



Runway Safety Team Handbook

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International Civil Aviation Organization

AMENDMENTS

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1. INTRODUCTION TO THE HANDBOOK

1.1 Background

ICAO Assembly resolution A37-6 urged States to enhance runway safety. ICAO promotes and supports the establishment and enhancement of multi-disciplinary Runway Safety Teams at aerodromes. The ICAO Runway Safety Programme (RSP) promotes the establishment of Runway Safety Teams (RSTs) at airports as an effective means to reduce runway related accidents and serious incidents. The requirement for airports to establish a Runway Safety Team (RST) is one of the main outcomes of the ICAO Global Runway Safety Symposium held in Montreal, Canada, in May 2011.

RSTs have proven highly successful at mitigating the risks of runway incursions and excursions, providing a collaborative solution which regulators, air navigation service providers, airline and airport operators have all positively contributed to. The creation of Runway Safety Teams (RSTs) to prevent and mitigate the effects of runway occurrences are also addressed in ICAO Doc 9870 - *Manual on the Prevention of Runway Incursions*. The correct establishment of local RSTs at individual aerodromes is key to the development and implementation of an effective action plan for runway safety and recommend strategies for hazard removal and mitigation of residual risks.

1.2 Purpose of the Handbook

This *Handbook* is designed to:

- a) describe the components of an effective Runway Safety Team (RST);
- b) serve as a single reference for RST activities; and
- c) promote the sharing and exchange of safety information between stakeholders.

1.3 Scope of the Handbook

A successful RST requires all key stakeholders to cooperate in a collaborative manner. This document, therefore, is intended to serve as a reference for aerodrome operators, air traffic services organizations, commercial air operators, organizations representing the general aviation community, the regulatory authority, meteorological services and other stakeholders interested in improving runway safety.

1.4 How to use the Handbook

Section 3 supports the development of a general understanding of the processes involved in operating an effective Runway Safety Team and offers guidance in developing a “Terms of Reference” document.

Section 4 contains guidance material in assisting the verification of minimum requirements for an operating Runway Safety Team.

Appendix E offers a comprehensive listing of literature and tools reflecting the multidisciplinary approach of Runway Safety Teams by incorporating documents and information material from a variety of stakeholders. To support this non-exhaustive listing, ICAO has developed an iKit containing available Runway Safety Products.

2. 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 defences 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. 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.

Note: This definition is based on ICAO Doc 9870 – Manual on the Prevention of Runway Safety Incursions, but takes into consideration evolving concepts resulting from recent work of the ICAO Runway Safety Program. It therefore slightly improves the original definition without contradicting but rather clarifying it for the purposes of this document. It may or may not be eventually harmonized in other publications, based on feedback on its use. For easy identification, the differences are between square brackets.

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 probability. The likelihood or frequency that a safety consequence or outcome might occur.

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.

3. RUNWAY SAFETY TEAM (RST)

3.1 Goals and general description of the RST Programme

The primary role of a runway safety team is to 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.

The RST should implement an 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.

Although not considered a regulatory authority or intended to replace any required component of a Safety Management System (SMS), the RST is aimed 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. 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.

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.

The RST is built on the principles of a formal Hazard Identification and Risk Management (HIRM) process, in accordance with ICAO Annex 19 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 SMS's with differing HIRM processes.

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

- Abnormal runway contact;
- Bird strike;
- Ground collision;
- Ground handling;
- Runway excursion;
- Runway incursion;
- Loss of control on ground;
- Collision with obstacle(s);
- Undershoot / overshoot, aerodrome
- Use of the wrong runway (runway confusion)
- High Speed Rejected Take-Off
- Wildlife Event
- Damage from Foreign Object Debris (FOD)

ICAO Doc 9870 – *Manual on the Prevention of Runway Safety Incursions*, provides specific guidance on the establishment and objectives of a runway incursion programme.

3.2 RST administrative processes

3.2.1 Terms of Reference

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.

