional items such as work programmes would be added where applicable.

8.1.4 Communicating Security

The Aerodrome Operator should ensure that there is an effective means of communication with stakeholders on matters of aerodrome security. For the larger aerodromes this will be a meeting held monthly but the smaller aerodromes may elect to include this in the quarterly Airside Safety Committee meetings.

This meeting will include discussion relating to security trends and breaches and share information from industry in relation to airside security.

8.1.5 Communicating Inclement Weather

The Aerodrome Operator should ensure that there is an effective means of communication for the various types of inclement weather forecasts to airside organisations providing a proactive warning so that aircraft and equipment can be relocated or secured to prevent these becoming an airside hazard resulting in damage to the equipment, aircraft or injuring personnel.

The aerodrome communications plan should include the communications plan for inclement weather events so that warnings and any requirements the Aerodrome Operator has of these organisations can be disseminated.

8.1.6 Communicating Emergency Planning

Each aerodrome is required to have an Aerodrome Emergency Plan detailing individual plans for all credible emergency scenarios. To be effective, all emergency plans need to be tested regularly. This ensures any deficiencies are identified, any communications failures are identified and personnel required are appropriately trained. In many situations, these plans will call upon external resources who need to be integrated with the airside environment and be able to move to the areas they may be required.

In order to test the adequacy of these plans, an Aerodrome Emergency Committee needs to be established to plan out and co-ordinate emergency exercises, perform the necessary changes to the plans as they are identified from these exercises and co-ordinate the aerodrome and external resources required for training.

The committee may not need to meet regularly but will need to meet before each planned exercise period to co-ordinate the exercise and the required resources. Smaller regional aerodromes may use the single Airside Safety Committee to perform this function.

8.1.7 Communicating with the External Community

The aerodrome is part of the community within each city or town. As such, the aerodrome has some obligations and responsibilities and the community will expect these to be carried out fully.

It is recommended that the Aerodrome Operator should have a regular community forum at which the aerodrome can discuss matters that may be of interest with the community.

While understanding that not all the community will view the presence of the aerodrome positively, a vast majority do understand its significance within the community and the benefits it brings. Regardless, communicating proactively tends to establish the aerodrome's safety, environmental and reputational credentials far better than not communicating.

Case study: *Airservices and Canberra Airport jointly conduct community education nights where the community are welcome to attend a forum with a range of industry technical experts who answer questions and present information. A great way to positively engage with the community.*

8.2 Master Planning and Land Use

The Airports Act requires all leased federal aerodromes to produce an Aerodrome Master Plan every 5 years. This plan is to detail:

- » a ground transport plan;
- » more detailed information on proposed developments for the next five-year cycle; and
- » analysis of 'fit' with planning schemes adjacent to the aerodrome.

8.2.1 Incorporation of An Environment Strategy

Given the diversity in size and operation of leased federal aerodromes, the level of detail required to address the requirements for a master plan will vary but will take into account the scale of activity at the aerodrome, local and regional circumstances, and the extent to which aerodrome activity affects the community.

The master plans are not specifically formulated around airside assets or activities but rather the aerodrome as a whole with the:

- » establishment of a strategic direction for the aerodrome;
- » provision of the development of the aerodrome site;
- » indication to the public the intended uses of the site;
- » reduction of potential conflicts between uses of the site;
- » ensuring that uses of the site are compatible with areas surrounding the aerodrome;
- » facilitation of integration between on- and off-aerodrome networks and planning;
- » provision of greater clarity for the community and aerodrome stakeholders around development and operation intentions; and
- » increasing alignment between the environment strategy and aerodrome planning.

Aerodromes that are not leased federal aerodromes can also gain significant planning advantages and alignment by producing a similar but simpler document. The Australian Airports Association has produced a Practice Note to assist Aerodrome Operators prepare a quality Airport Master Plan. This helps with alignment of key stakeholders towards a single and common development strategy, provides valuable input into community engagement, supports the budgeting cycle and provides a single document. A well-developed plan sets out the strategy for the development of the aerodrome, the need for supporting landside infrastructure and helps develop a comprehensive budget.

Airside safety improvements that are expensive to solve individually may be able to be consolidated into planned works to gain efficiencies and cost benefits while delivering operational efficiencies.

