



GHANA
CIVIL AVIATION AUTHORITY

ADVISORY CIRCULAR

AC 14-040

RUNWAY SAFETY PROGRAMME

1 GENERAL

Ghana Civil Aviation Authority (GCAA) Advisory Circulars from Aerodrome Safety and Standards (ASAS) contain information about standards, practices and procedures that the Authority has found to be an Acceptable Means of Compliance (AMC) with the associated Directives.

An AMC is not intended to be the only means of compliance with a directive, and consideration will be given to other methods of compliance that may be presented to the Ghana Civil Aviation Authority.

Information considered directive in nature is described in this AC in terms such as “shall” and “must”, indicating the actions are mandatory. Guidance information is described in terms such as “should” and “may” indicating the actions are desirable or permissive, but not mandatory.

1.1 Purpose

This AC is designed to give guidance to Aerodrome Operators and Service Providers on the establishment of a Runway Safety Team.

This Advisory Circular provides guidelines to Aerodrome Operators for the establishment of Runway Safety Teams (RSTs) at individual aerodromes, which is key for the identification of hazards related to runway safety, the development and implementation of an effective action plan, collection of data, promulgation of safety information and recommend strategies for the hazard removal and mitigation of residual risks. A successful RST requires all key stakeholders to cooperate in a collaborative manner.

1.2 Applicability

This AC is designed to give guidance to Aerodrome Operators and Service Providers on the establishment of a Runway Safety Team.

1.3 Description of Changes

This AC is the first to be issued on this subject.

1.4 References

The following directives and advisory circular are directly applicable to the guidance contained in this advisory circular—

- GCAD Part 14
- GCAD Part 36

- AC 14-014
- AC 14-021
- AC 14-030

1.5 Cancelled Documents

Not Applicable

APPROVAL

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- Advisory Circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the directives, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.
- Where a directive contains the words “prescribed by the Authority,” the AC may consider to “prescribe” a viable method of compliance, but status of that “prescription” is always “guidance” (never a directive).

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1.6 Definitions

Clearway - A defined rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an airplane may make a portion of its initial climb to a specified height.

Hazard - A condition or an object with the potential to cause death, injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function.

Hot spot - A location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary

Risk mitigation - The process of incorporating deficiencies or preventive controls to lower the severity and/or likelihood of a hazard's projected consequence.

Runway - A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft

Runway confusion - An error when an aircraft makes "unintentional use of a wrong runway or taxiway for landing or take-off".

Runway end safety area (RESA) - An area symmetrical about the extended runway centre line and adjacent to the end of the strip primarily intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway.

Runway Excursion - Any occurrence at any aerodrome involving the departure, wholly or partly, of an aircraft from the runway in use during take-off, a landing run, taxiing or maneuvering.

Runway incursion - 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 takeoff of aircraft.

Note - *In the context of runway incursions, the protected area of a surface designated for the landing and take-off of aircraft is comprised of: the runway; the stopway; the runway end safety area (RESA); the area along each side of the runway whose width is the runway-holding position distance; and, if provided, the clearway.*

Runway Safety Team (RST) - A team comprised of representatives from [the aerodrome operator], air traffic service providers, airlines or aircraft operators, pilot and air traffic controllers' associations and any other group with a direct involvement in runway operations [at a specific aerodrome,] that advise the appropriate management on the potential runway [safety] issues and recommend mitigation strategies.

Runway Safety - The state in which risks associated with the operation of aircraft on runways are reduced and controlled to an acceptable level.

Safety risk - The predicted probability and severity of the consequences or outcomes of a hazard.

Safety risk severity - The extent of harm that might reasonably occur as a consequence or outcome of the identified hazard.

Stopway - A defined rectangular area on the ground at the end of take-off run available prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take-off.

2 RUNWAY SAFETY TEAM (RST)

- (a) Runway safety is a key priority for aerodrome operators, aircraft operators, and air traffic services (ATS). The prevention of both runway incursions and excursions should be an important part of their programmes and activities for improving runway safety. The aerodrome operator and ATS cannot solely bring about improvements or positively manage runway safety without the coordination and cooperation of other stakeholders.
- (b) Improving runway safety on an aerodrome is a collaborative process, with the primary objective being, to develop a runway safety action plan that identifies and addresses safety issues through effective hazard identification and risk mitigation.
- (c) Gathering, monitoring and analyzing data on runway safety performance greatly contributes to understanding and proactively managing the risk related to the operations of the runway.

2.1 Goals and General Description of the RST Programme

- (a) All entities involved in the RST should participate in a collaborative process of hazard identification and safety risk assessment, as well as in the development of a robust runway safety action plan. The aerodrome operator should have ownership of the runway safety action plan and ensure that it forms an effective element of the aerodrome SMS, as appropriate.
- (b) The primary role of a runway safety team is to develop a runway safety action plan, advise relevant operators and service provider's management and operational staff on prevailing local conditions on the runway, taxiways and adjacent areas, other issues of concern and develop mitigating measures and solutions to identified issues.
- (c) This action plan should as a minimum, facilitate the identification of runway safety hazards and the conduct of runway safety risk assessments and recommend measures for hazard removal and mitigation of the residual risk.
- (d) The RST must implement the action plan for runway safety, advise management as appropriate on potential runway safety issues and recommend strategies for hazard removal and mitigation of the residual risk. These strategies may be developed based on local occurrences or combined with information collected elsewhere.
- (e) Although not considered a regulatory authority or intended to replace any required component of a Safety Management System (SMS), the RST should aim to improve and support runway safety by integrating the safety systems of the participating organizations (stakeholders). Interfacing service providers should document the interface between the SMS and the RST, where RSTs are available.
- (f) RSTs can serve as an excellent tool for managing runways safety related risk identified by the service provider programs. In addition, the service provider SMS process should be used to evaluate possible risk posed by operational changes resulting from RST proposed corrective actions.
- (g) The RST's meeting schedule depends on the situation and environment of the aerodrome. For example, if major works are proposed, or runway hazards and incidents are increasing, then the RST may need to meet more frequently. However, if operations are stable, with few hazards identified, then the meetings may be less frequent.
- (h) The RST is built on the principles of a formal Hazard Identification and Risk Management (HIRM) process, in accordance with GCAD Part 36, AC 14-030 - Safety Management Systems (SMS) and ICAO Doc 9859 - Safety Management Manual (SMM). The RST should be able to capture the HIRM results from its members, as most of them will have their own SMSs with differing HIRM processes.