Suggested ToRs for the RST include:

- Objectives, scope of oversight, and expected frequency of RST meetings
- Membership selection processes
- Roles and responsibilities of individual RST members
- 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)
- Consultation, decision-making and conflict resolution processes
- Regularly review the airfield to ensure its adequacy and compliance with ICAO SARPs
- Ensure that the recommendations contained in the ICAO Doc 9870 - *Manual on the Prevention of Runway Incursions* are implemented
- Documentation and reporting requirements
- Monitor runway incidents by type, severity and frequency of occurrence
- Identify risk factors and local issues, particular locations where risk exist (e.g., hot spots), and problems in daily operations and suggest improvements
- Solicit assistance by safety experts from within the industry
- Contribute to active development of solutions to these issues
- Ensure that the best possible solution is implemented
- Learn lessons from other incidents and consider the outcome of other investigation reports
- Disseminate information on developed solutions to stakeholders
- 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

3.2.2 Continuous improvement

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:

a) *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 5*. Their responses will be recorded and maintained as part of the safety library for at least two years.

b) *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..

3.3 RST organizational structure

The organizational setup required for an 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 provide basic concepts of leadership and administration sharing in order to assist RST as necessary. It may vary depending on the size and setup of each team.

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.

3.3.1 The RST Chairperson

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:

a) *Meeting planning*

The Chairperson schedules the meetings and arranges the venue. He or 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 A.

b) *Meeting facilitation*

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

c) *Maintaining the safety library*

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

d) *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.

3.3.2 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.

3.3.3 Role of the regulator

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 their participation is not required, ICAO encourages members of the regulatory authority to 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.

3.4 RST technical processes

3.4.1 Meetings

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.

Given the RSTs operational focus, it should include representatives from the following groups:

- 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 regulatory 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, accident investigation authority, etc.) (upon invitation); and
- f) consideration may be given to periodically inviting members of other RSTs to enable sharing of information and learning.

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 specific concern.

Note. — Refer to Appendix E for a sample Runway Safety Team meeting agenda.

3.4.2 Hazards and associated consequences

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. Guidance material on hazard identification is available through ICAO Doc 9859.

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.

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 is able to assess the safety risk.

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).

3.4.3 Safety risk assessment

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).

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 defences and mitigations in place at the time. This information should then be used to categorize the safety risk severity using predefined guidance in ICAO Doc 9859.

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 defences 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.

The last step in the assessment process is to ensure that the resulting level of safety risk is acceptable.

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.

3.4.4 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:

1. the probability of the consequences occurring;
2. the severity level of the consequences; or
3. 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*

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.

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*

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.

A summary of the entire process should include a master register of the hazards identified, current controls and defences, risk analysis and outcome, additional controls and mitigations, action plan for implementation (owner and timelines), and residual risk. Appendix C contains the RSM Form, which can serve as the tool to accomplish the recording of hazard and associated mitigation processes.

3.4.5 Record keeping – data sharing

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.

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.

4. RUNWAY SAFETY GO-TEAMS

4.1 Introduction to the methodology

The objective of a RS Go-Team is to assist a State and airport in establishing an RST, supporting the implementation stage by providing technical assistance, including training, assessments and gap analysis, expert advice and guidance based on best practices.

Runway Safety is a global safety priority. The use of coordinated and regionally deployed RS Go-Teams allows the use of existing expertise to foster the establishment and operation of RSTs.

The work of the RST, once established, will be supported by the ICAO Regional Office and the associated Regional Aviation Safety Group (RASG), which support implementation efforts related to the regional safety priorities and targets and the ICAO Global Aviation Safety Plan.

A RS Go-Team will be established based on a recommendation from the RASG, proposal by ICAO, or a request received from a State or airport to ICAO. Runway Safety Programme partner organizations will be informed of RS Go-Team plans and invited to participate.

When ICAO receives a request for a RS Go-Team from an airport, it will coordinate with ACI, particularly in relation to the Airport Excellence (APEX) in Safety programme to ensure the necessary coordination to avoid any potential duplication of activities. The ACI APEX in Safety programme is designed to help airports identify and mitigate aviation safety vulnerabilities through peer review missions, education, mentoring and best practice guidance. These peer review missions involve 1 – 2 weeks on site depending on the complexity of the airport being visited. The visit team, which usually includes an ICAO member, works with the host airport to cover airside operations on the runways, taxiways and aprons, infrastructure including lights, markings, signage, Rescue and Fire Fighting as well as reviewing documentation and systems such as Safety Management. The output of the APEX review is a report containing recommendations, mitigation strategies and relationships with industry resources that can be called upon to provide assistance.