The On-airport key objectives of a Master Plan usually revolve around:

- » maintaining the ability for aircraft to operate safely and unrestricted;
- » facilitating the ability for the airport to grow and expand in response to demand;
- » promoting the role of the airport and its significance as a community asset;
- » providing for the airport to increase revenue, including through non-aviation development;
- » safeguarding of the airport's long term plans;
- » ensuring compliance with relevant regulations; and
- » managing environmental and heritage constraints.

Off-airport planning is often an area overlooked or inadequately addressed by airport Master Plans. Nevertheless this is a critical issue for the long term safeguarding of any airport and it should be addressed. In relation to off-airport planning a Master Plan generally aims to minimise the potential encroachment of incompatible activities and development in the vicinity of the airport, particularly in terms of:

- » aircraft noise impacts;
- » intrusions into the protected operational airspace of the airport;
- » distractions to pilots from lighting in the vicinity of the airport;
- » wildlife strikes;

- » building generated wind-shear and turbulence from nearby development;
- » public safety; and
- » impacts on navigational aids.

An airport Master Plan may also address other off-airport planning issues such as ground transport arrangements serving the airport. It is important that on and off airport planning and development are linked and coordinated, and a comprehensive airport Master Plan can certainly assist in achieving this aim.

8.3 Environmental Considerations

Protection of the environment must factor into the Aerodrome Operator's design and maintenance of the aerodrome and the understanding of the airside workers.

There are multiple facets to maintaining good environmental controls including:

- » Having robust controls in place to prevent environmental incidents such as:
 - requiring all airside vehicles to have a preventative maintenance system to reduce the opportunity for component failure and fluid spills;
 - using covered waste bins and placing these at practical airside locations and ensuring that they are emptied or replaced before full;
 - having equipment in place to allow aircraft APU's to shut down where possible in extended turnarounds;
 - having all airside vehicles turned off when parked;
 - having shrink-wrapped freight consignments broken down in freight sheds to prevent the plastic blowing around the aerodrome;
 - placing waste bins at practical locations; and
 - ensuring all airside workers are trained in environmental awareness to assist in maintaining good environmental controls.

The response to environmental incidents should focus on containment of the incident as close to the source as possible without impacting human health. Prevention of drain entry should be high on the priority otherwise any spill is harder to contain and recover. There also needs to be a planned response for situations where contaminants have entered drains to prevent off-aerodrome impacts.

Preventing environmental incidents should be the aim of all organisations, however, should an incident occur, there must be robust environmental response plans in place in the organisation's Emergency Plans and the Aerodrome Emergency Plan should consider the scenarios that would require a significant response. These would include hazardous substance incidents due to their severity and fuel spill incidents due to their potential volumes.

The responsible organisation should have robust spill control measures in place that first prevent the material entering the aerodrome drainage system if at all possible and notify the Aerodrome Operator so that the necessary response, assessment of impact and notifications can be made should they be necessary.

Aerodrome Operators must understand and comply with the reporting requirements of their specific State-based regulator.

9.0 APPENDICES

9.1 Appendix 1 – Risk Assessment Matrix and Explanations

Figure 18: Risk Assessment Matrix

SEVERITY	CONSEQUENCES				INCREASING LIKELIHOOD					
	People	Assets	Environment	Reputation	A	B	C	D	E	
					Never heard of in the aviation industry	Heard of in the aviation industry	Has happened at an Australian aerodrome or more than once per year within the industry	Has happened at this location or more than once per year at an Australian aerodrome	Has happened more than once per year at this aerodrome	
					Never heard of in the aviation industry	Heard of in the aviation industry	Has happened within our organisation or more than once per year within the industry	Has happened at this location or more than once per year within our organisation	Has happened more than once per year at this aerodrome	Criteria for organisations operating at multiple aerodromes
0	No injury or health effect	No damage	No effect	No impact	Very Low	Very Low	Very Low	Very Low	Very Low	
1	Slight injury or health effect	Slight damage	Slight effect	Slight impact	Very Low	Very Low	Low	Low	Low	
2	Minor injury or health effect	Minor damage	Minor effect	Minor impact	Very Low	Low	Low	Medium	Medium	
3	Major injury or health effect	Moderate damage	Moderate effect	Moderate impact	Low	Low	Medium	Medium	High	
4	PTD or up to 3 fatalities	Major damage	Major effect	Major impact	Low	Medium	Medium	High	High	
5	More than 3 fatalities	Massive damage	Massive effect	Massive impact	Medium	Medium	High	High	High	

