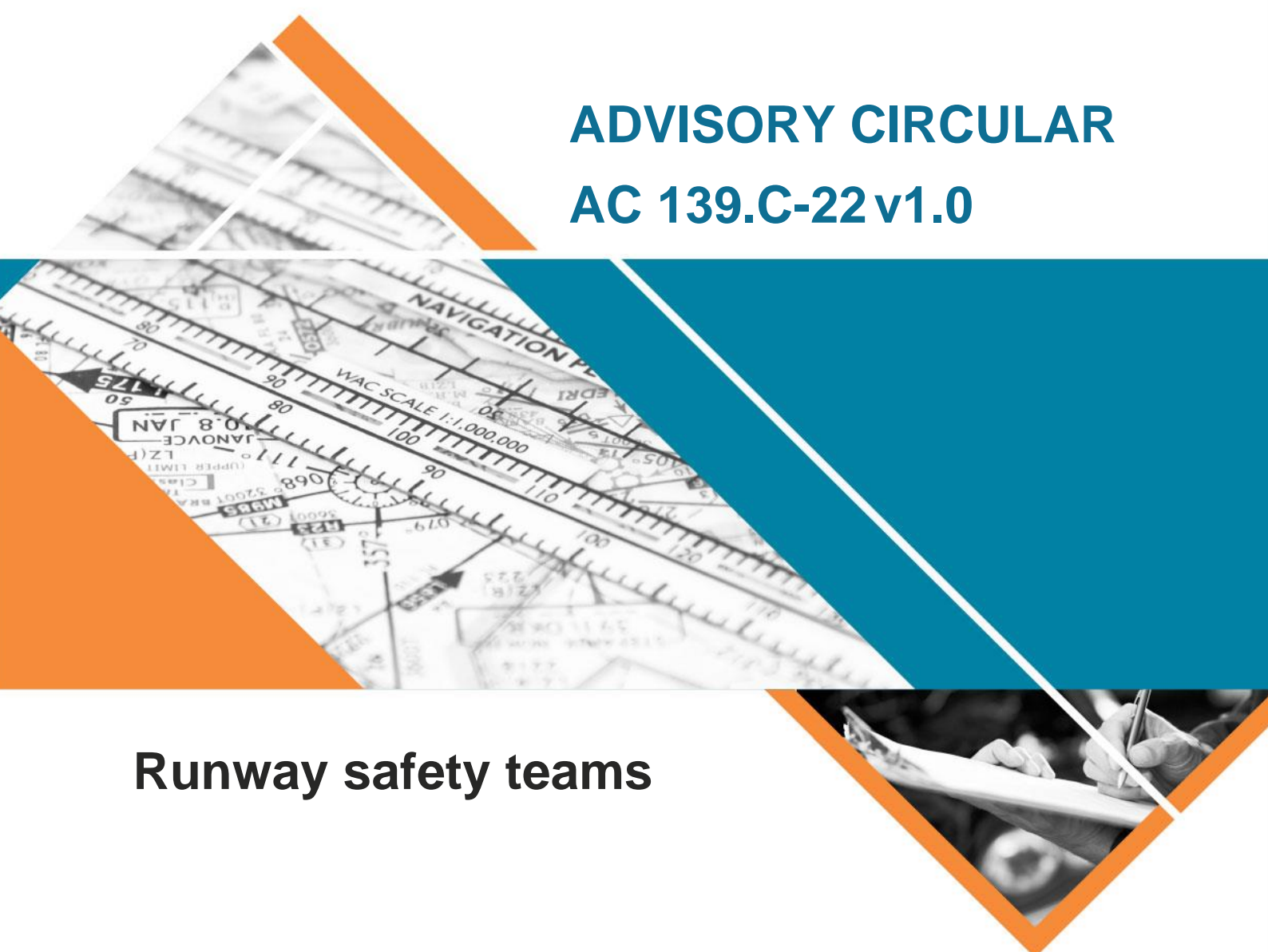




ADVISORY CIRCULAR

AC 139.C-22 v1.0



Runway safety teams

Date	June 2023
File ref	D19/176733

Advisory Circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

Advisory Circulars should always be read in conjunction with the relevant regulations.

Audience

This advisory circular (AC) applies to:

- Aerodrome operators
- Aircraft operators
- Aviation Rescue Fire Fighting Service
- Air Traffic Control services
- Local runway safety teams

Purpose

The purpose of this AC is to provide guidance to aerodrome operators in implementing local runway safety teams at each aerodrome. Aerodrome operators should use the guidance offered in this circular to inform their decision-making process in conjunction with the National Runway Safety Group guidelines. Operators should always consider the context of their own current and future operational environment, and the operational needs of pilots, aircraft operators and associated stakeholders, including but not limited to size and complexity.

It is important to note that this guidance does not create or permit deviations from regulatory requirements.

For further information

For further information, contact CASA's Personnel Licensing, Aerospace and Air Navigation Standards (telephone 131 757).

Status

This version of the AC is approved by the Manager, Flight Standards Branch.

Version	Date	Details
v1.0	June 2023	Initial AC.

Unless specified otherwise, all subregulations, regulations, divisions, subparts and parts referenced in this AC are references to the *Civil Aviation Safety Regulations 1998 (CASR)*.

Contents

1	Reference material	3
1.1	Acronyms	3
1.2	Definitions	3
1.3	References	5
2	Introduction	6
2.1	Background	6
3	Local Runway Safety Teams (LRSTs)	8
3.1	LRST purpose	8
3.2	Runway safety action plan	8
3.3	LRST composition and terms of reference	9
3.4	Correlating existing safety systems	10
3.5	Inputs to National Runway Safety Group (NRSRG)	10
4	Runway safety events	12
4.1	Runway incursion prevention	12
4.2	Runway excursion prevention	14
4.3	Runway confusion	15
4.4	Suspension of runway operations or runway closures	16
Appendix A	Utilising pre-existing teams at aerodromes for managing runway safety	18
Appendix B	Suggested agenda topics for LRST meetings	20
Appendix C	Local runway safety team checklist	22
Appendix D	ICAO occurrence categories	26
Appendix E	Best practices Guide for "HOT SPOTS" - Identification, removal and promulgation	28
Appendix F	Suspension of runway operations or closure of runways	31