- (i) The RST should cover a wide range of issues related to runway safety, including but not limited to, the following ICAO occurrence categories:
 - (i) Abnormal runway contact;
 - (ii) Bird strike;
 - (iii) Ground collision;
 - (iv) Ground handling;
 - (v) Runway excursion;
 - (vi) Runway incursion;
 - (vii) Loss of control on ground;
 - (viii) Collision with obstacle(s);
 - (ix) Undershoot / overshoot, aerodrome
 - (x) Use of the wrong runway (runway confusion)
 - (xi) High Speed Rejected Take-Off
 - (xii) Wildlife Event
 - (xiii) Damage from Foreign Object Debris (FOD)

2.2 Runway Incursion Prevention

- (a) New infrastructure and changes to existing infrastructure should be designed so as to prevent runway incursions.
- (b) Changes to manoeuvring area practices and procedures, including planned works and work in progress, should take account of runway safety and may require consultation with the RST. A safety assessment should be included for procedural and/or infrastructural changes on the manoeuvring area.
- (c) The aerodrome operator should designate taxiways in order to eliminate ground navigation errors and communication confusion.
- (d) The aerodrome operator should avoid infringing on the lines of sight from the air traffic control (ATC) tower. The safety risks associated with visibility restrictions from the tower impacting the ability to see the manoeuvring area should be assessed and appropriately mitigated.
- (e) Procedures for conducting runway inspections should take account of runway incursion prevention.
- (f) The aerodrome operator should produce aerodrome charts identifying runway incursion hot spots. These charts should be periodically revised as needed, distributed locally to manoeuvring area drivers, and published in the Aeronautical Information Publication (AIP).
- (g) Safety risks associated with the identified hot spots shall be assessed or mitigated.
- (h) Runway incursion prevention should be taken into account if the aerodrome operator develops surface movement guidance and control systems (SMGCS) in cooperation with the aerodrome air traffic services provider.
- (i) The RST should review the runway safety action plan when one or more of the following circumstances arise:
 - (i) The volume and density of aircraft and vehicle traffic increases significantly;
 - (ii) Operations in lower visibility conditions than currently permitted are planned;

- (iii) The aerodrome layout has changed, i.e. new runways, taxiways, or aprons are brought into operation;
 - (iv) Occurrences such as unintended entry of aircraft, persons and vehicles into runways and taxiways; and
 - (v) Reports received from pilots, ATC or operations personnel about unclear indication of, inter alia, lights, markers, markings and signs etc., which can potentially lead to confusion.
- (j) The RST should periodically review the provision and operational use of visual aids aimed at protecting the runway.
 - (k) Aerodrome operators shall establish and implement a formal manoeuvring area vehicle driver training and assessment programme and periodically review driver guidelines.
 - (l) Aerodrome operators shall ensure that all manoeuvring area vehicle drivers are briefed on the operational conditions of the manoeuvring area (runway in use, visibility conditions, etc.) at the start of their shift and also reminded that situational awareness is maintained throughout their shift.
 - (m) Aerodrome operators shall ensure that procedures for the control of all vehicles on the manoeuvring area are developed and implemented in cooperation with air traffic control.
 - (n) Runway-holding positions shall be clearly marked, signed and, if required, lit.

2.3 Runway Excursion Prevention

- (a) Where instrument landing systems (ILS) are provided, the aerodrome operator shall ensure that the critical and sensitive areas associated with these navigational aids are protected and not subject to signal disturbances.
- (b) Aerodrome operators shall ensure that aeronautical ground lighting, signs and markings are suitable for the planned operations on the runway, in particular:
 - (i) the aiming point and threshold must be clearly visible, contrasting with the surface, and maintained;
 - (ii) runway holding positions must be clearly marked, signed and, if required, lit to prevent departing aircraft commencing take-off roll at the wrong runway entry point;
 - (iii) the use of signs at the runway holding positions used for intersection take-offs to indicate the take-off run available should be considered; and
 - (iv) the use of visual aids to indicate the runway distance remaining should be considered.
- (c) The timely removal of rubber deposits and other contaminants from the runway must be undertaken to ensure that adequate friction is maintained.
- (d) The provision of wind information, including direction, strength and gusts, to pilots on approach by ATS reduces the likelihood of an excursion. Wind sensors and wind direction indicators must be sited to give the best practicable indication of conditions along the runway and touchdown zones.
- (e) Aerodrome operators must ensure that the declared distances notified to the aeronautical information service (AIS) for publication in the AIP are correct.
- (f) Aerodrome operators must ensure that procedures are in place for calculating accurate temporarily reduced declared distances (e.g. due to work in progress on the runway). When reduced declared distances are in operation, the aerodrome operator must ensure that the temporary markings, lighting and signs accurately portray the

reduced distances and that they are well-communicated to the AIS for publication. Consideration should also be given to measures taken to restrict access to intermediary runway entry points.