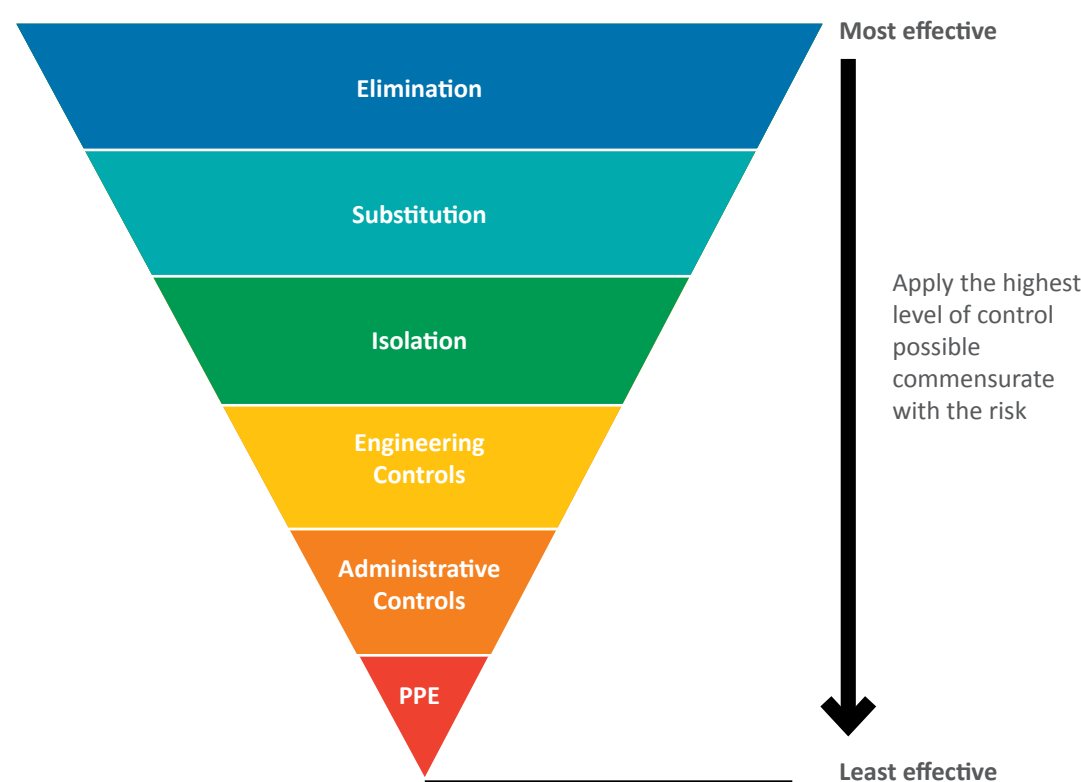
Source: Global Safety Partners

Consequence descriptions	
People	Environment
No injury or health effect	No effect
Slight injury or health effect - First aid provided or no treatment, however, illness/noticeable discomfort or irritation that stops after exposure is removed	Slight effect - contained on premises, small spill
Minor injury or health effect - Medical treatment, lost time injury or restricted work of duration up to 5 days. Reversible illness such as food poisoning	Minor effect - minor environmental impact, impact with no lasting effects (eg small spill to ground, onsite groundwater contamination, <10 complaints, single exceedance of prescribed limit.)
Major injury or health effect - Lost time injury >5 days. Irreversible health impact (eg. noise-induced hearing loss, permanent manual handling injury)	Moderate effect - limited environmental damage requiring cleanup (eg. Spill requiring a large quantity of soil/sand/materials to be disposed or or remediated, off-site contamination, >10 complaints, multiple exceedances of statutory or prescribed limits
Permanent Total Disability or up to 3 fatalities - Health effects such as asbestosis, cancer contracted in the workplace, stress-induced mental illness	Major effects - severe environmental damage requiring extensive resources to restore the environment (eg. offsite groundwater contamination over an extensive area, many complaints from individuals, frequent or extended exceedances of statutory or prescribed limits)
More than 3 fatalities or irreversible health effects impacting multiple people caused by a single event (ie burns from fire)	Massive effect - persistent severe environmental damage resulting in loss of commercial, recreational or natural resources