1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

Acronym	Description
AC	Advisory Circular
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
CAR	<i>Civil Aviation Regulations 1988</i>
CASA	Civil Aviation Safety Authority
CASR	<i>Civil Aviation Safety Regulations 1998</i>
ICAO	International Civil Aviation Organization
GASP	Global Aviation Safety Plan
GRSAP	Global Runway Safety Action Plan
HIRM	Hazard Identification and Risk Mitigation
LRST	Local Runway Safety Team
MOS	Manual of Standards
RMP	Risk Management Plan
NASP	Australian National Aviation Safety Plan
NRSG	National Runway Safety Group
SMS	Safety Management System
SSP	State Safety Program
WIP	Work in Progress

1.2 Definitions

Terms that have specific meaning within this AC are defined in the table below. Where definitions from the civil aviation legislation have been reproduced for ease of reference, these are identified by 'grey shading'. Should there be a discrepancy between a definition given in this AC and the civil aviation legislation, the definition in the legislation prevails.

Term	Definition
Aerodrome	A means an area of land or water (including any buildings, installations and equipment), the use of which as an aerodrome is authorised under the regulations, being such an area intended for use wholly or partly for the arrival, departure or movement of aircraft.
Aerodrome layout	the number of runways, taxiways and aprons at an aerodrome that are provided with lighting, in 1 of the following categories of aerodrome:

Term	Definition
	<ul style="list-style-type: none"> a. basic — an aerodrome with 1 runway, with 1 taxiway to 1 apron area b. simple — an aerodrome with 1 runway, having more than 1 taxiway to 1 or more apron areas c. complex — an aerodrome with more than 1 runway, having more than 1 taxiway to 1 or more apron areas.
Aerodrome operator	<p>means:</p> <ul style="list-style-type: none"> a. for a certified aerodrome—the person who holds the aerodrome certificate for the aerodrome; or b. otherwise—the person who is responsible for the operation and maintenance of the aerodrome
Air Traffic Control	means Air Traffic Services in its capacity as a provider of air traffic control services.
Consequence	<p>Outcome or impact of an event.</p> <p>Notes:</p> <ul style="list-style-type: none"> 1. There can be more than one consequence from one event. 2. Consequences can range from positive to negative. 3. Consequences can be expressed qualitatively or quantitatively. 4. Consequences are considered in relation to the achievement of objectives
Hazard	A condition or an object with the potential to cause or contribute to an aircraft incident or accident.
Likelihood	Used as a general description of probability or frequency. Note: Can be expressed qualitatively or quantitatively.
Manoeuvring area	means that part of the aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.
Movement area	means that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the aprons.
Stakeholders	Those people and organisations who may affect, be affected by, or perceive themselves to be affected by a decision, activity or risk.
Runway excursion	A runway excursion is an event in which an aircraft veers off or overruns the runway surface either during take-off or landing.
Runway Incursion	The Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444) defines a runway incursion as: “Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft.”
Runway confusion	An unintentional use of the wrong runway, or a taxiway, for landing or take-off, can contribute to runway confusion occurrences at an aerodrome.
Risk	<p>The predicted probability and severity of the consequences or outcomes of a hazard.</p> <p>Notes:</p> <ul style="list-style-type: none"> 1. A risk is often specified in terms of an event or circumstance and the consequence that may flow from it. 2. Risk is measured in terms of a combination of the consequences of an event and its likelihood.

Term	Definition
	3. Risk may have a positive or negative impact
Runway safety	The state in which risks associated with the operation of aircraft on runways are reduced and controlled to an acceptable level.
Safety	The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.

1.3 References

Legislation

Legislation is available on the Federal Register of Legislation website <https://www.legislation.gov.au/>

Document	Title
Part 139 of CASR 1998	Aerodromes
Part 139 (Aerodromes) Manual of Standards (MOS)	Aerodromes

International Civil Aviation Organization documents

International Civil Aviation Organization (ICAO) documents are available for purchase from <http://store1.icao.int/>

Many ICAO documents are also available for reading, but not purchase or downloading, from the ICAO eLibrary (<https://elibrary.icao.int/home>).

Document	Title
ICAO Doc 9981	PANS-Aerodromes
ICAO Doc 9859	Safety Management Manual
ICAO Doc 9870	Manual on the Prevention of Runway Incursions
ICAO Doc 10004	Global Aviation Safety Plan
ICAO Runway Safety Programme	Global Runway Safety Action Plan
ICAO Handbook	Runway Safety Team Handbook

Advisory material

CASA's advisory material is available at <https://www.casa.gov.au/resources-and-education/publications-and-resources/guidance-material>

Document	Title
AC 139-16	Safety management systems for aerodromes
AC 139.C-27	Risk management plans for aerodromes

2 Introduction

2.1 Background

- 2.1.1 The pilots of aircraft, arriving to and departing from aerodromes, have an expectation that the aerodrome operator has sufficient controls in place to ensure safe operations on the movement area. The movement area consists of a network of runways, taxiways and aprons and is likely to be unique to each aerodrome.
- 2.1.2 Runways and rapid exit taxiways (where installed) are portions of the movement area where aircraft are likely to be operating at high speed, and where pilots are in a high workload environment.
- 2.1.3 Runway safety is vital to protect aircraft operations at an aerodrome. The effective control of people, vehicles and animals that may enter a runway is a responsibility of the aerodrome operator. Runway safety events have been known to result in catastrophic consequences, therefore there is a global focus on improving runway safety.
- 2.1.4 Typically, runway safety events comprise the following occurrences. However, other events associated with a runway may also be included, as relevant to local conditions:
- runway incursion
 - runway excursion
 - runway confusion
 - suspension or closure of runway operations.
- 2.1.5 Runway safety is a crucial element of Australia's State Safety Programme (SSP) and a common area of safety focus across the Australian aviation industry. Runway safety events are identified as a Safety Performance Indicator in the Australian National Aviation Safety Plan (NASP).
- 2.1.6 The key metric relating to runway safety is "Improve the safety of Australian aviation operations across all sectors". Improving runway safety is a collaborative effort involving the aerodrome operator with multiple stakeholders. The process may involve setting up local runway safety teams, undertaking a hazard identification process and controlling risk through a risk mitigation program, establishing safety targets, and measuring performance.
- 2.1.7 In Australia, the National Runway Safety Group (NRSRG) has been established to promote and facilitate nation-wide visibility and continuous improvement in aviation safety performance, specifically for runway safety.
- 2.1.8 The NRSRG is a SSP hazard-specific working group, that identifies current and emerging issues relating to runway safety at the national level and implements national initiatives in a targeted, tailored and timely manner to assure the safety of operations.
- 2.1.9 In addition, ICAO through the Global Aviation Safety Plan (GASP) and Global Runway Safety Action Plan (GRSAP) strongly recommends establishing Local Runway Safety teams (LRSTs) at aerodromes. This is recognised as a key controlling factor to manage risks associated with runway related occurrences.