It is important to note that while the APEX team will address Runway Safety and Runway Safety teams, the team will focus on ensuring that a team is in place following ICAO and ACI best practice, or if not, create the framework to facilitate its creation to improve operational safety. The ICAO Runway Safety Programme Go-Team missions are built upon a complementary model, however, the focus is primarily limited in scope to Runway Safety, involving 4 days on site depending on the existence and maturity of a Runway Safety Team at, and needs of, the airport being visited. ICAO and ACI will coordinate on the complementary programmes to ensure there is synergy and no duplication in activities between the two programmes at any airport being considered for both an APEX safety review and RS Go-Team.

4.2 RS Go-Team mission phases

The RS Go-Team mission can be divided into the following phases:

Preparation

The coordination of the Go-Team preparation will be led by the ICAO Regional Office.

Phase I – Selection of candidate State and airport (at least twelve weeks prior to the mission)

Key actions and considerations:

- Criteria for the selection: State or airport request; USOAP audit results (e.g., non-existence of an RST); outcome from RASG activities (e.g., regional concerns based

on data and reports), identified runway safety hazards/risks; high number of runway safety incidents/accidents; traffic volume, aerodrome layout complexity, proposal by a safety stakeholder/partner, etc.

- Go-Team Pre-planning: Details of the eventual Go-Team members and mission to be communicated well in advance to interested parties: airport, State and partners, meetings, mission date, time, and location

Phase II – Data collection

Data to be collected and assessed before a mission is arranged:

- Identification of potential stakeholders (local and international expertise available). See Appendix D - *List of national/local agencies at an airport expected to participate in an RS Go-Team mission*
- Existing safety data and information on existing local runway safety initiatives and related implementation plans
- Capture available airport-specific data (surface events, LOAs/SOPs, training programmers, etc.)
- Request detailed information on hazards and risks, knowledge and experience on the airport, hot spots (request ATC Officers to update a list of every instance of wrong turns, requests for amplified taxi instructions, vehicles in the wrong place, etc.)
- Communications with relevant partners
- Send the received information and data to the Go-Team members as far in advance as possible

Phase III – Coordination (at least three weeks before the mission)

Coordination with State and RS Go-Team members, including logistics. Mechanisms for an effective and efficient RS Go-Team mission include:

- Identification of focal points of contact among partners
- Teleconferences
- RS Go-Team Agreement (see Attachment A)
- Proposed dates
- Team logistics: tickets, hotels, meeting rooms, transportation, visas, etc.
- Roles and responsibilities
- Expected outcomes: Report, detailed implementation plan, follow-up
- PowerPoint presentations should be previously coordinated to avoid duplication of information and ensure focus on the RST's activities and expected outcomes. One presentation per topic, which can combine particular approaches from different organizations.
- Agree on agenda for the RS Go-Team
- Schedule and coordinate airport visit

At least one week prior to the RS Go-Team mission:

- Consolidate updates and information received from the team members and industry stakeholders.
- Distribute the final agenda and supporting documents to the team and the interested stakeholders (Airport, State, etc.)

On-site activities (suggested: 4 days)

The Go-Team will focus on establishing an effective RST, ensuring that its members clearly understand what they should do and how to do it, based on their roles and responsibilities. Activities will be, to the maximum extent possible, in accordance with the procedures detailed in the ICAO RST Handbook and references in the ICAO Runway Safety i-Kit.

Phase IV – RS Go-Team deployment (See Appendix E)

- Two days preparation briefing (knowledge transfer and sharing of best practices): Day 1- RS Go-Team on-site coordination and agreement; training, detailed data, hazard identification and risk mitigation strategies, action plan, reporting, sharing and use of safety information, stakeholders; Day 2- RST Terms of reference, which will include accountability, roles, duties and responsibilities.
- Two-day airport visit and One-day debriefing (following local RST framework and proceedings): Day 1- Go-Team, visit to the airport and relevant facilities, installations and equipment; Day 2-Go-Team review of airport operations and procedures, identification of hazards, reporting system and planned risk assessment; Day 3- Agreement on actions to be taken, responsibilities, de-briefing.