2.4 Runway Safety Event Causal Factors

The following list is provided to identify the most common causes of runway safety events:

- (i) weather;
- (ii) runway surface conditions (contamination);
- (iii) aerodrome design;
- (iv) longitudinal runway slopes;
- (v) conditional clearances;
- (vi) multiple line-up procedures;
- (vii) runway crossing procedures;
- (viii) simultaneous use of intersecting runways;
- (ix) late issuance or late changes of departure clearances;
- (x) inadequate, improper or non-standard phraseology;
- (xi) concurrent use or use of more than one language for ATS communication;
- (xii) radio frequency congestion;
- (xiii) English language competence;
- (xiv) excessive pilot workload;
- (xv) excessive controller workload;
- (xvi) work in progress; and
- (xvii) distraction (pilot, controller, driver, etc.)

2.5 Runway Confusion Control

(a) The RST should undertake a safety assessment including the following factors, with the objective of identifying measures to reduce the risk of runway confusion:

- (i) Night operations;
- (ii) Low visibility operations;
- (iii) Adverse weather;
- (iv) Lack of precision in RTF communications;
- (v) Inadequate lights, markings and signs;
- (vi) Intersection departures (where applicable);
- (vii) Work in progress;
- (viii) Parallel taxiway use (where applicable);
- (ix) Late issue or amendment of departure clearance;
- (x) Time pressure;
- (xi) Taxiway and runway geometry and configurations; and
- (xii) Use of runways as taxi routes.

(b) The manoeuvring area should be clear of situations that may lead to the selection of the incorrect runway. Examples of mitigation measures can take the form of:

- (i) Proper identification and promulgation of hot spots;

- (ii) Reduction in the size/width of runway entrance taxiways;
- (iii) Closing certain runway entrance taxiways;
- (iv) Covering signs with the potential for confusion during work in progress;
- (v) Isolating taxiway aerodrome ground lighting routes; and
- (vi) using enhanced markings.

Note - almost all departure occurrences globally, where the correct runway was not positively identified, have been due to complacency in visual acquisition. Such failure most frequently occurs when a paved surface, in proximity to the correct runway and with the same or similar orientation, is selected.

- (c) The RST must include human factors and performance in the selection of mitigation measures described in 2.1.4(b).

2.6 Suspension or Closure of Runway Operations

Planned and unplanned events on an aerodrome can necessitate the temporary suspension of runway operations for a short period of time (counted in hours) or for a longer period of time (counted in days).

- (a) In the majority of cases, reasons for suspending runway operations will be unplanned. Examples may include:
 - (i) short-term removal of disabled aircraft or vehicle on runway;
 - (ii) significant foreign object debris (FOD) on runway;
 - (iii) significant wildlife strike remains on runway;
 - (iv) significant failure of aeronautical ground lighting or ILS;
 - (v) presence of ice/snow/flooding on runway;
 - (vi) aircraft incident, e.g., tail scrape, aborted take-off, tire burst; and
 - (vii) full emergency or local standby.
- (b) If runway operations must be suspended for a longer period of time due to planned circumstances, consideration should be given to closing the runway. Examples for runway closure may include:
 - (i) removal of disabled aircraft or heavy vehicle on runway which is expected to take significant time;
 - (ii) significant deterioration of runway surface; and
 - (iii) planned maintenance (e.g., rubber removal, repainting of markings, aeronautical ground lighting maintenance/cleaning, surface repairs).
- (c) Aerodrome operators should ensure that all stakeholders are fully aware of the procedures in place in the event of a suspension of runway operations. During such a suspension, the aerodrome operator should maintain a record of all activities.
- (d) The aerodrome operator should augment the testing of the written procedure through regular table-top exercises.
- (e) The following list contains a chronological sequence of actions which should be considered and applied when deciding whether or not to suspend operations:
 - (i) notify air traffic services (ATS) of a potential suspension of runway operations;
 - (ii) authorized aerodrome personnel to gain access to the runway for assessment purposes following clearance by ATS;

- (iii) authorized aerodrome personnel to make an initial assessment of the runway condition;
 - (iv) appointed aerodrome representative to decide whether to suspend runway operations;
 - (v) communication of the decision to ATS;
 - (vi) ATS to promulgate the information to pilots, vehicle drivers and other stakeholders using automatic terminal information service (ATIS) and radiotelephony;
 - (vii) a NOTAM is issued concerning the suspension of runway operations (it may also be necessary to issue a separate NOTAM if the aerodrome is unavailable for planned diversions). If the suspension is expected to be of a short duration, i.e., less than 60 minutes, it may not be necessary to issue a NOTAM;
 - (viii) in the case of an accident, the aerodrome operator should inform the appropriate accident/incident investigation Authority (permission to clear debris may be required from the appropriate accident/incident investigation Authority);
 - (ix) the aerodrome operator should contact the relevant department, maintenance contractor and aircraft operator (if relevant), to facilitate remedial works; and
 - (x) the aerodrome operator shall notify the GCAA
- (f) The aerodrome operator should ensure that if runway operations are suspended and ATS maintains authority over the access to the runway, access may only be granted under positive control of ATS as per normal operations. Alternatively, depending on the situation, non-controlled access may be granted to the runway by ATS after coordinating with the aerodrome operator. In this case, a full runway inspection should be carried out before resuming normal operations.
- (g) The aerodrome operator may decide that if the runway is closed due to a planned interruption, positive control may be handed over to another authority, e.g., airside operations department, or non-controlled access may be granted to authorized users. The coordination of runway access permissions should be agreed to and documented.
- Note - Non-controlled access is considered to be a runway which is no longer under ATS control and which may be accessed by appropriately authorized personnel.**
- (h) The following list contains a chronological sequence of conditions which should be met and/or applied if runway operations are recommenced following a suspension or closure of runway operations:
- (i) remedial works should be completed, e.g. clearance of FOD, wildlife remains, aeronautical ground lighting repair, removal of disabled aircraft;
 - (ii) a runway inspection under the authorization of ATS is conducted;
 - (iii) all vehicles and personnel should have vacated the runway and should report vacated to the relevant authority;
 - (iv) runway availability is confirmed to ATS and, if applicable, positive control is returned to ATS;
 - (v) aerodrome operators should cancel the NOTAM (if published);
 - (vi) the ANSP should promulgate the availability of the runway using ATIS and radiotelephony (if applicable); and
 - (vii) normal operations may resume