2.1.10 Furthermore, Section 8.2 of ICAO's PANS-Aerodromes (Doc 9981) requires aerodrome operators to establish a runway safety team comprised of relevant organisations operating or providing services on the aerodrome.

2.1.11 Under the NRSRG, LRSTs work collaboratively to identify current and emerging issues relating to runway safety at aerodromes and implement initiatives in a targeted, tailored, and timely manner to assure safe runway operations.

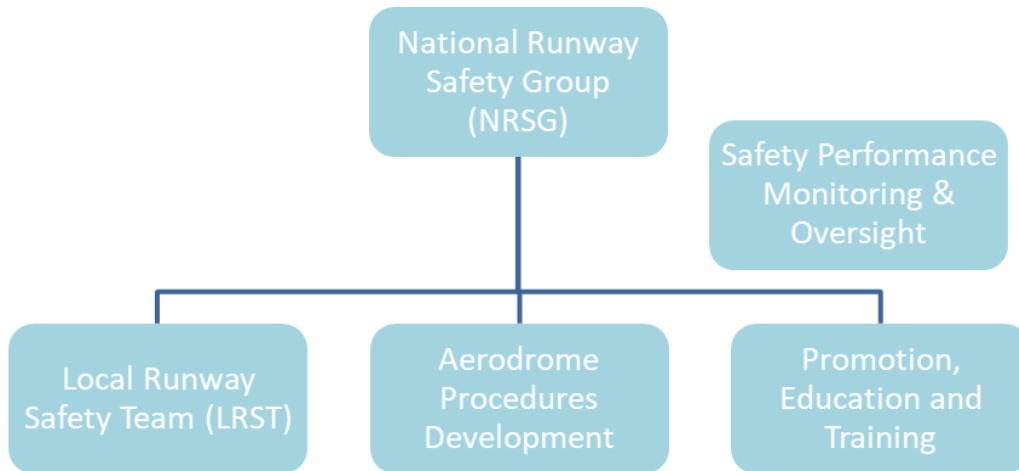


Figure 1: Runway Safety Team Structure (in Australia)

3 Local Runway Safety Teams (LRSTs)

3.1 LRST purpose

- 3.1.1 The LRST is a team of appropriate local representatives and stakeholders who work together to improve runway safety at the aerodrome.
- 3.1.2 The LRST should be established at each aerodrome and involve representatives from stakeholders whose operations relate to runway(s) at the aerodrome. The LRST should include representatives from the aerodrome operator, air traffic service provider (where applicable), airlines and aircraft operators, pilot associations, ground handling representatives and any other group with direct involvement in runway operations at the specific aerodrome.
- 3.1.3 The primary role of the LRST should be to develop a robust runway safety action plan, advise the aerodrome operator of potential runway safety issues and recommend strategies for hazard removal and effective mitigation of identified risks. While also providing advice and context regarding local conditions on the runway, taxiways and adjacent areas, the LRST should provide advice to the aerodrome operator on other issues of concern and provide support in developing mitigating measures and solutions to identified issues.
- 3.1.4 LRSTs also provide an avenue for hazard identification and risk management, along with safety assurance and safety promotion in support of an organisation's Safety Management System (SMS) or Risk Management Plan (RMP).

3.2 Runway safety action plan

- 3.2.1 The runway safety action plan should facilitate:
 - a. identification of runway safety hazards
 - b. conduct of runway safety risk assessments
 - c. recommendation of measures for hazard removal and mitigation of residual risk.
- 3.2.2 Initiatives to be undertaken at the aerodrome for effective runway safety management should be listed in the runway safety action plan. Furthermore, the plan should enable LRST members to identify responsibilities and lead specific initiatives, usually with a timeline attached for actions or implementation.
- 3.2.3 The LRST should review the runway safety action plan when one or more of the following circumstances arise:
 - a. the volume and density of aircraft and vehicle traffic increases significantly
 - b. operations in lower visibility conditions than currently permitted are planned
 - c. the aerodrome layout has changed, i.e., new runways, taxiways, or aprons are brought into operation. Also changes to airside facilities due to Work In Progress (WIP) at aerodromes
 - d. occurrences such as unintended entry of aircraft, persons and vehicles into runways and taxiways

- e. reports received from pilots, Air Traffic Control (ATC), or operations personnel about unclear indication of, inter alia, lights, markers, markings, and signs etc., which can potentially lead to confusion.

3.3 LRST composition and terms of reference

3.3.1 Ideally, the LRST should include members from the following stakeholders:

- a. Aerodrome operators
- b. Air Traffic Services (where available)
- c. Commercial air operators
- d. Representatives of flight crew operating at the aerodrome
- e. Members from general aviation community (where operating)
- f. Ground handling agents (where appropriate)
- g. Refuelling organisations (where appropriate)
- h. Any organisation or person that has access to the movement area.

3.3.2 The aerodrome operator may also consider including representatives from other organisations or associations, as relevant to local aerodrome conditions, including:

- a. Technical experts of air traffic controller associations.
- b. Technical experts of pilot associations.
- c. Military operators (where joint use of aerodrome for civil and military operations take place).
- d. Support services (that may operate on or close to a runway for offering ground services like follow-me operations, etc.).
- e. Emergency response service providers (e.g., ARFF, within the aerodrome).
- f. Subject matter experts (where appropriate e.g. wildlife hazard experts) upon invitation.

