



# Runway Safety Team Handbook

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**International Civil Aviation Organization**

# AMENDMENTS

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# **1. INTRODUCTION TO THE HANDBOOK**

## **1.1 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.

## **1.2 Scope of the Handbook**

A successful RST programme 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.

## **1.3 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

**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.

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

**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.

### 3. RUNWAY SAFETY TEAM (RST)

#### 3.1 Goals and general description of the RST Programme

The primary role of a local runway safety team, which may be coordinated by a central authority, should be to develop 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 programme is designed to improve and support runway safety by integrating the safety systems of the participating organizations. 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 runway 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 programme is built on the principles of a formal Hazard Identification and Risk Management (HIRM) process in accordance with ICAO Doc 9859 — *Safety Management Manual (SMM)* and covers 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

#### 3.2 RST administrative processes

##### 3.2.1 Terms of Reference / Memorandum of Understanding

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 are referred to as either the "Terms of Reference" (ToR) or the "Memorandum of Understanding" (MoU).

*(Note.— this Handbook uses ToR to refer to these rules).*

The ToR should include the following:

- a) Objectives, scope of oversight, and expected frequency of RST meetings.
- b) Membership selection processes.
- c) Roles and responsibilities of individual RST members.
- d) Processes governing and protecting the sharing of safety data, safety reports, and safety information from the participating organizations.
- e) Processes and formal agreements governing the protection of the sources of information shared within the RST (protection from inappropriate use and protection against disclosure).
- f) Consultation, decision-making and conflict resolution processes.
- g) Documentation and reporting requirements.

### 3.2.2 Continuous improvement process

All team members will constantly monitor the RST programme for areas in need of improvement and/or failure to achieve the standards set forth in the ToR. Additionally, the chairperson will schedule the following activities:

#### a) *Internal audits*

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

#### b) *External audits*

At least once per calendar year, the RST documentation should be audited and at least one meeting observed by a member of the regulatory authority or a contracted third-party. The results of this appraisal will be recorded and maintained as part of the safety library for a period acceptable to the local authority.

## 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. This handbook is not a comprehensive listing for different RST structures and should only serve as to provide basic concepts of leadership and administration sharing.

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.*

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

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);
- 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 B 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 damaging potential of the hazard, it is important to keep in mind that these “consequences” should be framed in realistic operational, 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, the objective is to determine the safety risk severity in the context of the local system accounting for the 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 consequences, 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, 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 encourage 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 TEAM SET-UP CHECKLIST

### 4.1 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.

### 4.2 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	
<i>Continued on next page</i>			
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
<b>3. Safety Risk Management</b>			
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	
<b>4. Communication</b>			
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	
<b>5. Continuous improvement</b>			
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

- a) Aerodrome operator/Authority representative (mandatory)
- b) Air Traffic Services Representative (mandatory)
- c) Commercial Air Operator(s) Representative(s) (mandatory)
- d) Representatives of flight crew familiar with the aerodrome
- e) General Aviation Representative(s)
- f) Regulatory Authority Representative
- g) Military Operator Representative
- h) Support Services Representative(s)
- i) Emergency Response Operators
- j) Subject Matter Expert(s)

### 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**
  - a) Aerodrome operator/Authority Representative (mandatory)
  - b) Air Traffic Services Representative (mandatory)
  - c) Commercial Air Operator(s) Representative(s) (mandatory)
  - d) General Aviation Representative(s)
  - e) Regulatory Authority Representative
  - f) Military Operator Representative
  - g) Support Services Representative(s)
  - h) Emergency Response Operators
  - i) Other RST guests
  
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 <i>dd/mm/yy</i>	Date Closed <i>dd/mm/yy</i>																																											
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"/> Wildlife Encounter <input type="checkbox"/> Abnormal Landing <input type="checkbox"/> Runway Incursion - Vehicle <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 <i>dd/mm/yy</i>																																											
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																																													
<i>Once you have completed the identification of the safety issues - please submit the form to log this report.            During the runway safety team meeting you should address each of the reports as an item on the agenda.            The following sections are provided as a tool to manage the outcomes of the meeting.</i>																																													
Risk Assessment																																													
(The risk assessment portion is to be completed as part of the runway safety team meeting)																																													
What is the <b>Severity</b> 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 <b>Likelihood</b> of occurrence:	<input type="checkbox"/> Frequent <input type="checkbox"/> Occasional <input type="checkbox"/> Remote <input type="checkbox"/> Improbable <input type="checkbox"/> Extremely Improbable																																												
<b>Risk Level</b> (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="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2" rowspan="2"></th> <th colspan="5" style="background-color: #e0e0e0;">Likelihood</th> </tr> <tr> <th style="background-color: #e0e0e0;">Certain / Frequent</th> <th style="background-color: #e0e0e0;">Likely / Occasional</th> <th style="background-color: #e0e0e0;">Possible / Remote</th> <th style="background-color: #e0e0e0;">Unlikely / Improbable</th> <th style="background-color: #e0e0e0;">Exceptional / Impossible</th> </tr> </thead> <tbody> <tr> <th rowspan="5" style="background-color: #e0e0e0; writing-mode: vertical-rl; transform: rotate(180deg);">Severity</th> <th style="background-color: #e0e0e0;">Catastrophic</th> <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> <th style="background-color: #e0e0e0;">Major</th> <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> <th style="background-color: #e0e0e0;">Moderate</th> <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> <th style="background-color: #e0e0e0;">Minor</th> <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> <th style="background-color: #e0e0e0;">Insignificant</th> <td style="background-color: green;">Low</td> <td style="background-color: green;">Low</td> <td style="background-color: green;">Low</td> <td style="background-color: green;">Low</td> <td style="background-color: green;">Low</td> </tr> </tbody> </table>					Likelihood					Certain / Frequent	Likely / Occasional	Possible / Remote	Unlikely / Improbable	Exceptional / Impossible	Severity	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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## APPENDIX D — 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 RST 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. (Please see *Appendix D, Figure App-D-4*, for an example of a safety risk probability table.)
  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. (Please see *Appendix D, Figure App-D-3*, for an example of a safety risk severity table.)
  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 (see *Appendix D, Figure App-D-4*, for an example) and their safety risk tolerability matrix (see *Figure App-D-5* for an example), 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 E — 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, 3<sup>rd</sup> 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.

— END —