Assets	Reputation
No damage	No impact
Slight damage: cost <\$10,000	Slight impact - local public awareness but no discernible concern, no media coverage
Minor damage: costs \$10,000 - \$100,000	Minor impact - local public concern, local media coverage
Moderate damage: costs \$100,000 - \$1 mill	Moderate impact - significant impact in region, local stakeholder/regulator/industry concern, extensive local media attention, regional and national coverage.
Major damage: costs \$1 mill - \$10 mill	Major impact - likely to escalate and impact organisation's reputation, national public concern, extensive national media attention
Massive damage: costs >\$10 mill	Massive impact - severe impact on organisation's reputation, high level of concern in government and international media attention

9.2 Appendix 2 – Hierarchy of Controls

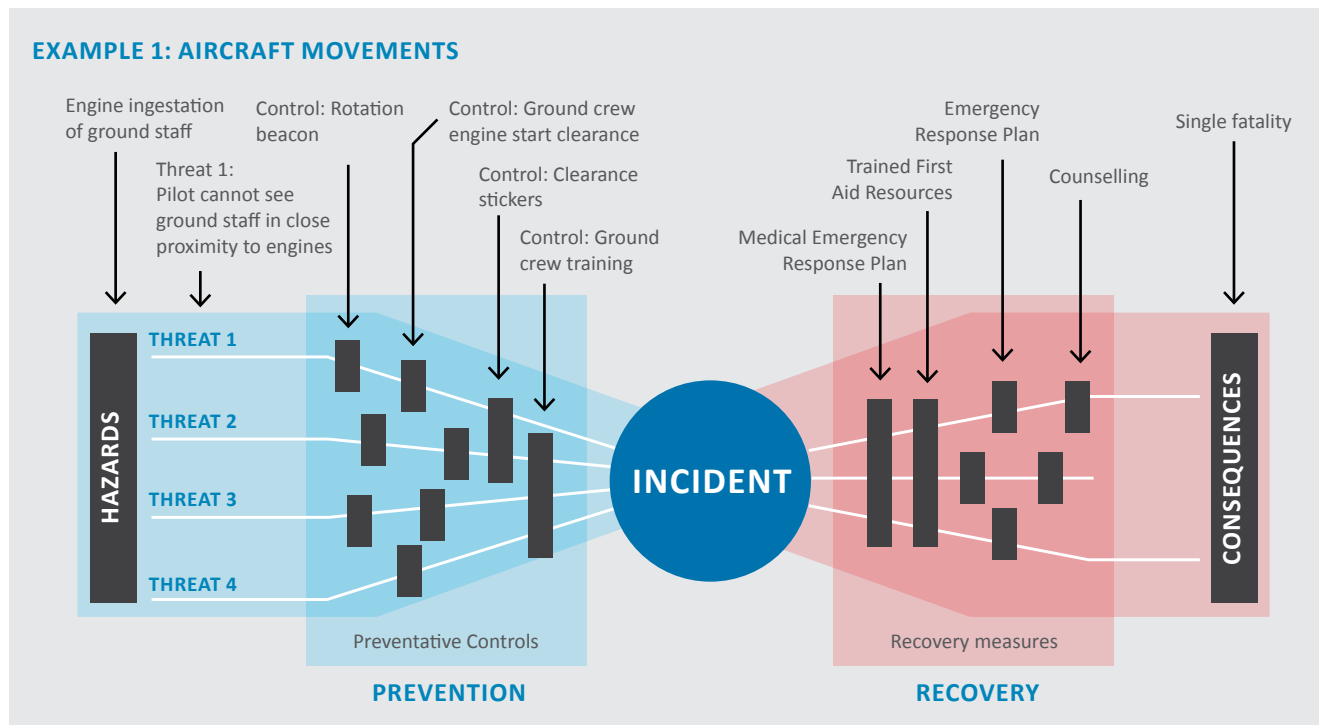
FIGURE 19: HIERARCHY OF CONTROLS



Source: Global Safety Partners

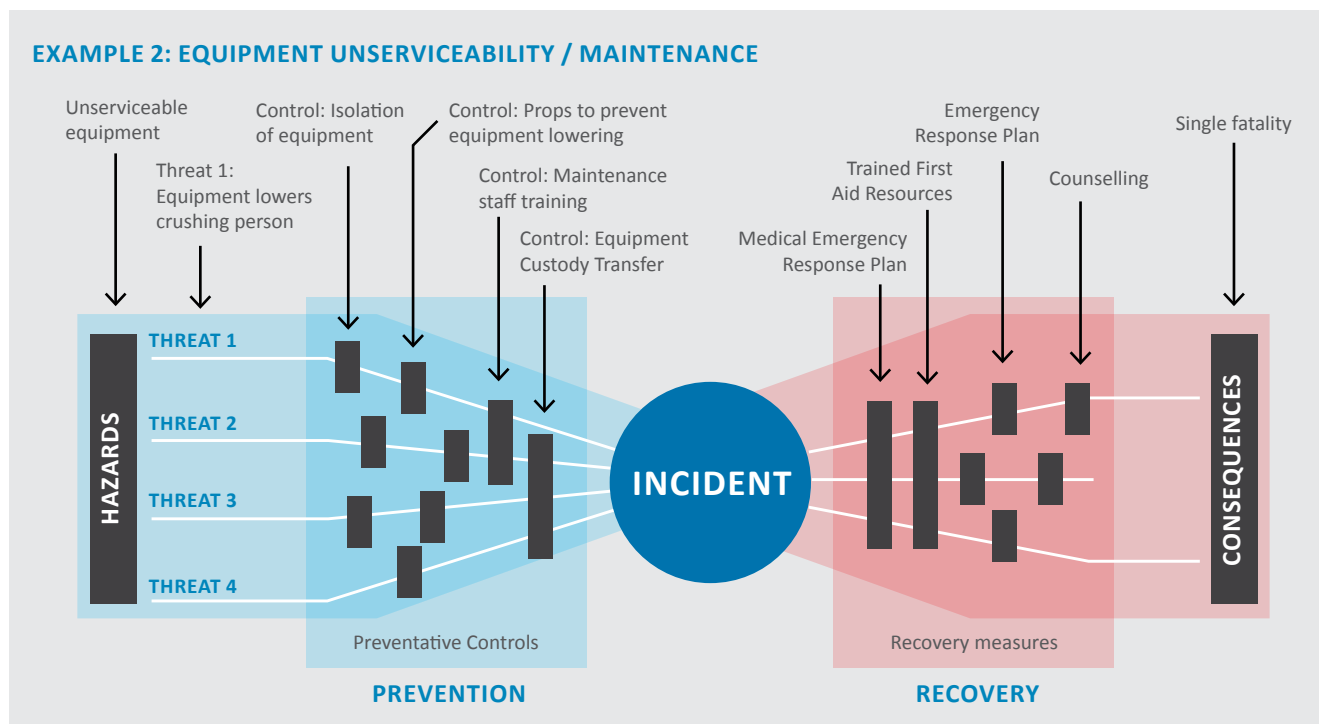
9.3 Appendix 3 – Bowtie Model Examples

FIGURE 20: BOW TIE RISK VISUAL FOR AIRCRAFT MOVEMENTS



Source: Global Safety Partners

FIGURE 21: BOW TIE RISK VISUAL FOR EQUIPMENT UNSERVICEABILITY



Source: Global Safety Partners

9.4 Appendix 4 – Foreign Object Debris

INSPECTION CHECKLIST (Aircraft parking bays)

Debris on the aerodrome presents a hazard to aircraft and personnel in a number of ways. FOD can be ingested into engines causing significant and costly damage and can be blown across aprons with wind or jet blast injuring personnel.

Regular inspection of airside areas should be undertaken by individuals, the Airside Safety Committee, airside tenant organisations and the Aerodrome Operator.