2.7 RST administrative processes

2.7.1 Terms of Reference

- (a) To facilitate effective decision-making, organizations seeking to establish an RST should agree to a set of procedural rules governing the actions of their representatives. Once formally documented and accepted, these rules will be referred to as the “Terms of Reference” (ToR) of the RST.
- (b) Suggested ToR for the RST include:
 - (i) Objectives, scope of oversight, and expected frequency of RST meetings
 - (ii) Membership selection processes
 - (iii) Roles and responsibilities of individual RST members
 - (iv) Processes and formal agreements governing sharing of safety data, safety reports, and safety information as well as the protection of the sources of information shared within the RST (protection from inappropriate use and protection against disclosure)
 - (v) Consultation, decision-making and conflict resolution processes
 - (vi) Regularly review the airfield to ensure its adequacy and compliance with approved Aerodrome Manual, GCADs and ICAO SARPs.
 - (vii) Documentation and reporting requirements
 - (viii) Monitor runway incidents by type, severity and frequency of occurrence
 - (ix) Identify risk factors and local issues, particular locations where risk exist (e.g., hot spots), and problems in daily operations and suggest improvements.
 - (x) Solicit assistance by safety experts from within the industry
 - (xi) Contribute to active development of solutions to these issues
 - (xii) Ensure that the best possible solution is implemented
 - (xiii) Learn lessons from other incidents and consider the outcome of other investigation reports
 - (xiv) Disseminate information on developed solutions to stakeholders
 - (xv) Initiate a comprehensive safety-awareness campaign to ensure that all stakeholders’ staffs are aware of safety issues, such as producing and distributing local hot spot maps or other guidance material
 - (xvi) analyze the safety data relating to the number, type, and if available, severity of runway incursions;
 - (xvii) consider the outcome of investigation reports in order to identify local hot spots or problem areas at the aerodrome;
 - (xviii) work as a cohesive team to better understand the operating difficulties of personnel working in other areas and recommending areas for improvement;
 - (xix) ensure that recommendations for the prevention of runway incursions are implemented;
 - (xx) identify any local problem areas and suggest improvements;
 - (xxi) conduct runway safety awareness campaigns that focus on local issues, for example, producing and distributing local hot spot maps or other guidance materials as considered necessary; and
 - (xxii) regularly review the aerodrome and runway operations to proactively identify any situation that may contribute to runway safety risks.

2.7.2 Continuous improvement

- (a) All team members will monitor the RST activities for areas in need of improvement and/or failure to achieving the conditions set forth in the ToR. Additionally, the chairperson will schedule the following activities:

(i) Internal reviews

At least once every six months, the team will allocate time during a regularly scheduled meeting to discuss each item on the checklist found in Section 3 of this AC. Their responses will be recorded and maintained as part of the safety library for at least two years.

(ii) External reviews

At least once per calendar year, the RST documentation should be audited and at least one meeting observed by a member of the regulatory body or an agreed third-party. The results of this appraisal will be recorded and maintained as part of the safety library for a period described in the SMS of the aerodrome operator.

2.8 RST organizational structure

- (a) The organizational setup required for a RST depends on the number of participating members, their interaction and cooperation capabilities and any other local requirements. In any case, the initiator would normally be the aerodrome operator. This section provides basic concepts of leadership and administration sharing in order to assist the RST as necessary. It may vary depending on the size and setup of each team.
- (b) Irrespective of the final RST set up, the team will require the designation of leadership and administration. These tasks may be carried out by one or more members of the RST; e.g., one Chairperson and one Rapporteur.

2.8.1 The RST Chairperson

- (a) The Chairperson serves as the coordinator and spokesperson for the team. The nomination and role of the Chairperson can, for example, be organized on a rotational basis amongst all RST members. The roles and responsibilities of the nominated Chairperson may also include a variety of administrative and/or organizational aspects, such as:

(i) Meeting planning

The Chairperson schedules the meetings and arranges the venue. He/she gathers input from the members in the weeks prior to the meeting and distributes an agenda one week prior to the meeting date. Guidance on meeting planning is included in Appendix 1.

(ii) Meeting facilitation

The Chairperson ensures the meetings are conducted in a collaborative manner and in accordance with the ToR processes. He/she constantly strives to enhance the programme by regularly engaging in continuous improvement activities.

(iii) Maintaining the safety library

The Chairperson ensures the actions of the RST are properly documented and maintained in the RST safety library.

(iv) Coordinating with external agencies

The Chairperson serves as the point of contact with external agencies and ensures all RST activities are properly communicated to applicable agencies/organizations.

2.8.2 Role of RST members

(a) *Meeting planning*

RST members will submit items for discussion at the next scheduled meeting as soon as possible, but not later than the date requested by the Chairperson. Each member presenting during the meeting should prepare briefing material and invite subject matter experts as necessary to provide the other members with a clear understanding of the issue they wish to discuss. The members should tour the airport just prior to the meeting to familiarize themselves with the current situation and identify potential safety hazards.