3.3.3 The LRST should provide to the aerodrome operator with strategies to mitigate risks associated with runway related occurrences. The LRST functions vital to achieving these objectives may include:

- a. analysis of safety data relating to the number, type, and, if available, severity of runway related occurrences
- b. consideration of the outcomes of any investigation reports in order to identify local hot spots or problem areas at the aerodrome
- c. working as a cohesive team to better understand the operating difficulties of personnel working in other areas and recommending areas for improvement
- d. promoting recommendations for the prevention of runway related occurrences for be implementation
- e. identification of any local problem areas and suggested improvements
- f. supporting the conduct of runway safety awareness campaigns that focus on local issues, for example, producing and distributing local hot spot maps or other guidance material as considered necessary
- g. regularly reviewing the aerodrome and runway operations to proactively identify any situation that may contribute to runway safety risks

h. open sharing of information and safety lessons learned across stakeholders to improve overall safety performance around and at aerodromes.

3.3.4 At some airports, stakeholder engagement forums may have already been established where the aerodrome operator could consider including runway safety on the agendas. In such cases, the existing forum may be used as the LRST. (Refer Appendix A on how such pre-existing teams can contribute for runway safety).

3.3.5 To ensure the success of an LRST attendees should be encouraged to participate regularly and actively. Changing representatives frequently may reduce the effectiveness of the team's performance.

3.3.6 The LRST should meet regularly, ideally at least on an annual basis or more often at complex aerodromes or aerodromes where an increase in runway safety incidents have been identified. The agenda for meetings should be adapted to suit local conditions and emerging trends. (Refer Appendix B for suggested agenda topics).

3.4 Correlating existing safety systems

3.4.1 Aerodrome operators should include or link the establishment and responsibilities of the LRST in their Aerodrome Manual under their SMS or RMP content. This could include the Terms of Reference and composition of the LRST at the aerodrome.

3.4.2 The safety analysis outcomes from LRST activities should follow the aerodrome operator's SMS or RMP, where appropriate.

3.5 Inputs to National Runway Safety Group (NRSNG)

3.5.1 The aerodrome operator, on behalf of their LRST, should provide inputs regarding systemic issues, growing trends and industry best practices related to runway safety to the NRSNG, which conducts nation-wide trend analysis.

3.5.2 The NRSNG is a State Safety Programme hazard-specific working group that facilitates state-level visibility and continuous improvement in safety performance, specific to runway safety in Australia.

3.5.3 The NRSNG performs a national advisory and coordination role to promote the establishment and effectiveness of LRSTs and utilises intelligence from these forums and other sources to develop and implement national strategies to improve runway safety. The NRSNG brings together industry stakeholders that have a common goal in enhancing runway safety in a collaborative forum.

3.5.4 Membership of the NRSNG enables broad industry participation in the identification, development, implementation, and promotion of runway safety initiatives at national and local levels and within the members' own organisations.

3.5.5 The NRSNG focuses on the following areas to integrate the safety value of LRSTs at a national level:

- promoting the exchange and analysis of data and information to identify and prioritise runway safety issues which need to be considered nationally
- increasing the shared understanding of aerodrome, aircraft and air traffic services operational issues which could impact on runway safety performance

- identifying issues during the implementation, promotion, and participation of effective LRSTs across aerodromes
- the improvement and continuous promotion of runway safety at aerodromes
- standardisation of terminology to enable ongoing sharing of runway safety performance and risk information across the industry
- maintaining a central information-hub of runway safety performance information.

3.5.6 The NRSG terms of reference and current membership can be found at <https://www.casa.gov.au/about-us/who-we-work/national-runway-safety-group>

3.5.7 CASA has established a Runway Safety Mailbox (RunwaySafety@casa.gov.au), to which LRST meeting minutes and matters requiring NRSG attention or escalation can be submitted.

4 Runway safety events

The LRST should endeavour to identify hazards associated with runway operations at the aerodrome and provide recommendations to the aerodrome operator on proposed safety measures to remove such hazards and mitigate residual risk.

The LRST should cover a wide range of issues and hazards related to runway safety, including but not limited to, the following ICAO occurrence categories:

- a. abnormal runway contact
- b. ground collision
- c. ground handling incidents
- d. runway confusion
- e. runway excursion
- f. runway incursion
- g. loss of control on ground
- h. collision with obstacle(s)
- i. undershoot / overshoot at an aerodrome
- j. high speed rejected take-off
- k. wildlife events, including bird strike
- l. damage from foreign object debris (FOD)

Note: See Appendix D for further information on ICAO occurrence categories.

The range of runway safety issues an LRST may experience can vary between aerodromes. The objectives of the LRST should be adapted based on local conditions, the nature of aircraft operations at the aerodrome, the configuration of the movement area and prevailing causal factors.

4.1 Runway incursion prevention

4.1.1 Across the globe, a substantial share of runway associated safety events stem from runway incursions.

4.1.2 Runway incursion involves any incorrect presence (of aircraft, vehicle, or personnel) on the protected area or surface designated for aircraft landing and take-off.

4.1.3 Contributory factors for runway incursions include:

- a. Increasing traffic volume
- b. The introduction of new aviation activities at the aerodrome
- c. capacity-enhancing procedures
- d. aerodrome design.

4.1.4 The possibility of runway incursion occurrences may increase when these factors occur concurrently, i.e.:

- a. As traffic volume increases, the likelihood of a runway incursion may increase when capacity-enhancing procedures and processes have not been considered.
- b. Some aerodrome improvement projects result in a more complex aerodrome layout which, together with legacy aerodrome design features, signage, markings and

lighting, or the lack of standard taxi routes and availability of updated aerodrome diagrams, can increase risk.