Phase V – Report, Action Plan and Recommendations (responsible: local RST)

Prepare a technical report, including observations and recommended mitigation actions, as well as other recommendations as may be required:

- Contents
- Hazards and risk mitigation proposals
- Areas of improvement and recommendations
- Expected outcomes
- Identified Hot Spots
- Recommendations and plan for action, including:
 - prioritized actions and associated timelines
 - Timeframe for the resolution of identified safety issues
 - Resource planning
 - Funds
 - Responsibilities
 - Potential barriers for the establishment and proper functioning of the RST
 - Stakeholder Management Plan

Implementation and follow-up

Phase VI – Implementation (responsible: RST)

- RST meetings (frequency, format, agenda, chairmanship, quorum, etc.)
- Resolution of identified safety issues

Phase VII – Follow-up

Continuous monitoring of progress will be done by the ICAO Regional Office within the RASG framework as reported by the State, considering:

- Action plan
- Baseline measurement: comparison between pre- and post-implementation of safety improvements

- Annual performance measurement of the operational benefits achieved to be included in the Regional Annual Safety Report
- Possible future Follow-up Go-Team missions

5. RUNWAY SAFETY TEAM SET-UP CHECKLIST

5.1 Instructions

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.

Five main areas are included in the checklist:

- 1) Terms of Reference;
- 2) Hazard identification;
- 3) Safety Risk Management;
- 4) Communication; and
- 5) Continuous improvement.

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.

5.2 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 A — RST MEETING ORGANIZER TOOL (EXAMPLE)

1. Schedule meeting

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

2. Determine invitees

- aerodrome operators;
- air traffic services;
- commercial air operators;
- representatives of flight crew familiar with the aerodrome;
- members from the general aviation community (if applicable);
- technical experts of controller associations; and
- technical experts of pilots associations.

The team may also include:

- the regulatory authority;
- military operator (if applicable, based on joint use of the airport or other military roles);
- support services (de-icing, catering, ground handling, etc.);
- emergency response service providers;
- subject matter experts (meteorologists, ornithologists, accident investigation authority, etc.) (upon invitation); and
- 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:
 - Notify stakeholders of the meeting date, time, and location.
 - Solicit input for agenda items from each of the members.
- b) Two weeks prior to the meeting date:
 - Schedule airport tours (as required).
 - Send tentative agenda to the team.
- c) One week prior to the meeting date:
 - Consolidate updates and information received from members.
 - 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 B — RUNWAY SAFETY TEAM MEETING AGENDA (EXAMPLE)

1. Meeting information

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

2. Members and guests in attendance

- aerodrome operators;
- air traffic services;
- commercial air operators;
- representatives of flight crew familiar with the aerodrome;
- members from the general aviation community (if applicable);
- technical experts of controller associations; and
- technical experts of pilots associations.

The team may also include:

- the regulatory authority;
- military operator (if applicable, based on joint use of the airport or other military roles);
- support services (de-icing, catering, ground handling, etc.);
- emergency response service providers;
- subject matter experts (meteorologists, ornithologists, accident investigation authority, etc.) (upon invitation); and
- 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 [refer to 3.3.3 – the intent of the airport tour is 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 C — 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"/> Abnormal Landing	<input type="checkbox"/> Runway Incursion - Aircraft <input type="checkbox"/> Runway Incursion - Vehicle	<input type="checkbox"/> Wildlife Encounter <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) <input type="checkbox"/> potential outcome (no event occurred)		occurrence date dd/mm/yy			
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"/> Other			
<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>Once you have completed the identification of the safety issues - please submit the form to log this report.</p> <p>During the runway safety team meeting you should address each of the reports as an item on the agenda.</p> <p>The following sections are provided as a tool to manage the outcomes of the meeting.</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"/> Negligible					
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					
If the risk level is Moderate or High, a corrective action plan is required						
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	
Corrective Action Plan						
(The corrective action plan is based on the recommendations of the Runway Safety Team and is to be completed as part of the Runway Safety Team meeting)						
Action Plan Description:						
Action Item Description:						
Executing Body:		Implementation date: dd/mm/yy		Status:		
Action Plan Description:						
Action Item Description:						
Executing Body:		Implementation date: dd/mm/yy		Status:		