Note - A tour of the airport during different times of the day and varying environmental conditions should be considered to allow identification of hazards specific to certain light and adverse weather conditions. The tour is for the identification of safety issues only and should not be used by any person external to the RST nor cause disruption to current operations.

(b) *Meeting participation*

RST members will openly share information and strive to achieve consensus during decision-making activities. They will constantly strive to enhance the programme by engaging in continuous improvement activities.

(c) *Contributing to the safety library*

RST members should contribute safety data & analysis, reports, and information from the safety management systems or other safety relevant sources of their participating organizations to the RST.

(d) *Coordinating with participating organizations*

RST members will communicate the findings and decisions of the RST within their respective organizations and ensure the recommendations are properly addressed.

2.8.3 Role of the GCAA

The RST is considered an activity of the SMS of the aerodrome operator, which coordinates safety issues from all the users of that aerodrome. Although the participation of the GCAA is not required, staff of the GCAA Aerodrome and Aerodrome Safety and Standards (ASAS) Section may attend RST meetings to advise on regulatory matters, participate in the information sharing activities, understand the current hazards and risks associated with local operations, and interface with other government agencies (e.g. land use authorities) on behalf of the RST when appropriate.

2.9 RST technical processes

2.9.1 Meetings

- (a) The RST meeting is the most important component of the programme as it is the forum in which hazards are discussed, consequences determined, risks assessed, priorities determined, and recommendations developed. This type of face-to-face interaction, leads to improved collaboration, problem-solving and risk management because the team members benefit from information sharing and the perspectives of representatives from other groups.

- (b) Given the RSTs operational focus, it should include representatives from the following groups:
- (i) aerodrome operators;
 - (ii) air navigation services provider (ANSP);
 - (iii) commercial air operators;
 - (iv) representatives of flight crew familiar with the aerodrome;
 - (v) members from the general aviation community (if applicable);
 - (vi) technical experts of controller associations; and
 - (vii) technical experts of pilots' associations.
- (c) The team may also include:
- (i) the regulatory authority (as an observer)
 - (ii) technical experts of controller and pilots' associations;
 - (iii) military operator (if applicable, based on joint use of the airport or other military roles);
 - (iv) Support services (catering, ground handling, etc.);
 - (v) emergency response service providers;
 - (vi) Subject matter experts (meteorologists, ornithologists, States Appropriate Accident Investigation Authority etc.) (upon invitation); and
 - (vii) Consideration may be given to periodically inviting members of other RSTs to enable sharing of information and learning.
- (d) In addition to the normal RST members, service providers operating at the aerodrome may participate in the RST process to address operational hazards identified by their internal SMS. In this regard, the service providers will interface with the RST as needed to address the specify concern.

Note - Refer to Appendix 2 of this AC, for a sample Runway Safety Team meeting agenda.

2.9.2 Hazards and associated consequences

- (a) Once the team members are identified, the Chairperson selected, and the ToR and schedule are agreed to, the real work of the RST begins with the hazard identification process. It is anticipated that each member will come to the meeting prepared to brief on the hazards related to runway safety, as identified through their respective SMS or other aviation safety relevant systems (arising mostly from safety reporting, investigation and audit activities). Hazards identified through the SMS of service providers who may not be participating in person at the meeting should be presented for evaluation.

Note - Guidance material on hazard identification is available in ICAO Doc 9859.

- (b) In addition to the hazard reporting systems of the member organizations, the RST should also conduct periodic visits to various airport locations (i.e., tower facility, construction areas, taxiway intersections, etc.) and solicit input especially from organizations without formal representation at the meeting. These may include corporate operators, flight schools, industry organizations, ground services and others. By casting a wide net, the RST will develop a deeper understanding of the operational complexity associated with the airport environment and, therefore, be better able to identify hazards and determine operational risks.

- (c) As the team discusses the destructive potential of the hazard, it is important to keep in mind that these “consequences” should be framed in realistic operational outcomes, as opposed to extremely remote and unlikely outcomes. A useful technique is to identify the top-level (or generic) hazard, then to list the related specific hazards and associated consequences. For example, a generic hazard category might be “airport construction.” The specific hazards associated with a construction project at the airport might be “the presence of construction equipment” and “the closure of taxiways.” These, in turn, may result in the RST identifying the potential consequences of these specific hazards as “an aircraft colliding with the construction equipment” and “an aircraft taxiing onto a closed taxiway.” By correctly identifying (and documenting) the hazard and defining the associated consequences in operational terms, the RST can assess the safety risk.
- (d) Hazardous conditions can sometimes combine, resulting in an even greater severity and/or probability of outcome. For example, the hazards associated with airport construction, coupled with the hazards of low visibility and night operations, may result in a greater risk than just the airport construction hazard alone (in this situation, the probability of the risk would likely be increased).

2.9.3 Safety risk assessment

- (a) The reason for conducting safety risk assessments is to provide the RST with a method for appropriately managing the risks of identified hazards, developing effective risk mitigation strategies, and prioritizing their workflow. Given that time and financial resources are limited, the following process allows the RST to efficiently determine which areas require its immediate attention to reduce the runway safety risk to As Low As Reasonably Practicable (ALARP).
- (b) The process of runway safety risk assessment and management should be in line with the guidance available in ICAO Doc 9859. Once the hazards have been identified by the RST, the objective is for the airport operator to make a determination of the safety risk severity in the context of the local system, accounting for current deficiencies and mitigations in place at the time. This information should then be used to categorize the safety risk severity using predefined guidance in AC 14-030 and ICAO Doc 9859.
- (c) Based on the event that would be the worst consequence, the next step is to evaluate the relative probability (or likelihood) of that event occurring in the specific operational environment, after taking into account the current deficiencies and risk mitigation strategies in place. The team should consult associated safety and hazard report databases, incident & accident investigation reports, flight data monitoring and analysis, operational audit data and other historical sources to determine the likelihood of the identified consequence occurring.
- (d) The last step in the assessment process is to ensure that the resulting level of safety risk is acceptable.
- (e) One of the advantages of using the RST to conduct the risk assessment is that all stakeholders have been involved in the risk assessment process, thus ensuring that the worst outcome and appropriate probability have been evaluated.