- c. Increasing operational environmental pressure can compromise safe ATC practices by requiring too many configuration changes.
 - d. The volume of aircraft traffic exceeds the capability or capacity of the movement area or circuit pattern.
- 4.1.5 Effective controls for these risk factors may be developed by the LRST, based on local experience or shared knowledge obtained from other sources. Inputs from the NRSG and information available from the Airservices website¹ act as a valuable source of information to assist the implementation of preventive safety measures and hence should be considered when recommending control measures.
- 4.1.6 The level of risk that may be present at an aerodrome may increase. Some common runway incursion prevention controls include:
- a. Designing new infrastructure or changes to existing infrastructure to prevent runway incursions.
 - b. Designing taxiways to eliminate ground navigation errors and communication confusion.
 - c. Changes to manoeuvring area practices and procedures, including planned works and Work in Progress (WIP), should take account of runway safety and may require consultation with the LRST. A safety assessment should be included for procedural and/or infrastructural changes on the manoeuvring area.
 - d. Endeavouring to avoid line of sight infringements of manoeuvring area from the ATC tower. Where infrastructure exists that introduces visibility restrictions from the tower, the associated safety risks should be assessed and appropriately mitigated.
 - e. Runway inspection procedures should consider runway incursion prevention measures, and personnel performing such functions should be appropriately trained.
 - f. To better inform stakeholders of existing high-risk locations airside, aerodrome operators may produce aerodrome charts identifying runway incursion hotspots. These charts are an outcome of LRST activities, which determine the effectiveness of such charts to manage risks. (*Information on identifying hot spots in a particular aerodrome is included in Appendix E of this circular*). These charts, where developed, may be published in the AIP and should be periodically reviewed
 - g. Safety risks associated with the identified hot spots should be assessed or mitigated at the earliest opportunity.
 - h. Where a Surface Movement Guidance and Control System (SMGCS) is implemented, runway incursion prevention and alerting measures should be incorporated into the system, if possible.
 - i. Periodic review of runway safety controls and risk mitigation measures in accordance to evolving operating conditions.

¹ <https://www.airservicesaustralia.com/industry-info/pilot-tools/pilot-and-airside-safety/runway-safety/>

- 4.1.7 Furthermore, safety measures like airside vehicle control, driver training, an airside driver permit system, vehicle conditions and daily briefings have also proved beneficial in preventing runway incursions. (For detailed information/guidance on these aspects refer to AC 139.C-14 v1.0 - Airside vehicle control).

4.2 Runway excursion prevention

- 4.2.1 A runway excursion is an event in which an aircraft veers off or overruns the runway surface either during take-off or landing.
- 4.2.2 Factors that generally contribute to runway excursion occurrences range from:
- a. human performance errors
 - b. non-stabilised approaches
 - c. inappropriate visual aids
 - d. low or reduced visibility conditions
 - e. aircraft related failure (i.e., flat tyre)
 - f. poorly maintained runway surfaces
 - g. weather.
- 4.2.3 Some common safety controls that aid in mitigating runway excursion (overruns & veering off) risks include:
- a. Risk mitigation activities associated with runway overruns:
 - i. Ensure aerodrome visual aids are suitable for the nature of operations on the runway(s) at the aerodrome. Such visual aids may vary among airports. They include ground markings, signs, and where available, aeronautical ground lighting.
 - ii. A clearly visible and suitably maintained aiming point and threshold markings (contrasting with the surface) are essential visual aids for landing aircraft that help prevent delayed touch downs leading to runway overruns.
 - iii. Additionally, visual aids to indicate the runway distance remaining may be considered to aid pilots during the landing roll to help prevent runway overruns during landings.
 - iv. Occasionally, aircraft departures from the incorrect runway entry-point lead to runway overruns. At airports where intersecting taxiways are provided and when operating procedures allow aircraft intersection take-offs, runway holding positions should be clearly marked, signed and, if required, lit to prevent departing aircraft commencing take-off from an unintended runway entry point.
 - v. Availability of 'take-off run available' signs at the identified intersection take-off locations should be considered to aid pilots to make informed decisions during departure phase.
 - vi. Aerodrome operators should ensure that the declared distances and intersection departure distances to run information published by the aeronautical information service (AIS) in the AIP are correct.
 - b. Risk sources associated with aircraft veering-off the runway:

- i. Surface conditions should be adequate for aircraft to stay on the runway during landing and take-off. The probability of an aircraft skidding and veering-off the runway increases where runway friction levels do not meet prescribed limits. Therefore, timely removal of rubber deposits and other contaminants is recommended in preventing aircraft veering-off the runways.
- ii. Weather information is an essential input for pilots to plan and execute safe landing and take-off operations and a precursor to stabilised approaches. The provision of wind information, including direction, strength and gusts, to pilots on approach by ATC, if available, reduces the likelihood and magnitude of veer-off occurrences. Additionally, wind sensors and wind direction indicators should be sited to give the best practicable indication of conditions along the runway and touchdown zones.

4.2.4 Where airside works (including on runway(s)) are undertaken, flight operations procedures should be in place to ensure safe aircraft operations, including operations with reduced declared distances. (Refer AC 139-20 - Safe Planning and Conduct of Aerodrome Works, for comprehensive guidance on safe conduct of aerodrome works).

4.2.5 Where aerodrome works are in the proximity of the runway, work activities are to be arranged to ensure pilots are not distracted, do not provide a risk of glare or other sight interference and, if the works are at night, work site lights are to be arranged to ensure pilot night vision is not negatively impacted.

4.3 Runway confusion

4.3.1 An unintentional use of the wrong runway, or a taxiway, for landing or take-off, can contribute to runway confusion occurrences at an aerodrome.

4.3.2 Runway confusion relates to runway safety events that occur at aerodromes where certain conditions may exist:

- a. Aerodromes where parallel runway systems exist and where there is a potential to misidentify runways, by either day or night. Where there is a potential for pilots to enter, take-off or land on the incorrect runways, sufficient signage, marking, and published information should be deployed to reduce the risk of pilot confusion.
- b. Runway confusion can also occur when a taxiway, usually parallel, is mistaken for a runway. This can be an increased issue during low-visibility conditions.
- c. The following factors may also contribute to runway confusion occurrences:
 - i. night operations
 - ii. low visibility operations
 - iii. adverse weather
 - iv. poor radio transmissions and communication practices
 - v. inadequate visual aids (including lights, markings, and signs)
 - vi. Information on intersection departures not appropriately published
 - vii. work in progress
 - viii. time pressure on pilots
 - ix. taxiway and runway geometry and configurations

- x. use of runways as taxi routes.