Inspection done by /team: _____

Inspection date: _____ Area: _____

Inspection item	Yes	No	Comments
Is an inspection of each bay performed prior to aircraft arrival?	☐	☐	
Is an inspection of each bay performed after each aircraft departure?	☐	☐	
Are personnel consciously picking up FOD and disposing of it properly?	☐	☐	
Are there sufficient covered FOD waste bins on apron?	☐	☐	
Are there sufficient covered general waste bins on apron?	☐	☐	
Does the area inspected contain rubbish or items that could become FOD?	☐	☐	
Do vehicles/ plant have adequate covered storage for waste?	☐	☐	
Is rubbish removed from the vehicles/ plant at the earliest opportunity?	☐	☐	
Is there any FOD promotional material in the offices?	☐	☐	
Are staff aware of FOD as an airside hazard (ask)?	☐	☐	
Is FOD training provided to staff (ask)?	☐	☐	
Non-FOD questions whilst in area			
Is equipment parked within marked storage or staging areas?	☐	☐	
Is there sufficient storage or staging areas for the bay?	☐	☐	
Is the bay safe for aircraft to arrive?	☐	☐	
Is equipment stored appropriately without becoming a hazard for personnel or aircraft?	☐	☐	

Additional notes / comments: _____

9.5 Appendix 5 – Airport Serviceability Inspection Report

FACILITY	CHECKED	COMMENTS
RUNWAY 09/27 16/34	☐ Debris on runway ☐ Fuel or oil spillage ☐ Markings are correct ☐ Pavement deterioration ☐ Runway lights are functioning ☐ Bearing strength and riding quality ☐ Approach lights ☐ Shoulder erosion	
RUNWAY STRIP	09/27 SOUTH SIDE 16/34 EAST SIDE 09/27 NORTH SIDE 16/34 WEST SIDE	
	☐ Undue roughness ☐ Obstructions, potholes, trenches ☐ Grass height ☐ Boundary markers are visible	
OBSTACLE LIMITATION SURFACES	☐ 16 ☐ 09 ☐ 27 ☐ 34	
	☐ Clearways and Stopways ☐ Approach surfaces are clear ☐ Transitional surfaces are clear ☐ Obstructions are marked and lit	
TAXIWAY/ TAXILANE	☐ A ☐ E ☐ J ☐ N ☐ R ☐ U ☐ W1 ☐ W4 ☐ B ☐ F ☐ K ☐ P ☐ S ☐ V ☐ W2 ☐ X ☐ C ☐ G ☐ M ☐ Q ☐ T ☐ W ☐ W3 ☐ Y	
	☐ Debris on taxiway ☐ Pavement deterioration ☐ Shoulder erosion ☐ Grass height in strip ☐ Markings are correct ☐ Lights are functioning ☐ Obstructions, potholes, trenches ☐ Undue roughness	
APRONS	☐ Bravo ☐ Charlie ☐ Delta ☐ Echo ☐ Foxtrot ☐ Golf ☐ Hotel	
Bird Watch Conditions	☐ Severe ☐ Moderate ☐ Low	
Location of Hazard:		
Bird Species/Numbers:		
ATC informed: Yes / No Time:		
Action taken to disperse birds:		
Type of Inspection:		
Date:	Time:	OFFICER:
☐ First Light ☐ Midday ☐ Last Light ☐ Midnight	Signed	
☐ Other Specify		

Source: Melbourne Airport

9.6 Appendix 6 – Works Permit Example

PERMIT TO COMMENCE WORK

PERMIT TO COMMENCE WORK NUMBER: _				
Section 1: GENERAL DETAILS				
Project Description				
Name of Company/Entity performing work		Address of Entity		
Phone (B)		Email address		
NAME of on-site Supervisor		Contact no. of on-site Supervisor		
Commencement date proposed	Estimated duration		Proposed hours of activities:	
Section 2: PERMIT REQUEST (Onsite supervisor in direct control)				
This acknowledgement signifies a formal request to commence a work activity. As the person requesting this permit, I hereby certify that can comply with the items listed immediately below (tick each to confirm)				
☐	I have developed and/or reviewed the Risk Assessment and controls relevant to this work activity			
☐	I have consulted with relevant aerodrome personnel to ensure that the controls to manage the risks are adequate and will be in place			
☐	I am competent to co-ordinate the planned activities and will apply all relevant controls identified within the Risk Assessment			
☐	All relevant health and safety legislation will be implemented and enforced during the works duration			
☐	I shall ensure that all personnel carrying out activities required by the works plan undertaken a project induction, have understood the relevant works hazards and controls in relation to aerodrome requirements and have reviewed and understood the Risk Assessments and relevant Safe Work Method Statements			
☐	I have read and understood all aerodrome Special Conditions shown in section 3 or appendices to this Permit and all conditions imposed by the ABC's Building Approval process, agree to abide by all conditions, will ensure that all site contractors/staff are made aware of the relevant conditions and requirements and will ensure that they are adhered to.			
☐	I shall monitor hazards and control these in accordance with the hierarchy of controls and update the hazard register to reflect the identified hazards and their adequate controls			
☐	I shall report all incidents, near misses and potential incidents/accidents to the aerodrome's Safety Officer or other appointed contact			
☐	I have ensured that all sub-surface services have been located within the work area			
☐	I have received and understood the aerodrome's Visitor/Contractor Airside Induction and/or safety briefing			
☐	I have been provided by the aerodrome personnel a height assessment of the project works and equipment			
☐	I have reviewed the aerodrome Asbestos Register and Asbestos Management Plan and will ensure compliance with this plan			
I attach the following documentation:				
☐	Contractor's Certificate of Currency and Public Liability Insurance Certificates			
☐	Construction Environment Management Plan			
Name	Signature	Date	Date	Time