APPENDIX D – LIST OF NATIONAL/LOCAL AGENCIES AT AN AIRPORT EXPECTED TO PARTICIPATE IN AN RS GO-TEAM MISSION

The RS Go-Team mission activities should include the participation of representatives from the following as applicable to runway safety (users of the manoeuvring area) at the airport and as needed for the Go-Team mission objectives, expected to be the same as the existing and planned members of the airport Runway Safety Team (RST). The participants are to be invited by the RST chair and/or airport operator.

- aerodrome operators;
- air traffic services;
- commercial air operators;
- representatives of flight crew familiar with the aerodrome;
- members from the general aviation community (if applicable);
- technical experts of controller associations; and
- technical experts of pilots associations.

The team may also include:

- the regulatory authority;
- military operator (if applicable, based on joint use of the airport or other military roles);
- support services (de-icing, catering, ground handling, etc.);
- emergency response service providers;
- subject matter experts (meteorologists, ornithologists, accident investigation authority, etc.) (upon invitation); and
- consideration may be given to periodically inviting members of other RSTs to enable sharing of information and learning.

Consideration should be given to periodically inviting members of other airport RSTs to enable sharing of information and lessons learned.

APPENDIX E – TEMPLATE FOR RS GO-TEAM ON-SITE MISSION PROGRAMME/AGENDA

Day 1	<p>Registration and Opening</p> <p>The Runway Safety Program - Perspectives</p> <ul style="list-style-type: none"> • Global <ul style="list-style-type: none"> • ICAO Global Runway Safety Programme • Related ICAO SARPS, PANS and guidance material • Regional <ul style="list-style-type: none"> • RASG - Safety Enhancement Initiatives, Detailed Implementation Plans and Annual Safety Report • Local <ul style="list-style-type: none"> • Regulator • ANSP • Air Operator • Airport operator • Other Service providers at the airport
Day 2	<p>Safety management</p> <ul style="list-style-type: none"> • Hazard Identification • Risk Assessment • Safety Oversight <p>The Runway Safety Team (RST)</p> <ul style="list-style-type: none"> • Introduction • The ICAO RST handbook • Implementation of the RST • Terms of reference for the RST • Responsibilities • Sharing and use of safety information <p>Airport's briefing</p> <ul style="list-style-type: none"> • Identification of Hot Spots • Safety briefing (Identification, safety vests, instructions, leaders, communications, clearance, traffic, etc.)
Day 3	<p>Airport visit – the intent of the airport visit is to identify existing and new hazards as well as to observe rectification measures that have been implemented based on previous findings.</p> <ul style="list-style-type: none"> • ATC Control Tower • Runway and runway strips • Taxiways and taxiway strips (focusing on runway safety issues only) • Runway End Safety Areas (RESA) • Visual aids • Obstacle control • FOD control and management • Wildlife control and management

	<ul style="list-style-type: none"> Any active construction sites <p>Debriefing after the visit to the airport</p> <ul style="list-style-type: none"> Members present new projects, hazards, or events identified by the RST and its stakeholder's own safety management systems. The team then: <ul style="list-style-type: none"> defines the hazards, identifies the safety risk assessments to be conducted, and proposes recommendations for managing the safety risk reviews arrangements to ensure the sustainability of the RST
Day 4 (half-day)	<p>Go-Team draft report for RST</p> <p>Action log : Document findings and action plan</p> <p>Conclusions and closing</p>

APPENDIX F – LIST OF REQUIREMENTS IN STATE/AIRPORT FOR THE GO-TEAM MISSION

- Focal point coordinator
- Administrative support staff
- Meeting room & audio-visual equipment
- Simultaneous interpretation (if required)
- Transportation to/from airport, meeting venue and hotel for team
- Refreshments/ amenities
- Invitation of local participants
- Coordinate the schedule for the meetings and mission
- Airport visit coordination, e.g. security access, transportation, facilitation, IDs, safety equipment (vests, etc.)
- Coordinate the presentations by national and local organizations
- Prepare reference documents, information and data