- 4.3.3 The above factors may exist by themselves or in combination. Therefore the LRST, when performing safety assessments with a focus on runway confusion occurrences, should consider these factors as relevant to local conditions.
- 4.3.4 Based on the hazards identified, the LRST should propose risk mitigation measures that are designed to effectively control the risk of a pilot selecting, or ATC nominating, an incorrect runway for a take-off or landing.
- 4.3.5 Mitigation measures available to the aerodrome operator to consider based on feedback from the LRST may include the following:
- a. identification and promulgation of hot spots
 - b. reduction in the size or width of runway entrance taxiways
 - c. closing certain runway entrance taxiways
 - d. covering signs with the potential for confusion during work in progress
 - e. isolating taxiway aerodrome ground lighting routes
 - f. removing redundant markings, markers, or lights
 - g. using enhanced markings and lights, such as stop bars.
- 4.3.6 Since runway confusion events largely depend on decisions made by pilots when departing or landing, during the day, at night, or under low-visibility conditions, the LRST should also consider human factors related inputs from pilots and others, and their related impacts on aircraft operations and pilot performance, during the Hazard Identification and Risk Mitigation (HIRM) processes.

4.4 Suspension of runway operations or runway closures

- 4.4.1 The suspension of runway operations, or runway closures, may occur due to decisions made by aerodrome operators due to planned or unplanned circumstances. Runway safety events, previously described in this AC, have the potential to lead to the suspension of runway operations or runway closures.
- 4.4.2 The following circumstances may cause unplanned runway closures:
- a. aircraft incident, e.g., tail strike, tyre burst; etc.
 - a. short-term removal of disabled aircraft or vehicles from a runway
 - b. significant FOD on runway
 - c. removal of wildlife or wildlife remains on the runway
 - d. significant failure of aeronautical ground lighting or ILS
 - e. presence of ice, snow, or flooding on the runway
 - f. aerodrome emergency response.
- 4.4.3 Similarly, there are causal factors that lead to planned runway closures for longer periods of time. These may include:
- a. removal of disabled aircraft on the runway or runway strip, which is expected to take significant time
 - b. significant deterioration of runway surface

- c. planned maintenance (e.g., rubber removal, repainting of markings, aeronautical ground lighting maintenance/cleaning, surface repairs).
- 4.4.4 To ensure the safety of aircraft operations and prevent the potential of runway safety occurrences during the closure of a runway, procedures should be in place to ensure smooth and safe implementation of runway closures, both planned and unplanned, and the subsequent return of the runway to service (Refer Appendix E for activities to be considered to execute runway closure).
- 4.4.5 The aerodrome operator, with (where possible) the support of the LRST, should actively engage in assessing changes and developing procedures and mitigation measures for runway closure and return to service. Such aerodrome operating procedures should be developed in consultation with ATC, where present, and other relevant stakeholders.
- 4.4.6 Planned airside maintenance or construction works should, as far as reasonably practical, be undertaken during low traffic times. Works that require the closure of a runway should be communicated to stakeholders in a timely manner, with as much notice as possible. Runways should be fully returned to service at or before the time notified to avoid the sudden precipitation of unscheduled aircraft delays and diversions.

Appendix A

Utilising pre-existing teams at aerodromes for managing runway safety

Aerodrome operators may use different approaches to establish a LRST.

One such methodology is to delegate LRST responsibilities to an existing team that is already functioning within the aerodrome and whose functions are closely aligned with runway safety.

For instance, at smaller aerodromes with fewer active stakeholders or at large aerodromes, teams responsible for airport specific issues may already be established. These teams may also be responsible for runway safety in their specific aerodromes or be able to adapt their scope accordingly.

Working groups or safety teams may exist within an aerodrome operator's range of responsibilities. Runway safety can be included as additional responsibilities within existing working groups such as (the names could differ between airports):

- a. apron safety committees
- b. airside management committee
- c. airside safety committee, etc.

While the practicalities of formulating a team with runway safety responsibilities may vary, the team composition and terms of reference should satisfy the guidelines provided in Section 3 of this Advisory Circular.

When such an arrangement is made to enable an existing team to perform the LRST functions within an aerodrome, the team should endeavour to meet regularly, and at least annually. Furthermore, they should provide inputs including minutes of the meetings (only sections relevant to runway safety) to the NRSB as mentioned in section 3.5 of this Advisory Circular.

Appendix B

Suggested agenda topics for LRST meetings

Listed below are suggested agenda topics for a typical LRST. The inclusion of these topics will vary between aerodromes and should be adapted to suit an aerodrome operator's location, unique operating conditions or intended aircraft operations.

- a. Review of open action items
- b. Review of runway safety performance indicators (leading and lagging)
- c. Data reports such as:
 - i. National Runway Safety Report
 - ii. Location specific runway safety and hazard reports or occurrences
- d. Aerodrome works (Planned/Ongoing)
- e. Visual aids and signage
- f. Runway markings
- g. Low visibility operations (if applicable)
- h. Foreign Object Damage - maintenance and FOD management program
- i. Wildlife hazard management
- j. Special Data Reports - Emerging risks (if applicable)
- k. Communications – phraseology, language, and equipment
- l. Procedures and practices (ATC, ARFF, Airlines etc) that relate to runway operations or runway safety
- m. Publications and procedures:
 - i. DAP
 - ii. ERSA
 - iii. Local Instructions
 - iv. SOPs e. Aerodrome Charts
 - v. Runway Hot Spot Diagrams
 - vi. Other
- n. Lessons learnt (local and external)
- o. Safety promotional and education programs, safety alerts etc
- p. Technology, research, and development (if applicable)
- q. Periodic review of LRST risks and control effectiveness evaluations.

Appendix C

Local runway safety team checklist

The following checklist can be used to both implement a LRST and to review existing LRSTs to determine if gaps exist or improvements can be made. Although not an exhaustive checklist the items included are designed to identify gaps that could hinder the effectiveness of LRSTs.