PERMIT TO COMMENCE WORK (CONT.)

Section 3: AERODROME AUTHORISATION

PERMIT TO COMMENCE WORK NUMBER: (CONT.)

Project Description

This authorisation signifies the building control component of the work activity has been completed and that the work is authorised to commence in accordance with the aerodrome's SPECIAL CONDITIONS and Building Code of Australia requirements and conditions.

SPECIAL CONDITIONS: (Consider dust, noise, environmental conditions, etc.)

Vehicle and Traffic Management	<i>Parking only permitted in designated parking areas as pre-arranged with the aerodrome manager</i>
Delivery and storage of materials	<i>All materials are to be delivered to, and stored on, the work site. Loading and unloading times may apply.</i>
Waste management	<i>All waste bins are to be located on the work site and are to be removed and disposed of at a suitable licensed waste disposal area at the completion of work</i>
Restoration of work site	<i>All existing building fabric and/or landscaping is to be returned to a condition at least equivalent to the condition existing prior to the commencement of works</i>
Other (e.g. where works impact of aviation activities)	<i>Height assessment to be submitted is a crane or other plant, equipment or materials are to be used outside a building</i>

As the aerodrome authorised person, I certify that:

- ☐ The Building control component is complete
- ☐ I have received a copy of the Contractor's Certificate of Currency and Public Liability Insurance Certificate for the required amounts
- ☐ I have registered the Permit in the aerodrome's Permit to Work Register
- ☐ I have conducted a positive height assessment on the works and associated equipment (where relevant)
- ☐ The contractor has received the aerodrome's Visitor/Contractor Airside Induction and/or safety briefing
- ☐ The contractor has been provided with a copy of the aerodrome's Asbestos Management Plan

Name	Signature	Date	Time
------	-----------	------	------

Constraints: This authorisation is valid until the earlier of completion of the works and acceptance by the aerodrome or the date and time shown below:

Date	Time
------	------

Source: Global Safety Partners Acknowledging Archerfield Airport Corporation's Permit to Work template

9.7 Appendix 7 – Worksite Checklist Example

WORKSITE CHECKLIST

WORKS ESTABLISHMENT		
Permit No.	Location:	Date/Time:
Checklist item	Completed (Initial)	
1. Works are permitted and conditions shown on permit are clear and achievable.		
2. Works area is effectively isolated from operational areas		
3. Works notifications have been issued to airside tenants		
4. Works personnel are inducted and understand all conditions of Works Permit		
5. Works areas are barricaded with compliant barricades and secured		
6. Underground service location has been performed		
7. Live electrical circuits to area have been isolated and locked out		
8. Pavement markings have been altered and/or works area appropriately marked to prevent intrusions from aircraft and vehicles		
9. Aerodrome directional signage is altered, covered, lighting removed		
10. Fencing meets aerodrome requirements and will not obstruct aircraft or aerodrome navigation aids		
11. Work area has appropriate lighting for security and visibility		
12. Safe transit routes established for works personnel to/from works area		
13. Communications equipment and protocols are in place to be able to co-ordinate personnel, plant and materials movements		
14. Aerodrome emergency plan accommodates works or separate emergency plan established to be able to evacuate personnel from work area if required		
15. Aerodrome reporting requirements for works areas are understood and in place		

WORKSITE CHECKLIST (CONT.)