2.9.4 Developing recommendations and action plan

Following the safety risk assessment, the RST should develop specific recommendations to reduce the risk, and an action plan to ensure the recommendations are implemented. In doing so, the following concepts should be considered:

- (a) *Prioritization*

The RST should ensure their solutions are prioritized according to the “safety risk tolerability” assessment. For example, if they determine that “the operation may continue” with the assessed level of safety risk, their recommendations should reflect a strategy where improvements are implemented as resources become available. Conversely, if they determine “the operation may continue with mitigation,” their recommendations should reflect a strategy requiring immediate action(s) to address the consequences of the hazard. Thus, time frames for completing the actions must be commensurate with the risk levels involved.

(b) *Control strategies*

Safety risk is controlled by addressing either:

- (i) the probability of the consequences occurring.
- (ii) the severity level of the consequences; or
- (iii) both simultaneously.

Key approaches to controlling safety risk include:

- (1) **Avoidance:** The operation or activity is cancelled because the safety risk exceeds the benefit of continuing the operation or activity.
- (2) **Reduction:** The frequency of the operation or activity is reduced, or action is taken to reduce the severity of the consequences of the risks.
- (3) **Segregation:** Action is taken to isolate the effects of the consequences of the hazard or build in redundancy to protect against them.

(c) *Evaluating alternative solutions*

- (i) During the process, the RST should explore several strategies for controlling safety risks. These strategies should be evaluated against one another to find the most effective and efficient solution using objective and subjective measures. These measures may include criteria such as conducting a cost/benefit analysis, determining the enforceability of the proposal, assessing the acceptability to the affected stakeholder, and others. In all cases, however, the RST must conduct a risk assessment of their proposed solution and evaluate any potential hazards created by their strategy.
- (ii) However, just because a solution is easy to implement, cost effective and acceptable to all stakeholders, it does not mean that it will reduce the risk level. The effectiveness of the strategy in reducing the risk is measured by the residual or remaining risk once the strategy has been activated. A risk assessment should determine if the remaining (residual) risk is acceptable, or if more solutions and mitigations are required.

(d) *Notification to Affected Stakeholder*

- (i) If the RST determines that either a mitigation strategy is required or part of the operation should be modified or suspended, it should make a formal recommendation to the organization responsible for that part of the operation and include the rationale and risk assessment.
- (ii) A summary of the entire process should include a master register of the hazards identified, current controls and deficiencies, risk analysis and outcome, additional controls and mitigations, action plan for implementation (owner and timelines), and residual risk. Appendix 3 of this AC contains the RSM Form, which can serve as the tool to accomplish the recording of hazard and associated mitigation processes.

2.9.5 Record keeping - data sharing

- (a) Proper and structured record keeping of observed and identified hazards, safety events and corrective actions allow for trend analysis. The RST should identify a gate keeper who is responsible for the maintenance of the data base and can present reports and analysis upon request of the RST members.
- (b) Data exchange and sharing amongst RST members enhances the effectiveness of the RST. RSTs from different airports are encouraged to set a protocol in place that could allow for data sharing across various locations and will support the teams in identifying proper mitigation strategies.

3 RUNWAY SAFETY TEAM SET-UP CHECKLIST

3.1 Instructions

- (a) The following checklist is provided to assist both existing and new RSTs in determining if gaps exist in their programme, or if improvements can be made. Although not intended to be an exhaustive list, the items on the checklist are designed to identify gaps in the system that would hinder the RST from achieving their goal of improving runway safety.
- (b) Five main areas are included in the checklist:
 - (i) Terms of Reference.
 - (ii) Hazard identification.
 - (iii) Safety Risk Management.
 - (iv) Communication; and
 - (v) Continuous improvement
- (c) A negative response to any of the associated question indicates an area that should receive attention by all members of the RST (and the organizations they represent) until the gap is filled.

3.2 Checklist

Item	Question	Response	Comments
1. Terms of Reference (ToR)			
1.1	Is there a ToR agreement in place?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1.2	Does the ToR define the scope of work of the RST?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1.3	Does the ToR define the roles for members of the RST?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1.4	Does the ToR define a process for handling data/reports received from the participating organizations?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1.5	Does the ToR describe the decision-making process to be used by the RST?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1.6	Does the ToR define a process for resolving disagreements between RST members?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2. Hazard identification			
2.1	Does the RST have a formal safety data collection and processing system for documenting operational hazards?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2.2	Do all RST members contribute to the formal safety data collection and processing system by sharing identified operational hazards?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2.3	Does the RST define and document specific consequences for the operational hazards?	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Item	Question	Response	Comments
3. Safety Risk Management			
3.1	Does the RST have a formal process to manage the operational risk?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3.2	As part of the risk management process, are the consequences of the operational hazards assessed in terms of probability and severity?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3.3	Is there a formalized process to determine the level of risk the RST is willing to accept?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3.4	Does the RST develop risk mitigation strategies to control the level of risk within the operational environment?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3.5	Is there a formalized process for the RST to make recommendations to applicable stakeholders?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3.6	Is there a formalized process to document the decisions made by the RST during the risk management process?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3.7	Are the decisions made by the RST periodically reviewed to determine if the desired effect was achieved by their mitigations/recommendations?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4. Communication			
4.1	Does the RST have a formal process to communicate with applicable stakeholders?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4.2	Does the RST periodically provide runway safety material to key frontline employees?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4.3	Does the RST participate in information sharing activities with other RSTs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4.4	Does the RST solicit safety-related information from all airport users via common links embedded within websites of the RST participating organizations?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5. Continuous improvement			
5.1	Does the RST have a formal process to continuously improve their processes & products?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5.2	Does the RST engage in formal, periodic reviews of their programme to ensure they are improving runway safety?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5.3	Are the results of the continuous improvement programme documented?	<input type="checkbox"/> Yes <input type="checkbox"/> No	