C.1 LRST checklists

Table 1: Component 1 – Terms of reference (ToR)

Item	Question	Response	Comments
1.1	Are there documented ToR in place?	Yes / No	
1.2	Do the ToR define the purpose and scope of the LRST?	Yes / No	
1.3	Do the ToR define the LRST members and their roles?	Yes / No	
1.4	Do the ToR define a process for handling data/reports received from members and other stakeholders?	Yes / No	
1.5	Do the ToR describe the decision-making processes to be used by the LRST?	Yes / No	
1.6	Do the ToR define a process for resolving any disagreements between LRST members?	Yes / No	
1.7	Do the ToR identify a process for raising issues, concerns and/or lessons learned to the NRSG?	Yes / No	

Table 2: Component 2 – Hazard identification

Item	Question	Response	Comments
2.1	Does the LRST have a formal safety data collection and processing system (SDCPS) for documenting operational hazards?	Yes / No	
2.2	Do all LRST members	Yes / No	

Item	Question	Response	Comments
	contribute to sharing safety data and identified runway safety hazards?		
2.3	Does the LRST define and document specific consequences for operational hazards?	Yes / No	

Table 3: Component 3 – Safety risk management

Item	Question	Response	Comments
3.1	Does the LRST have a formally documented process to manage identified runway safety risks?	Yes / No	
3.2	Within the risk management process, are the consequences of operational hazards assessed in terms of probability and severity?	Yes / No	
3.3	Is there a formalised process to determine the level of risk the LRST is willing to accept?	Yes / No	
3.4	Does the LRST develop risk mitigation strategies to control the level of risk within the operational environment?	Yes / No	
3.5	Is there a formalised process for the LRST to make recommendations to applicable stakeholders relating to identified risks?	Yes / No	
3.6	Is there a formalised process to document the decisions made by the LRST during the risk management process?	Yes / No	
3.7	Are the LRST determined risk mitigations periodically reviewed to determine if the desired effect/outcome was	Yes / No	

Item	Question	Response	Comments
	achieved?		

Table 4: Component 4 – Communication

Item	Question	Response	Comments
4.1	Does the LRST have a formal process to communicate with applicable stakeholders?	Yes / No	
4.2	Does the LRST periodically provide runway safety material to key frontline/operational staff?	Yes / No	
4.3	Does the LRST participate in safety lessons learned and information sharing with other LRSTs and the NRSG?	Yes / No	
4.4	Does the LRST solicit safety-related information from all airport users?	Yes / No	

Table 5: Component 5 – Continuous Improvement

Item	Question	Response	Comments
5.1	Does the LRST have a formal process to continuously improve their processes and outputs?	Yes / No	
5.2	Does the LRST engage in formal, periodic reviews of the program to ensure they are improving and maintaining runway safety?	Yes / No	
5.3	Are the results of the continuous improvement program documented?	Yes / No	

Appendix D

ICAO occurrence categories

D.1 ICAO Runway Safety Accident and Incident Category Definitions

The ICAO Runway Safety Programme – Global Runway Safety Action Plan² provides recommended actions for all runway safety stakeholders, with the aim of reducing the global rate of runway excursions and runway incursions. Runway Safety Teams (RSTs) at airports are an effective means to help reduce runway related accidents and incidents.

Runway safety-related events include the following ICAO accident and incident occurrence categories. Wherever possible, accidents and incidents should be considered and reported using the categories below to ensure consistency and ease of data comparison across all LRSTs and aerodromes.

Table 1: ICAO accident and incident occurrence categories

Category	Description
Abnormal Runway Contact (ARC)	Any landing or take-off involving abnormal runway or landing surface contact
Bird Strike (Bird)	A collision / near collision with or ingestion of one or several birds
Ground Collision (GCOL)	Collision while taxiing to or from a runway in use
Ground Handling (RAMP)	Occurrences during (or as a result of) ground handling operations
Runway Excursion (RE)	An event in which an aircraft veers off or overruns off the runway surface during either take-off or landing.
Runway Incursion (RI)	Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft
Loss of Control on the Ground (LOC-G)	Loss of aircraft control while the aircraft is on the ground
Collision with Obstacle(s) (CTOL)	Collision with obstacle(s), during take-off or landing whilst airborne
Undershoot / Overshoot (USOS)	A touchdown off the runway surface
Aerodrome (ADRM)	Occurrences involving aerodrome design, service, or functionality issues.

² ICAO Runway Safety Programme – Global Runway Safety Action Plan First Edition, November 2017. Retrieved from:

https://www.icao.int/safety/RunwaySafety/Documents%20and%20Toolkits/GRSAP_Final_Edition01_2017-11-27.pdf

Appendix E

Best practices Guide for "HOT SPOTS" - Identification, removal and promulgation

Aerodrome movement area 'hot spots' may be locations that, although fully compliant with applicable regulations, are potentially difficult to navigate due to awkward geometry, or are locations where additional awareness is required, such as at runway crossing locations, to ensure safe operations.

E.1 Hot Spot identification

One responsibility for the aerodrome operator, with support from the LRST, is runway hot spot identification. Through HIRM processes, the LRST should assist in identifying prevailing hot spots within the aerodrome environment that could lead to runway safety occurrences.

Essentially, the LRST should assist the aerodrome operator with hazard identification and risk assessment processes considering factors like:

- a. aerodrome design
- b. availability of visual aids and their suitability to existing operations
- c. aerodrome/ATC procedures (including standard taxi routes, ATC clearances, and non-standard communication practices prevailing in the aerodrome)
- d. intended aerodrome operating conditions (including low-visibility operations)
- e. human factors, etc.

The HIRM process described above should be reviewed periodically or after any reported event to ensure its continuing validity and ensure the consideration of contemporary aerodrome operating and design practices.

E.2 Hot Spot removal

Ideally, the aerodrome operator, with support from the LRST, should endeavour to eliminate hot spots in the airside environment.

However, for those that cannot be eliminated immediately or completely, it has been proven to be advantageous to highlight such locations and spread awareness among key stakeholders such as air traffic controllers, pilots, airside drivers, etc.

Some common strategies to manage hot spots include:

- a. construction of new taxiways
- b. additional visual aids (signage, markings, lights)
- c. use of alternative routings
- d. mitigating against blind spots in the aerodrome control tower
- e. awareness campaigns
- f. publishing the hot spot in the AIP (DAP and ERSA).

E.3 Promulgating Hot Spots among stakeholders

Some hot spot causal factors may be addressed swiftly but others may take much longer to remove, or it may be impracticable to remove them altogether. A new hot spot may occur because of a change to the movement area or an operating procedure.