APPENDIX G — AN EXAMPLE OF RST CASE

Note.— This material is offered as an example “case scenario” only and not intended to serve as a standard for how RST meetings should be conducted. The authors of this handbook recognize that the procedure used by a particular RST is dependent on the needs, capabilities, and complexities of the participating organizations.

a) Meeting Preparation

Three weeks prior to the meeting, the Chairperson solicited input for agenda topics from each of the members. In response to this request, the airport manager indicated that he would like to discuss a planned construction project near the approach end of one of the parallel runways. After receiving input from the rest of the members, the Chairperson consolidated the information and distributed the agenda to the team one week prior to the meeting date.

b) Attendance

The following attendees were present during the meeting:

- Tower Supervisor (Chairperson), voting member.
- Airport Manager, voting member.
- Airline Operations Manager, voting member.
- Flight School Operations Manager, voting member.
- Airport Safety Manager (RST Secretary), supporting member.
- Fire Chief, routinely invited guest.
- Regulator, routinely invited guest.
- Construction Foreman, subject matter expert invited by the Airport Manager.

c) Previous Business

During this phase of the meeting, updates to previous action items were discussed and documented on the Action Log. Communication plans were reviewed and the next issue of the airport newsletter was presented.

d) New Business

Following the Previous Business, the Chairperson asked each member to present the new hazards and issues identified through their respective safety management systems. When it was his turn, the Airport Manager asked the Construction Foreman to brief the team on the upcoming construction project. The Construction Foreman provided the following details to the RST:

1. In an effort to address water accumulation issues, the airport plans to install a drainage system near the approach end of the secondary runway.
2. Given the location of the worksite, construction vehicles must cross the primary runway.
3. In an effort to reduce the impact on the arrival rate, the work is scheduled to occur at night.
4. In an effort to reduce the likelihood of a runway incursion by a construction vehicle, each driver will be required to attend a special training course and escorts will be used during the project.

e) System Description

The Runway Safety Team discussed how the airport system would be affected by this project. Their comments were documented by the airport Safety Manager and included the following:

1. There will be a high volume of construction vehicles wanting to cross the primary runway during night operations.
2. The tower may have difficulty in communicating directly with the drivers of the construction vehicles.
3. Signs, markings, and lighting for taxiways and runways will be modified during the period of construction.

f) Hazard Identification

The RST then described the hazards and possible consequences associated with this project. The airport

Safety Manager (in his role as the RST Secretary) captured the following comments:

- 1) **Generic Hazard:** Airport Construction.
- 2) **Specific Hazard:** Construction vehicles crossing the primary runway.
- 3) **Consequences of the Hazard:**
 - i. Construction vehicles may deviate from the prescribed procedures and cross the primary runway without clearance.
 - ii. Aircraft could conflict with a crossing vehicle.

g) *Safety Risk Assessment Process*

The RST Secretary documented the following results of the risk assessment process:

1. The RST concluded there is a remote probability that a construction vehicle will deviate from prescribed procedures and cross the primary runway without an escort.
2. Given there is a night airfreight operation at the airport, the RST concluded there is a remote probability an aircraft could conflict with a crossing vehicle.
3. While the probability of an aircraft/construction vehicle conflict is remote, the RST assessed that, should such conflict occur, the severity of the occurrence could be catastrophic.
4. The RST assessed existing defenses (driver training programme, use of escorts for construction vehicles, signs, markings and lighting).
5. Using their safety risk assessment matrix and their safety risk tolerability matrix, the RST assessed the safety risk index as 3A ("unacceptable under the existing circumstances").
6. The RST concluded, therefore, that the safety risk of the consequences of the hazard generated by movement of construction vehicles to the construction site is, under the prevailing conditions, unacceptable and that control/mitigation is necessary.

h) *Safety Risk Control Process*

Given the conflict between the need to address the drainage issues by the airport and the unacceptability of the assessed risk by the RST, an adjustment to the original plan must be made.