APPENDIX 1 - RST MEETING ORGANIZER TOOL (EXAMPLE)

1 Schedule meeting

- (a) Date
- (b) Time
- (c) Location

2 Determine invitees

- (a) aerodrome operators.
- (b) air traffic services.
- (c) commercial air operators.
- (d) representatives of flight crew familiar with the aerodrome.
- (e) members from the general aviation community (if applicable);
- (f) technical experts of controller associations; and
- (g) technical experts of pilots' associations.

The team may also include:

- (a) The Ghana Civil Aviation Authority.
- (b) military operator (if applicable, based on joint use of the airport or other military roles);
- (c) support services (de-icing, catering, ground handling, etc.);
- (d) emergency response service providers.
- (e) subject matter experts (meteorologists, ornithologists, the Appropriate Accident/Incident Investigation Authority (upon invitation); and
- (f) consideration may be given to periodically inviting members of other RSTs to enable sharing of information and learning.

3 Plan Discussion Topics

- (a) Three weeks prior to the meeting date:
 - (i) Notify stakeholders of the meeting date, time, and location.
 - (ii) Solicit input for agenda items from each of the members.
- (b) Two weeks prior to the meeting date:
 - (i) Schedule airport tours (as required).
 - (ii) Send tentative agenda to the team.
- (c) One week prior to the meeting date:
 - (i) Consolidate updates and information received from members.
 - (ii) Distribute the final agenda and supporting documents to the team.

4 Meeting Logistics

- (a) Confirm availability of members
- (b) Schedule meeting room appropriate for the size and requirements of the RST
- (c) Coordinate airfield tour with airport management, tower, etc., including vehicle and escort availability.

APPENDIX 2 - RUNWAY SAFETY TEAM MEETING AGENDA (EXAMPLE)

1 Meeting information

- (a) Date
- (b) Time
- (c) Location

2 Members and guests in attendance

- (a) aerodrome operators.
- (b) air traffic services.
- (c) commercial air operators.
- (d) representatives of flight crew familiar with the aerodrome.
- (e) members from the general aviation community (if applicable);
- (f) technical experts of controller associations; and
- (g) technical experts of pilot's associations.

The team may also include:

- (a) The Ghana Civil Aviation Authority.
- (b) military operator (if applicable, based on joint use of the airport or other military roles);
- (c) support services (de-icing, catering, ground handling, etc.);
- (d) emergency response service providers.
- (e) subject matter experts (meteorologists, ornithologists, the Appropriate Accident/Incident Investigation Authority (upon invitation); and
- (f) consideration may be given to periodically inviting members of other RSTs to enable sharing of information and learning.

3 Previous business [Review the status of previous action items and update the Action log as appropriate]

4 New business [Members present new projects, hazards, or events identified within their safety management systems. The team then: (a) defines the hazards, (b) conducts safety risk assessments, and (c) proposes recommendations for managing the safety risk]

5 Action log [Document findings and action plan]

6 Next meeting [Agree to the date, time, and location for the next meeting]

Note - Airport tour [the intent of the airport tour should be to identify existing and new hazards as well as to observe rectification measures that have been implemented based on previous findings. The most suitable time for the tour, if conditions permit, is between Agenda Item 3 and 4.