Aerodrome charts indicating identified hot spots may be developed by aerodrome operators, and if the risks are anticipated to exist for a longer timeline (for instance, beyond one AIRAC cycle),

the aerodrome operators should endeavour to publish the chart in AIP (DAP and ERSA), for wider attention among stakeholders.

Other modalities of disseminating hot spot information to stakeholders include bulletins, safety workshops, periodic safety publications (like safety brochures, journals, etc) and information sharing through multiple forums formulated among aerodrome stakeholders.

Appendix F

Suspension of runway operations or closure of runways

The information in this Appendix should be read in conjunction with the [NOTAM Data Quality Requirements for Aerodrome Operators published](#) by Airservices Australia.

Runway closures may be:

- a. Permanent:
 - i. The runway is no longer able to be used for the landing or take-off of aircraft; or

- b. Temporary:
 - i. The runway is not able to support the landing or take-off of aircraft for a defined period of time.
 - ii. Reasons for the temporary closure of a runway may include:
 - A. Planned aerodrome works – refer Section 15.01 of the Part 139 MOS
 - B. Emergency aerodrome works
 - C. Disabled aircraft
 - D. Aerodrome emergency response
 - E. The presence of hazards, not otherwise promulgated, which affect air navigation
 - F. The presence or removal of significant hazardous conditions due to snow, slush, ice, volcanic ash deposition or water on the movement area.

When determining a temporary closure, the aerodrome operator should advise whether the runway is not available for landing or take-off operations, and whether the taxiing of aircraft on or across portions of the closed runway is available for the period the runway is closed.

- c. Suspension:
 - i. The landing, take-off or taxiing of aircraft on a runway may be partially or fully suspended for the following reasons:
 - A. Inclement Weather:
 - 1. Severe weather conditions such as heavy rain, snow, fog, or strong crosswinds can make it unsafe for aircraft to take off or land.
 - B. Aircraft Incidents or Accidents:
 - 1. the operations may be suspended to ensure the safety of personnel involved in response efforts and to investigate the incident.
 - C. FOD on the Runway:
 - 1. if there is significant debris on the runway, the operations may be temporarily halted until the debris is cleared.
 - D. Security Threats:
 - 1. In the event of a security threat or breach at an airport, runway operations may be suspended as a precautionary measure until the situation is resolved and deemed safe.
 - E. ATC Issues:
 - 1. Unforeseen circumstances such as technical failures, staffing issues, or airspace congestion can result in the suspension of runway operations. These issues can disrupt the normal flow of air traffic and necessitate a temporary halt to runway activities.
 - 2. Wildlife:

3. Birds or animals on the runway that could result in a safety hazard to aircraft operations are identified and may be in the process of dispersal.
4. Obstacles: obstacles and objects that may impact the safe operation of aircraft in navigable airspace is identified.

Note: A suspension of runway operations in itself is not a runway closure. Rather, the suspension of runway operations is an impact to the use of the runway by aircraft.

The aerodrome operator is responsible for ensuring the ongoing serviceability of the runway, including determining when the hazard or risk requires the closure of the runway, or suspension of aircraft operations, until the hazard has been removed or otherwise mitigated.

Runway closures or the suspension of runway operations may be implemented for different reasons at aerodromes. However, to ensure runway safety and prevent runway safety occurrences during runway closures or suspension or runway operations, standard procedures commensurate with the local environment should be implemented.

Procedures to ensure safe runway closure, should normally cover activities during pre-closure, post-closure and while runway is closed for operations:

- a. Pre-closure of Runway(s): If this is a planned activity, a MOWP should be issued not less than 14 days prior to the commence of work refer Section 15.02(3) of the Part 139 MOS.
- b. A chronological sequence of actions that should be considered and applied when deciding whether or not to suspend operations:
 - i. Where appropriate, notify ATC of a potential suspension of runway operations.
 - ii. Authorised aerodrome personnel to gain access to the runway for assessment purposes following clearance by ATC, if available.
 - iii. Authorised aerodrome personnel to make an initial assessment of the runway condition.
 - iv. Appointed aerodrome representative to decide whether to suspend runway operations.
 - v. Communicate decision to ATC, where available.
 - vi. Promulgate information to pilots, vehicle drivers and other stakeholders using existing communication modes, like Automatic Terminal Information Service (ATIS), radiotelephony, etc.
 - vii. A NOTAM is issued concerning the suspension of runway operations (considerations should be given if the aerodrome is not available for diversion flights). Where closure is expected for only a short duration, and when aircraft operations can safely be conducted on other available runways, or the equipment used can be removed, when necessary, a NOTAM may not be necessarily issued.
 - viii. In case of a reportable occurrences, the occurrence should be reported to Australian Transport Safety Bureau (ATSB) in accordance with *Transport Safety Investigation Regulations 2021*.
 - ix. The aerodrome operator should contact the relevant department, maintenance contractor and aircraft operator if relevant, to facilitate remedial works.
- c. When runway is closed for operations:
 - i. Authority to access runway: Either aerodrome operator or ATC, where ATC is available or when operational.
 - ii. Ideally, runway access control is handed to another authority (for instance, airside operations department where available or other) for planned closures. However,

this arrangement depends on the capacity to handle airside traffic at each aerodrome.

- iii. Any runway access should ideally be restricted to only authorised personnel, or when under direct supervision.
- d. Post-closure and before commencement of aircraft operations on runway(s):
 - i. A chronological sequence of actions to be considered prior to commencing aircraft operations on runway(s) following suspension or closure:
 - A. Remedial works should be completed, e.g., clearance of FOD, wildlife remains, aeronautical ground lighting repair, removal of disabled aircraft.
 - B. Runway to be inspected, under the authorisation of ATC where available.
 - C. All vehicles and personnel should have vacated the runway and should report vacated to the relevant authority.
 - D. Runway availability is confirmed to ATC and, if applicable, positive control is returned to ATC.
 - E. Aerodrome operators should cancel the NOTAM (if published).
 - F. Promulgate runway availability using existing communication modes, like ATIS and radiotelephony (if applicable).
 - G. Normal operations may resume.