1. While reviewing the airport diagram, one of the members suggested using the perimeter road to gain access to the construction site while continuing to use the escort vehicles to guide the construction crew.
2. With this mitigation as part of the plan, the RST used the same process to assess the probability and severity of the consequences of the hazards and determined that, although the severity would remain catastrophic, the likelihood would drop to "extremely improbable."
3. This resulted in an assessment value of 1A ("Acceptable") using the safety assessment matrix.
4. The RST documented this recommendation in the Action Log and tasked the Airport Manager with the responsibility for ensuring their recommendation was communicated to Airport Authority prior to beginning construction.
5. The Chairperson then added an item to the next RST meeting agenda requesting a follow-up on the status of this recommendation and the project.

i) *Action Log Documentation*

Throughout the meeting the RST Secretary documented the process in the Hazard Identification and Safety Risk Management Log. The purpose of this log is to provide a useful method for tracking recommendations and as a reference for future safety risk assessments. The log should be retained permanently in the "safety library" under the care of the current Chairperson. (Please see **Appendix E** for an example of how this entry might appear in an Action Log maintained by the RST.)

APPENDIX H — LIST OF USEFUL REFERENCES

- Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual (ICAO Doc 9830)
- Aerodrome Design Manual (ICAO Doc 9157)
- Airport Services Manual (ICAO Doc 9137)
- Circular 329 AN191 Runway Surface Condition Assessment, Measurement and Reporting
- Global Air Navigation Plan (ICAO Doc 9750)
- Global Air Traffic Management Operational Concept (Doc 9854)
- Human Factors Guidelines for Air Traffic Management (ATM) Systems (ICAO Doc 9758)
- Hazardous to Civil Aircraft Operations (ICAO Doc 9554)
- Hazards at Aircraft Accident Sites (ICAO Cir 315)
- Human Factors Digest No. 17 — Threat and Error Management (TEM) in Air Traffic Control (ICAO Cir 314)
- ICAO Annex 19 to the Convention on International Civil Aviation, Safety Management
- Manual of Aircraft Ground De-icing/Anti-icing Operations (ICAO Doc 9640)
- Manual of All-Weather Operations (ICAO Doc 9365)
- Manual on Airspace Planning Methodology for the Determination of Separation Minima (ICAO Doc 9689)
- Manual on Air Traffic Management System Requirements (ICAO Doc 9882)
- Manual on Certification of Aerodromes (ICAO Doc 9774)
- Manual on ICAO Bird Strike Information Systems (IBIS) (ICAO Doc 9332)
- Manual on the Prevention of Runway Incursions (ICAO Doc 9870)
- Manual on Required Communication Performance (RCP) (ICAO Doc 9869)
- Manual on Simultaneous Operations on Parallel or Near-Parallel Instrument Runways (SOIR) (ICAO Doc 9643)
- Manual of Surface Movement Guidance and Control Systems (SMGCS) (ICAO Doc 9476)
- Operation of New Larger Aeroplanes at Existing Aerodromes (ICAO Cir 305)
- Reducing the Risk of Runway Incursions (Flight Safety Foundation, May 2009)
- Safety Management Manual (ICAO Doc 9859, 3rd edition)
- ICAO Annexes 6, 11, 14 and 19 to the Convention on International Civil Aviation
- ACI Airside Safety Handbook and Wildlife Management Handbook
- CANSO Runway Safety Maturity Checklist
- CANSO Flyer – Avoiding Unstable Approaches
- CANSO Flyer – Runway Excursions
- European Action Plan for the Prevention of Runway Excursions
- European Action Plan for the Prevention of Runway Incursions
- FAA Runway Safety: A Best Practices Guide to Operations and Communications
- FAA Guide to Ground Vehicle Operations
- FAA Pilot's Guide to Airport Signs and Markings Drilled Card
- FAA Pilot and Flight Crew Taxi Procedures at Towered Airports Drilled Card
- Runway Safety Programme (FAA Order 7050.1A)
- IATA Pilot / ATC Phraseology Report
- IATA REER Toolkit
- IFALPA Runway Safety Manual

An ICAO iKit is available, containing available Runway Safety Products from various stakeholders at http://cfapp.icao.int/tools/RSP_ikit/story.html

— END —