Works Completion		
Permit No.	Location:	Date/Time:
Checklist item	Completed (Initial)	
1. Temporary fencing and barricades have been removed from works area		
2. Pavement has been re-established, is clean, lines marked and is operational		
3. Pavements have been swept to remove all loose debris		
4. All work and adjacent areas have been inspected and confirmed free of debris		
5. Light fittings are in place, operational and covers are secure		
6. All service inspection points / lids are in place and secure		
7. Electrical circuits isolated have been re-energised and checked		
8. Pavement markings have been re-instated and temporary works markings removed.		
9. Aerodrome directional signage has been returned to operational condition		
10. Aerodrome emergency plan has removed reference to works and/or separate emergency plan established work activity are rescinded		
11. Works notifications have been rescinded		
12. Works area is returned to operational duty		
13. Works Permit is rescinded and shown as complete		
14. Statement of Fitness is completed and area returned to Aerodrome Operator		

Source: Global Safety Partners

10 REFERENCES

ACT Work Health and Safety Act 2011

Airports Act 1996

Airport Planning and Regulations - Department of Infrastructure and Regional Development

- » Airport Planning
- » Airport Master Plans
- » Airport Regulations
- » Community Aviation Consultation Groups and Planning Coordination Forums
- » Community Impact Guide
- » Environment Management at Airports

Airport Serviceability Inspection Report – Melbourne Airport

Airside Safety Handbook 2010 4th Edition – Airports Council International

CAP642 Airside Safety Manual – UK Civil Aviation Authority

CASA AC139-7(0) Aerodrome emergency planning (September 2012)

CASA AC139-8(0) Reporting of tall structures (April 2005)

CASA AC139-9(0) Aerodrome safety inspections at registered and certain other aerodromes (April 2007)

CASA AC139-12(0) Handling of hazardous materials on an aerodrome (November 2011)

CASA AC139-16(1) Safety Management Systems for Aerodromes (January 2013)

CASA AC139-20(0) Safe planning and conduct of aerodrome works (March 2007)

CASA AC139-26(0) Wildlife Hazard Management at Aerodromes (July 2011)

CASA AC172-1(0) Guidelines for preparing a Safety Management System (September 2005)

CASA Safety Management System resources

Conditions for Working Airside at Brisbane Airport

Controlling risks in the workplace – UK Health and Safety Executive

Guide to the Model Work Health and Safety Regulations – Safe work Australia

ICAO Safety Management Systems

ICAO Safety Report 2014

Line marking images – Civil Aviation Safety Authority

Line marking images – Melbourne Airport

Model Work Health and Safety Regulations 2014 – Safe work Australia

NSW Work Health Safety Regulations 2012

Queensland Work Health Safety Regulations 2011

Risk identification, evaluation and control for airports - Global Safety Partners

South Australian Work Health and Safety Regulations 2012

Tasmanian Work Health and Safety Regulations 2012

Victorian Occupational Health and Safety Regulations 2007

Western Australia Occupational Health and Safety Regulations 1996

Work Health and Safety Act 2011

11 GLOSSARY OF TERMS USED IN THIS DOCUMENT

We have specifically used as few acronyms in the production of this manual as possible and all used are explained when first referenced. Despite this, we have listed the used acronyms below to ensure there is an easy reference for all terms used.

ADA	Authority to Drive Airside
AEC	Aerodrome Emergency Committee
AEP	Aerodrome Emergency Plan
ALARP	As Low As Reasonably Practicable
ARFF	Aerodrome Rescue and Fire Fighting Service
ASIC	Aviation Security Identification Card
ATSB	Australian Transport Safety Bureau
ATC	Air Traffic Control
AVP	Airside Vehicle Permit
CASA	Civil Aviation Safety Authority
CTAF	Common Traffic Advisory Frequency
FEGP	Fixed Electrical Ground Power
FOD	Foreign Object Debris
GNSS	Global Navigation Satellite System
HAZMAT	Hazardous Materials
ICAO	International Civil Aviation Organisation
MOWP	Method of Working Plan
NOTAM	Notice to Airmen
PPE	Personal Protective Equipment
SMS	Safety Management System