APPENDIX 3 - RUNWAY SAFETY MANAGEMENT FORM

Runway Safety Management Form																																											
Reference:	Date Opened dd/mm/yy	Date Closed dd/mm/yy																																									
General Information																																											
Airport:	What area is affected: <input type="checkbox"/> runway <input type="checkbox"/> taxiway <input type="checkbox"/> ramp <input type="checkbox"/> general																																										
Specific Identifier (runway/taxiway identifier):																																											
Safety Outcomes																																											
Safety Risk Type:	<input type="checkbox"/> Runway Excursion	<input type="checkbox"/> Runway Incursion - Aircraft																																									
	<input type="checkbox"/> Abnormal Landing	<input type="checkbox"/> Runway Incursion - Vehicle																																									
	<input type="checkbox"/> Wildlife Encounter	<input type="checkbox"/> Runway Confusion																																									
	<input type="checkbox"/> Birdstrike	<input type="checkbox"/> Other (Specify)																																									
Has an event occurred, or is this a hazard (potential outcome):	<input type="checkbox"/> actual outcome (event occurred)	occurrence date dd/mm/yy																																									
	<input type="checkbox"/> potential outcome (no event occurred)																																										
Description of actual or potential outcome																																											
Supporting Document Type: <input type="checkbox"/> Accident Report <input type="checkbox"/> Incident Report <input type="checkbox"/> Audit Report <input type="checkbox"/> Other (Specify)																																											
Safety Issues																																											
<input type="checkbox"/> Navigation Aids	<input type="checkbox"/> Meteorological	<input type="checkbox"/> Approach Vectoring																																									
<input type="checkbox"/> Runway/Taxiway Marking	<input type="checkbox"/> Obstacles	<input type="checkbox"/> Runway Surface Condition																																									
<input type="checkbox"/> VASI / PAPI	<input type="checkbox"/> Approach lights	<input type="checkbox"/> Airport Construction																																									
<input type="checkbox"/> Communications	<input type="checkbox"/> Runway/Taxiway Lights	<input type="checkbox"/> Procedures																																									
<p><i>Once you have completed the identification of the safety issues - please submit the form to log this report.</i></p> <p><i>During the runway safety team meeting you should address each of the reports as an item on the agenda.</i></p> <p><i>The following sections are provided as a tool to manage the outcomes of the meeting.</i></p>																																											
Risk Assessment																																											
(The risk assessment portion is to be completed as part of the runway safety team meeting)																																											
What is the Severity of occurrence:	<input type="checkbox"/> Catastrophic <input type="checkbox"/> Hazardous <input type="checkbox"/> Major <input type="checkbox"/> Minor <input type="checkbox"/> Negligable																																										
What is the Likelihood of occurrence:	<input type="checkbox"/> Frequent <input type="checkbox"/> Occasional <input type="checkbox"/> Remote <input type="checkbox"/> Improbable <input type="checkbox"/> Extremely Improbable																																										
Risk Level (from below risk table):	<input type="checkbox"/> High <input type="checkbox"/> Moderate <input type="checkbox"/> Low																																										
<i>If the risk level is Moderate or High, a corrective action plan is required</i>																																											
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2" style="writing-mode: vertical-rl; transform: rotate(180deg);">Severity</th> <th colspan="5">Likelihood</th> </tr> <tr> <th>Certain / Frequent</th> <th>Likely / Occasional</th> <th>Possible / Remote</th> <th>Unlikely / Improbable</th> <th>Exceptional / Impossible</th> </tr> </thead> <tbody> <tr> <td>Catastrophic</td> <td style="background-color: red;">High</td> <td style="background-color: red;">High</td> <td style="background-color: red;">High</td> <td style="background-color: yellow;">Moderate</td> <td style="background-color: yellow;">Moderate</td> </tr> <tr> <td>Major</td> <td style="background-color: red;">High</td> <td style="background-color: red;">High</td> <td style="background-color: yellow;">Moderate</td> <td style="background-color: yellow;">Moderate</td> <td style="background-color: yellow;">Moderate</td> </tr> <tr> <td>Moderate</td> <td style="background-color: red;">High</td> <td style="background-color: yellow;">Moderate</td> <td style="background-color: yellow;">Moderate</td> <td style="background-color: yellow;">Moderate</td> <td style="background-color: green;">Low</td> </tr> <tr> <td>Minor</td> <td style="background-color: yellow;">Moderate</td> <td style="background-color: yellow;">Moderate</td> <td style="background-color: yellow;">Moderate</td> <td style="background-color: green;">Low</td> <td style="background-color: green;">Low</td> </tr> <tr> <td>Insignificant</td> <td style="background-color: green;">Low</td> </tr> </tbody> </table>			Severity	Likelihood					Certain / Frequent	Likely / Occasional	Possible / Remote	Unlikely / Improbable	Exceptional / Impossible	Catastrophic	High	High	High	Moderate	Moderate	Major	High	High	Moderate	Moderate	Moderate	Moderate	High	Moderate	Moderate	Moderate	Low	Minor	Moderate	Moderate	Moderate	Low	Low	Insignificant	Low	Low	Low	Low	Low
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Action Plan Description:																																											
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APPENDIX 4 - GUIDE FOR “HOT SPOTS” IDENTIFICATION, REMOVAL AND PROMULGATION.

- (a) Aerodrome operators, air navigation services providers (ANSPs) and other key stakeholders should be especially aware of locations on an aerodrome with a history of, or potential risk for, collisions or runway incursions. Additionally, hot spots may be locations that, although fully compliant, are potentially difficult to navigate due to awkward geometry, or where additional awareness is required, such as at runway crossing locations.
- (b) Ideally, the runway safety team (RST) will ensure that hot spots do not exist. To achieve this objective, aerodrome operators, in conjunction with the RST, should conduct an assessment to determine whether any hot spot currently exists on the aerodrome. The assessment should also address the potential for air traffic procedures (particularly acknowledging runway incursion causal factors, such as the use of conditional clearances and non-standard communications) and other aerodrome operating procedures to create any hot spots. Human factors should also be given due consideration in any hot spot assessment.
- (c) If hot spots are identified, the recommended strategy should be implemented to remove the hazard and, where this is not immediately possible, manage and mitigate the risk. These strategies may include:
 - (i) Construction of new taxiways;
 - (ii) Additional visual aids (signs, markings, lights);
 - (iii) Use of alternative routings;
 - (iv) Mitigating against blind spots in the aerodrome control tower;
 - (v) Awareness campaigns; and
 - (vi) Publishing the hot spot in the AIP.
- (d) 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.
- (e) A new hot spot may occur as a result of a change to the movement area or an operating procedure. An assessment should therefore be conducted before the start of any work, such as new pavement layout on the manoeuvring area, or the introduction of a new or revised operating procedure, to prevent the inadvertent creation of new hot spots.
- (f) The assessment described above should be repeated periodically to ensure its validity and take into account current aerodrome operating practices and design.
- (g) Where the measures to mitigate or remove an identified hot spot will be a lengthy process, or if it is considered that the publication of a hot spot would benefit pilot awareness, the hot spot should be notified by an appropriate means to air traffic services personnel and pilots using the aerodrome. However, if a hot spot is likely to exist for more than one aeronautical information regulation and control (AIRAC) publication cycle, it should be notified on the aerodrome chart in the AIP, as specified in GCAD Part 21 - Aeronautical Charts.